



Effect of brassinosteroids on protein profiling of salinity susceptible and resistance cultivars of groundnut under salinity stress

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Abstract

Groundnut (*Arachis hypogaea* L.) belong to Leguminaceae family is a nutritious legume for human diet. It is an important oil seed crop grown in India. Several abiotic stresses including salinity alter the growth and development of this sensitive crop. In the present investigation Leaf protein content reduced in under salinity treatment at the different growth stages of groundnut but when applied with brassinosteroids the protein content increased. Maximum protein content of leaf was reported in all the treatments over control at fruiting stage. Proteins Analysis of salinity resistant and susceptible varieties of groundnut was done by Polyacrylamide Gel Electrophoresis (PAGE) method in control and all treatments seeds after harvesting stage. Application of Brassinosteroids induced the synthesis of new resistant protein and increased the intensity of the original protein bands and caused the appearance of additional new bands under the salinity condition.

Keywords: Groundnut, Salinity, Brassinosteroids, Protein, SDS- PAGE

1. Introduction

Groundnut (*Arachis hypogaea* L.) is the most important oil seed as well as an exportable agricultural commodity in India. Groundnut seeds contain 50% oil, 25–30% protein, 20% carbohydrates and 5% fiber which has high nutritive value for human and produced different types of food like cake as well as the green leafy hay for livestock (Salwa, 2010) [48]. It is widely used as cooking oil, digestible protein, minerals and vitamins in many different countries and contributes significantly to food security and alleviating poverty. However, India, Nigeria, Brazil and Argentina, China, Indonesia, Senegal, USA are major producing countries of groundnut (FAO, 2003) [20]. Among different countries, India has second largest production of groundnut.

Groundnut is one of the most important legumes crops with its largest area in the world, but the area and production of this crop is fluctuating between 6.0 – 8.5 m ha and 6.0 – 9.5 million tones, respectively (Singh and Basu, 2004) [53]. Salinity is one of the most important abiotic stress and limiting factor for worldwide plant production (De bez *et al.*, 2006) [12]. In India soil salinity is around 7.1 m ha, in which 3.5 m ha is under high salinity threat area and 3.5 m ha is under medium level of Salinity (Yadav, 1979) [63]. Major groundnut growing states of India, Soil salinity spread in about 2.0 m ha of coastal and saline areas are affecting the groundnut productivity (Chhabra and Kamra, 2000) [10]. Depends on the variety of groundnut salinity stress affect the seed germination, seedling length; dry matter production and change in ionic concentration etc., (Nithila, 2013) [41]. Salinity stress induced the Ca, K and Fe deficiencies in groundnut (Singh *et al.*, 2004) [53] causing loss of the yield (Hunshal *et al.*, 1991) [26]. Salinity stress also affects the plant metabolic processes such as, photosynthesis, protein synthesis, nitrogen fixation, energy and lipid metabolism (Parida and Das, 2005) [43]. Salinity connects with plant in two ways: Osmotic stress and ion toxicity (Munns, 2002) [39]. Osmotic stress is caused by ions (mainly Na⁺ and Cl⁻) in the soil solution reducing the water

availability to roots. Ion toxicity arise when plant roots take up Na⁺ and Cl⁻ and these ions accumulated to detrimental levels in leaves. Ion imbalances and nutrient deficiency, particularly for K⁺ nutrition, can be also occur (Tejera *et al.*, 2007) [56]. In addition, the high level of Na⁺ also causes the secondary responses in plants; consequently the oxidative stress is occurred leading to cellular damages in the plant cells (Apel and Hirt, 2004) [4]. This stress can induce over production of reactive oxygen species (Ashraf, 2009) [9]. ROSs derived from the molecular oxygen can accumulate in the plant cell and cause oxidative damages in cellular components, including DNA mutation, proteins, chlorophylls degradation and lipids by lipid peroxidation. Plants commonly react to salinity stress by accumulation of compatible solutes, such as proline, in cells which results in the improvement of environmental stress tolerance in plant (Ashraf and Foolad, 2007) [8]. These solutes can be accumulated in high concentrations without impairing plant metabolisms. Over accumulation of these osmolytes may help plants to tolerate against stress by improving their ability to maintain osmotic balance within the cell (Apse and Blumwald, 2002) [5]. Plant cells have the ability to prevent water loss and to maintain the continuous growth in their whole life cycle.

Deleterious effect of salinity stress and increase the resistance to environmental stresses are often correlated with an efficient antioxidative system. Such systems may be induced or enhanced by the application of hormones such as Brassinosteroids. Brassinosteroids are a six group of plant steroidal hormones that regulate various aspects of plant growth and development, including seed germination, cell elongation, photo morphogenesis, xylem differentiation, gene expression regulation, proton pump activation, and induction of ethylene biosynthesis, (Sasse, 2003) [50], as well as adaptation to abiotic and biotic environmental stresses (Divi and Krishna, 2009) [15]. Brassinosteroids are a novel polyhydroxylated steroidal lactone with high growth-promoting activity, obtained from rape pollen (*Brassica napus*



QUANTIFICATION OF STIGMASTEROL UNDER *IN VIVO* AND *IN VITRO* PLANT EXTRACTS OF CHLOROPHYTUM SPS

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ABSTRACT

In the present work, a unique attempt has been made to extract from *in vivo* and *in vitro* plant parts along with callus and undergone HPTLC (High Performance Thin Layer Chromatography) analysis to quantify stigmasterol from *Chlorophytum borivilianum* Santapau & R. R. Fern and *Chlorophytum tuberosum* (Roxb.) Baker. Crude extract of both these plant (*in vivo* as well as *in vitro*) were isolated with polar solvent n-hexane. Stigmasterol was quantified by HPTLC (toluene: methanol 9.5:0.5 [v/v] as mobile phase) following ICH (International Council for Harmonisation) guide lines at R_f (Retention factor) 0.34 which gave single peak at 540nm after derivatization. Method validation carried by applying samples on precoated silica gel 60 F₂₅₄ TLC (Thin Layer Chromatography) plates and found out the precision, accuracy, specificity, reproducibility along with linearity. Standard stigmasterol was applied in the range of 4-9 µg/fractions. The intra-day precision value appeared to be 24.11% RSD (Relative standard deviation) concomitantly 24.77% RSD inter-day precision, that makes the method precise and reproducible. The limit of detection (LOD) - 4µg and Limit of Quantification - 12µg values for both the plant varieties observed to be accurate. The percentage recovery at values of three different levels was profoundly found to be more than 90%. This method clarified the knowledge of availability of stigmasterol in both plant varieties which would be beneficial for pharmaceutical industries.

KEYWORDS: Stigmasterol, Chlorophytum, HPTLC, Quantification



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First record of *Seulocia pulchra* from India with a note on its colour pattern

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Abstract The present report records the presence of the leucosiid crab *Seulocia pulchra* (Shen and Chen 1978) from the Indian coast of the Arabian Sea. The species was previously reported from China and Sri Lanka. The details of the body color pattern of the species are described and illustrated for the first time in the present study.

Keywords *Seulocia pulchra* · Gujarat · India · Arabian Sea · Colour pattern · New record

Introduction

Leucosiid crabs are common inhabitants of littoral and sub-littoral soft sediments (Naderloo and Apel 2012). While revising *Leucosia* Weber, 1795, Galil (2005) erected a new genus, *Seulocia* which differs from the other genera of Leucosiidae in the fused third to sixth male abdominal somites and in the straight-shafted G1 that is twisted once on its axis. Currently *Seulocia* contains at least 11 species (Ng et al. 2008; Galil and Ng 2015) out of which four species have been hitherto reported from Indian waters: *S. anahita* (Galil 2005), *S. cristata* (Galil 2005), *S. truncata* (Alcock 1896), and *S. vittata* (Stimpson 1858) (Alcock 1896; Dev Roy 2013). The present

report records the presence of a fifth species, *S. pulchra* (Shen and Chen 1978) for the first time from Indian waters. The species was described from Hainan (Holotype) and Guangxi, North Bay (Para types), China by Shen and Chen (1978). The species is so far reported from China (Shen and Chen 1978; Chen and Sun 2002) and Sri Lanka (Galil 2005). In the present study, the species is for the first time reported from Indian waters. Fresh coloration of the species was not described in the previous studies, and it is described for the first time here.

Material and methods

During field work carried out for the survey of crustacean fauna of Gujarat in April-2014, 21 specimens (14 males and seven females) were collected from the freshly discarded by-catch of a commercial fishing trawler at Jakhau fishing harbor located in the Gulf of Kachchh (Gulf of Kutch), Gujarat, India. The specimens were washed properly to remove the sediment and photographed (Canon 1000D) in the field to record the details of fresh coloration. The specimens were preserved in 70 % alcohol and deposited in the Zoology Museum, Department of Zoology, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India with museum accession number, ZL-AR-CR-89. The present study material was compared with detailed photographs of the material examined by Galil (2005), which was collected from Sri Lanka available at the Berlin Zoological Museum (BZM), Germany. The measurement of the morphological characters follows Galil (2005). All the measurements are recorded in millimeters (mm). Abbreviations: CL, carapace length, measured along the vertical median line of the carapace; CW, carapace width, measured at the widest point; G1, male first gonopod; coll., collector.

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A new species of the genus *Diogenes* Dana, 1851 (Crustacea: Decapoda: Anomura: Diogenidae) from Gujarat, northwestern India

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Abstract

A new species of diogenid hermit crab, *Diogenes chhapgari* n. sp., is described on the basis of material collected during the crustacean faunal survey along the coastal areas of the Gujarat State, northwestern India. The new species is referred to the *D. edwardsii* (De Haan, 1849) species group and appears closest to *D. singaporensis* Rahayu, 2015. However, *D. chhapgari* n. sp. is distinguished from this species by the armature on the fourth segment of the antennal peduncle and carpus of the left cheliped.

Key words: Paguroidea, *Diogenes edwardsii* species group, Gulf of Khambhat

Introduction

The diogenid hermit crab genus *Diogenes* Dana, 1851 is currently recognized to include 64 species from the world; among them, 61 species have been recorded from the Indo-West Pacific (McLaughlin *et al.* 2010; Rahayu 2012, 2015; Komai *et al.* 2012, 2013). A series of papers has been published regarding the clarification of ambiguities in the taxonomy of several described species and addition of new species (Forest 1956; Nayak & Neelakantan 1985, 1989; Morgan & Forest 1991; McLaughlin & Haig 1996; Rahayu 1996, 2012, 2015; McLaughlin & Clark 1997; McLaughlin & Dworschak 2001; McLaughlin & Holthuis 2001; McLaughlin 2002a, b, 2004, 2005; Rahayu & Hurtle 2002; Siddiqui & McLaughlin 2003; Siddiqui *et al.* 2004; Asakura 2006; Asakura & Godwin 2006; Korn *et al.* 2008; Asakura & Tachikawa 2010; Komai *et al.* 2012, 2013). In India, 19 species have been reported: *D. alias* McLaughlin & Holthuis, 2001; *D. avarus* Heller 1865; *D. bicristimanus* Alcock, 1905; *D. canaliculatus* Komai, Reshmi & Bijukumar, 2013; *D. costatus* Henderson, 1893; *D. custos* (Fabricius, 1798); *D. dubius* (Herbst, 1804); *D. investigatoris* Alcock, 1905; *D. karwarensis* Nayak & Neelakantan, 1989; *D. klaasi* Rahayu and Forest, 1995; *D. maclaughlinae* Nayak & Neelakantan, 1985; *D. manaarensis* Henderson, 1893; *D. merguensis* De Man, 1888; *D. miles* Herbst, 1791; *D. planimanus* Henderson, 1893; *D. pallescens* Whitelegge, 1897 (= *D. gardineri* Alcock, 1905, *D. serenei* Forest, 1956; see McLaughlin 2002a); *D. planimanus* Henderson, 1893; *D. violaceus* Henderson, 1893; and *D. waltirensis* Kamalaveni, 1950 (Henderson 1893; Alcock 1905; Kamalaveni 1950; Khan & Natarajan 1984; Nayak & Neelakantan 1985, 1989; Thomas 1989; Reshmi & Bijukumar 2011; Komai *et al.* 2013; Trivedi *et al.* 2015a, b).

In the present study, a new species of *Diogenes* is described on the basis of material collected during the survey of the crustacean fauna of the Gujarat State, northwestern India. *Diogenes chhapgari* n. sp. is referred to the *D. edwardsii* (De Haan, 1849) species group which is characterized by having a simple intercalary rostral process, the non-bifurcate antennal acicles, the antennal and antennular peduncles distinctly longer than the ocular peduncles, and the long antennal flagellum bearing setae on the ventral side (Asakura & Tachikawa 2010). The affinities of the new species with allied species are discussed.

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A new species of *Lyphira* Galil, 2009 (Crustacea, Decapoda, Leucosiidae) from Gujarat, India

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A new species of crab belonging to the genus *Lyphira* Galil, 2009 of the family Leucosiidae Samouelle, 1819, is described from Gujarat state, India. *Lyphira georgei* n. sp. is distinguished from the related species *L. perplexa* Galil, 2009, in the shape of main shaft and apical lobe of male first gonopod, shape and size of the male telson as well as size and shape of somite 2 of male abdomen. The details of morphological differences are presented in the report.

<http://zoobank.org/urn:lsid:zoobank.org:pub:8DC6CACE-4BF9-45F4-B151-CFB-2BAF4D82B>

Keywords: brachyuran crab; new species; gonopod; morphology; Western India; taxonomy

Introduction

Alcock (1895) and Alcock and Anderson (1896) extensively studied the species diversity of Leucosiidae occurring in Indian waters and identified several new species. Recently, Dev Roy (2013) has compiled the checklist of marine brachyuran crabs of western coast of India and recorded occurrence of 84 species of Leucosiidae from Indian waters out of which 22 species are occurring on west coast of India and 52 species are occurring on east coast of India. Of the 22 species reported from west coast of India, genus *Philyra* Leach, 1817 is represented by three species. Ng et al. (2008) listed 45 species of *Philyra* Leach, 1817, making it the largest genus in Leucosiidae. Galil (2009) revised the confused taxonomy of *Philyra* by examining type specimens of various species and established seven new genera.

One of these genera was *Lyphira* Galil, 2009, which currently contains four species: *L. heterograna* (Ortmann 1892), *L. natalensis* Galil, 2009, *L. ovata* Galil, 2009 and *L. perplexa* Galil, 2009. In the present study, brachyuran crab specimens were collected from the bycatch discarded by the commercial trawlers at Jakhau and Veraval fishing ports located on the coastal areas of Gujarat state, India. The specimens examined belonged to *Lyphira*. The morphology of the specimens most closely resembled *L. perplexa*, the only species of the genus reported from Indian waters so far (Galil 2009). Detailed examination of our specimens showed significant morphological differences with *L. perplexa* Galil, 2009, and as such, a new species is described in the present study. The details of morphological characters of the new species and its comparison with closely related species are given in

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ABSTRACT

Remote sensing has become a very powerful tool for crop condition assessment and management. The objective of this study was to understand the effectiveness of basal crop coefficient (K_{cb}) values estimated from remote sensing and their application in real time crop water requirement. During the crop growing season, the value of K_c for most agricultural crops increase from a minimum value at emergence in relation to change in canopy development, until a maximum K_c is reached at full canopy cover. The study was carried out for the Cotton crop in Sirsa district of Haryana. A spectral index such as SAVI (Soil Adjusted Vegetation Index) and Fractional Vegetation Cover (F_c) was used to estimate K_{cb} value. High spatial resolution Landsat TM 5 images were used to generate a spectral profile of NDVI, SAVI, and F_c for different crop cover. Using, available empirical models from literature, crop coefficient was derived from SAVI values. Reference Crop Evapotranspiration (ET₀) was estimated using Blaney-Criddle Method, taking weather data from ICAR Research Station Observatory. The crop coefficients derived from Remote Sensing data were used along with ET₀ values to estimate crop evapotranspiration (ET_c). The result showed that the spatial distribution of seasonal ET_c varied depending upon sowing date and other condition. The estimated crop evapotranspiration (ET_c) pattern was compared with fractional vegetation cover. Spatial distribution map of cotton ET_c, basal crop coefficient, and fractional vegetation cover showed areas of high and low water demand. This work can help in water management practices for better irrigation management.

KEYWORDS: Crop Evapotranspiration (ET_c), SAVI, NDVI, Basal crop Coefficient, Fractional vegetation Cover and remote sensing.

INTRODUCTION

Cotton is an important fiber crop in the world [1]. Being a warm climate crop, it is grown dry sub-tropical climates having adequate rainfall and ample sunshine during the growing period. Air temperature of 32° C to 35° C is considered optimum for normal growth of cotton plants with a minimum and maximum range 16° C to 38° C [2]. The major cotton producing countries are china, India, USA, Pakistan, Brazil and Uzbekistan which contribute approximately 80% of world's cotton production. The basic aim of efficient water requirement strategy is not only to irrigate crop to avoid any physiological stress but also to ensure against the application of excess water. Availability of soil water encourages crop growth leading to high water use while insufficient water content in soil leads to wilting or death of crop plants [3]. Multispectral vegetation indices computed as differences, ratios or a linear combination of reflected light in visible and near infrared spectrum have been found to be closely related to several crop growth parameters [3-4]. The simple ratio and normalized difference vegetation index have used for estimating plant cover, green plant biomass and leaf area index. The potential application of remotely sensed vegetation indices as near real-time surrogates for crop coefficient estimate was proposed over two decades ago by [5], Who pointed out the similarity between the seasonal pattern of vegetation indices for wheat and that of wheat crop coefficient. Multispectral vegetation indices computed from crop canopy reflectance measurement were demonstrated to function effectively as near real time surrogates for corn [6-7] beans [8] and cotton [9]. Major benefits of vegetation indices based crop coefficient is the ability to account for variations in plant growth due to abnormal weather condition and improved irrigation scheduling due to better estimation of water use and more appropriate timing of irrigation. Normalized difference vegetation index and soil adjusted vegetation index are the two predominant vegetation indices for



RESEARCH ARTICLE

A Virtual Survey based Debate on Conservation Strategies of Indian Giant Flying Squirrel (*Petaurista p. philippensis*)

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Study Area: State Gujarat, the Western part of India.

Coordinates: 24°44'22.41" N 72°61'07.70" E to 20°58'67.64" N 73°67'60.04" E

Key words: Online survey, Distribution pattern, Threats, Conservation

Abstract

The information on status and distribution of small and rare animals are always necessary for designing, implementation and evaluation of conservation measures was the reason behind origin of this study on the Indian Giant Flying squirrel. Since available information is small and scattered, an attempt was made to collect information from the peoples who are directly or indirectly related with wildlife / forest services. To go ahead with our research on this species, we prepared a structured questionnaire and sent to the individuals through an online survey tool, to whom we know and further the same were also posted on social website for voluntary participation. We have set the time duration of the survey and at the end we received a total of 66 responses from a diverse group of individuals; most of them belong to Gujarat. Responses were analyzed to reach a conclusion that the flying squirrel population has declined from the past few decades.

Introduction

Knowledge on home range and activity patterns, along with their responses to environmental fluctuations, is important for the understanding of wildlife ecology and conservation, but related studies on flying squirrel species (*Petaurista* sp.) are still limited in Indian sub continent and especially of *Petaurista Petaurista Philippensis* in state Gujarat.

The Indian giant flying squirrel, *Petaurista philippensis* Elliot 1839 is a rodent belonging to family Sciuridae and has the widest distribution among all the flying squirrels in the tropical and sub-tropical zones of South-Eastern Asia (Koli *et al.*, 2013). The presence of translucent membrane connecting limbs forms a parachute like structure that helps in gliding through the

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Assessment of human–sloth bear conflicts in North Gujarat, India

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Abstract: Human–sloth bear (*Melursus ursinus*) conflict can be an important human safety issue where people and sloth bears co-exist. We characterized aspects of sloth bear attacks on humans using standardized surveys and interviews in Banaskantha, Sabarkantha, and Mehsana districts of North Gujarat, India. We interviewed 71 victims from 202 villages in the study area during 2008–2009; most attacks occurred during late monsoon (Oct) and early winter (Nov). Sloth bears typically attacked victims by charging, knocking them to the ground, and then rearing up on their hind legs. Most human injuries occurred on the arms (52%), legs (38%), and head (32%). Most victims were males (82%) traveling alone. We recommend education programs to reduce human injury through mitigation techniques. These efforts could include placing signs with information about sloth bear behavior and occurrence in the area and advising locals about when to enter forests, especially when alone, to reduce conflicts and facilitate coexistence of humans and sloth bears.

Key words: attack pattern, human–bear conflicts, human injuries, India, *Melursus ursinus*, North Gujarat, safety issues, sloth bear

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The sloth bear (*Melursus ursinus*) is 1 of 4 bear species found in India and the only species occurring in the state of Gujarat. Garshelis et al. (1999) compiled population densities from wildlife-protected areas (National Parks and Wildlife Sanctuaries) throughout India and determined that Jessore Wildlife Sanctuary and Balaram-Ambaji Wildlife Sanctuary in Gujarat have some of the highest sloth bear densities in India. Sloth bears inhabit a variety of vegetation cover types including teak (*Tectona grandis*) and sal (*Shorea robusta*) forests, lowland evergreen forests, grasslands, and highlands

to an elevation of 1,700 m (Garshelis et al. 1999, Dharaiya 2009). The sloth bear's diet mainly consists of ants, termites, and sugar-rich fruits (Bargali et al. 2004).

Sloth bears are exposed to multiple threats, including increased habitat degradation and fragmentation due to an increasing human population, decreased food resources, poaching and illegal trade, and human–bear conflict (Cowan 1972, Garshelis et al. 1999, Bargali et al. 2005). Habitat fragmentation is considered to have facilitated the recent increase in human–bear conflicts in North Gujarat (Dharaiya 2009). Bear encounters are dangerous because sloth bears can be aggressive and unpredictable (Bargali et al. 2005, Dharaiya 2009). In addition to human mortality or permanent physical injury that sometimes occurs, injuries inflicted to the head and face by sloth bears can result in social and economic hardships (Ratnayeke et al. 2014).

We present data collected about sloth bear attacks on humans by using surveys collected from victims from 202 villages in the Banaskantha, Sabarkantha, and Mehsana districts of North Gujarat. Previous studies have shown the spatial and temporal patterns of sloth bear attacks (Dharaiya 2009, Mewada 2010). Our objective was to characterize patterns of sloth bear attacks (including timing of attacks, people more vulnerable to attacks, and the location of the human body most susceptible to injury) to in turn inform villagers and reduce the likelihood of attacks.

Study area

The study area included Banaskantha, Sabarkantha, and Mehsana districts in northern Gujarat State, India (Fig. 1), which occurs within the sub-biogenic province 4B3 (hilly forests) and 4B4 (arid to semi-arid zones; Singh 2001). The climate is sub-tropical with 3 main seasons. The monsoon or rainy season is typically from early June through September, winter is from October to February, and summer is from March to June. The climate is sub-tropical with temperatures from 10°C during January to 45°C in June, with occasional temperatures below 0°C in parts of Sabarkantha and Banaskantha districts.

The study area consists of dry deciduous forest with small patches of scrub, open, and dense forests. Banaskantha and Sabarkantha districts contain forest cover of 8.5% and 10.9%, respectively (Fig. 1). In contrast, forest cover in Mehsana is 2.5% (Anonymous

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Record of Sloth Bear (*Melursus ursinus ursinus*, Shaw, 1791) from Aravalli District, Gujarat

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ABSTRACT

Sloth bear is amongst the four bear species found in India, mostly occurring in the lowland forests with patchy distribution throughout its range. The habitat is highly fragmented in Gujarat state of western India, restricting the natural dispersal of bears within the landscape. During our regular field survey, we found an evidence of sloth bear presence in an area where it was not reported since last few decades. The area is located between two forest patches with dry deciduous vegetation where the recent record of sloth bear indicates that this area can be a potential corridor for sloth bear dispersal and needs further monitoring and conservation.

Key Words: Sloth Bear, Vagheshvari, Sign Surveys, Interviews, New Record.

INTRODUCTION

Bears are symbolized by eight species in the world, among those Sloth bear *Melursus ursinus ursinus*, Shaw 1791 is endemic to Indian subcontinent only. In Gujarat, Sloth Bears are considered to be found in northern and north-eastern districts like Banaskantha, Sabarkantha, Dahod, Vadodara and Narmada districts (Table 1). Recently with the help of forest staffs, we have reported sloth bear presence in Aravalli district of Gujarat. Sloth bear is vulnerable according to IUCN 2016, listed as Schedule I under the Wildlife Protection Act, 1972 and Appendix I of CITES.

Sloth bear mainly prefers low land and hilly terrain of dry deciduous forests (Brander, 1982; Phillips, 1984; Sukhadiya *et al.*, 2013), preferably feeds on termites, black ants, red ants, honey, some fruits like *Ziziphus* spp., *Aegle marmelos*, *Cassia fistula*, *Semecarpus anacardium*,

Ficus spp, *Diospyros melanoxylon*, *Buchanania lanzan*, *Bridelia squamosa*, *Schleichera oleosa*, *Syzygium cumini*, *Psidium guajava*, *Mangifera indica*, *Arachis hypogea* and flowers like *Madhuca indica*. It was also observed to consume animal matters (Laurie and Seidensticker, 1977; Gokula *et al.*, 1995; Baskaran *et al.*, 1997; Joshi *et al.*, 1997; Akhtar *et al.*, 2004; Mewada and Dharaiya, 2010; Palei *et al.*, 2014).

In mid July, the forest field staff of Aravalli forest division has reported that they were observed a female sloth bear with cubs in the Vagheshvari forest round of Aravalli division during their routine forest patrolling. The area is politically known as Vagheshvari beat of Vagheshvari round, part of Bhitloda range of Aravalli wildlife division. This zone is geographically located at 23.843729° N latitude, 73.217246° E longitude at outer most

ASSESSMENT OF AIR QUALITY BY AIR QUALITY INDEX OF AN URBAN AREA OF ARID ZONE OF INDIA

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ABSTRACT

Air Pollution become a major problem worldwide raising several issues for wellbeing and survival of human as well as environment. Sulphur dioxide, Nitrogen oxides, Suspended particulate matter and Respirable particulate matter are some of the major air pollutants. Present study has been carried out in Patan city, located in Gujarat state. Air samples were collected to evaluate major air pollutants like SO₂, NO_x, SPM and RSPM from four different zones, such as industrial, residential, commercial and suburb using the ambient fine dust sampler. The concentration of SO₂, NO_x, SPM were recorded high 1.68 µg m⁻³, 10.42 µg m⁻³ & 155.64 µg m⁻³ respectively in industrial area and concentration of RSPM found high 90.84 µg m⁻³ in commercial area. The findings were used to calculate Air Quality Index for further monitoring ambient air in the city. The study shows the concentration of gaseous and suspended solid pollutants found below the Indian Standard values. AQI revealed that the ambient air quality of Patan is fairly clean; however rapid industrialization and increase in vehicular load in the city might change the situation in future. The study suggests that the urban cities in arid climate should regularly monitored for their air qualities to reduce the effects of desertification and climate change.

Key words: Ambient air pollutants, Vehicles, SPM & RSPM, desertification, climate change

I. INTRODUCTION

Increase with the population, the developmental activities like Industrialization and Urbanization cause degradation and drastic change in every component of environment namely Hydrosphere, Lithosphere, Atmosphere and Biosphere through the Pollution. Air pollution has become the most crucial problem to mankind in the past few decades ^[1]. Various pollutants are entering in to the atmosphere through natural and made activities which cause disease, toxicity and environmental decay. These air pollutants can be in solid, liquids or gaseous form ^[2]. There is also increasing evidence that the adverse effect of air pollution not only on the respiratory system but it also on the cardiovascular system ^[3]. Although the net effect of air pollutants on health is not clear but the Committee Of the Medical Effects of Air Pollution (COMEAP) which set up by the UK government has found the strongest link between health and pollution to be for PM₁₀, SO₂ and O₃ ^[4]. Keeping the air quality acceptable has become a challengeable task for decision makers as well as for NGOs. Particulate matter and gaseous emissions of pollutant emission from Industrial activity as well as auto exhausts

Synthesis of Biogenic Silver Nanoparticles From Medicinal Plant And It's Antibacterial Activity

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Abstract: Biological synthesis of nanoparticles from medicinal plant is gaining importance due to its eco-friendliness. The synthesis of metal nanoparticles is a broad research area due to the potential applications for the development of different novel technologies. In our research work, we have described a cost effective and eco-friendly technique for the green synthesis of silver nanoparticles and evaluated their Antibacterial activity. Synthesis and characterization of silver nanoparticles were carried out by using *Crateva religiosa* plant bark extract as reducing agent as well as capping agent. The Synthesized nanoparticles were characterized with UV-Visible spectrometry (UV-Vis), Fourier Transform Infrared Spectroscopy (FT-IR), Scanning Electron Microscopy (SEM) and X-ray Diffraction Spectroscopy (XRD). The antibacterial activity of silver nanoparticles has been Observed.

Keyword: Biogenic synthesis, *Crateva religiosa* bark extract as a reducing agent, AgNO₃ salt, Nanoparticles, Antibacterial activity.

I. Introduction

Nanotechnology deals with the synthesis of nanoparticles with controlled size, shape, and dispersity of materials at the nanometer scale length and also deals with matter at the scale of 1 billionth of a meter. Also it is the study of manipulating matter at the atomic and molecular scale. Nanoparticles below 10nm range are of great interest due to its potential use in application of electronic, chemical, mechanical industries, drug carriers, sensor as well as in magnetic and electronic materials. Recently fabrication of silver nanoparticles has drawn considerable attention due to their physical and chemical properties and application in biomedicine, antiangiogenic activity against bovine retinal endothelial cells, anticancer activity against lung carcinoma cells [1], controlling HIV infection [2], detection of bacterial pathogens [3] and good catalytic activity [4]. The increasing dimension of microbial resistance has made the management of public health an important issue in the modern world. Although several new antibiotics developed in the last few years, none of them have improved activity against multidrug-resistant bacteria. Therefore, it is important to develop more effective, less toxic (negligible) and ultimate therapeutic strategies to treat gram-negative and gram-positive pathogenic bacteria. Nanoparticles, which have been used successfully for the delivery of therapeutic agents, in diagnostics for chronic diseases and treatment of bacterial infections in skin and burn wounds, are one option.

In this investigation, biological synthesis of silver nanoparticles was carried out using aqueous solution of 1 mM AgNO₃ and extract of *Crateva religiosa* Bark and characterized by using UV-visible spectra, Fourier Transform Infra-red Spectra (FTIR), Scanning Electron Microscopy (SEM) and X-ray Diffraction Spectroscopy (XRD). The antibacterial activity has been investigated against gram positive and gram negative bacteria. Biological approaches using microorganisms and plant extract for metal nanoparticles synthesis have been suggested as valuable alternative to chemical method [5-12].

II. Materials And Method

2.1 Chemicals and reagents

Silver nitrate was purchased from Himedia.

2.2 Plant Materials

Plant (*Crateva religiosa*) used in the present study was collected from north Gujarat region mounted areas. Fresh bark from the plant was collected and washed several times with double distilled water then dried it in shadow and grind it in mixture. Now 10gm powder of plant parts (bark) mixed with 100 ml double distilled water. The mixture was boiled for 30 min. at 60°C. The solution was filtered through Whatman filter paper No.1 and filtrate was stored at 4°C and used as stock solution for Ag NPs synthesis.

2.3 Synthesis Of Nanoparticles

For the synthesis of nanoparticles from plant took 20 ml of bark extract of *Crateva religiosa*, add 30 ml of 1mM AgNO₃ solution, then heated up to 60°C with constant stirring using magnetic stirrer with hot plate for 2

Synthesis and antimicrobial activities of various *N*-phenyl-2-[[5-(3,4,5-trimethoxyphenyl)-1,3,4-oxadiazol-2-yl]sulfonyl]acetamides

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A new series of various *N*-phenyl-2-[[5-(3,4,5-trimethoxyphenyl)-1,3,4-oxadiazol-2-yl]sulfonyl]acetamide have been synthesized by the condensation of 5-(3,4,5-trimethoxyphenyl)-1,3,4-oxadiazole-2-thiol and 2-chloro-*N*-(aryl)-acetamides. The novel compound structures have been established on the basis of their substituted *N*-chloro aryl acetamide derivatives. All the compounds have been characterized by FT-IR, mass spectra, ¹H and ¹³C NMR spectroscopy. These new compounds have been evaluated for their *in vitro* antibacterial and anti-fungal activities.

Keywords: 1,3,4-Oxadiazole, substituted chloro acetamide, anti-fungal activity, anti-bacterial activity

The rapidly expanding population of immune compromised patients results in a corresponding increase of diseases caused by bacteria, fungi and other microbes. Infection caused by these microorganisms pose a serious challenge to the medical community and highlights the importance and urgent need for new, more potent and selective non-traditional antimicrobial agents. The incidence of bacterial infections has increased dramatically in recent years¹. The widespread use of antibacterial and antifungal drugs and their resistance against bacterial and fungal infections has led to serious health hazards. The resistance of a wide spectrum of antibacterial agents has prompted discovery and modification of existing drugs toward new antifungal and antibacterial drugs^{2,3}.

Chloroacetamide derivatives possess antimicrobial^{4,5} activity. In continuation of our interest in the chemistry of functionalized chloroacetamide derivatives⁶, herein we report some novel chloro acetamide derivatives based on 1,3,4-oxadiazole nucleus. Because of the high mobility of chlorine atom and reactive N-H group (Table 1), compounds containing chloroacetamide moiety are known to be useful synthetic scaffolds for design of aziridines⁷, N-lactams⁸, piperazines⁹, oxazolidines¹⁰, imidazolidines and tetrahydropyrimidines – precursors of heterocyclic carbenes¹¹, macrocyclic ligands¹² and dendrimers¹³.

2-Chloroacetamide derivatives have found application in solid-state chemistry¹⁴. In synthesis of

aminoacids¹⁵, natural compounds¹⁶ and their homologs¹⁷, pharmacologically promising substances¹⁸ and biomarkers¹⁹, reagents for polymer modification²⁰, ion-exchange resins for heavy and radioactive metal sorption²¹, chloroacetamide pesticides²² and dyes²³ are also well known. Thus, investigation of 2-chloroacetamide chemistry is an actual task both from theoretical and applied view points.

1,3,4-Oxadiazole moieties are privileged structures in medicinal chemistry, and are in widespread use as pharmacophores^{24,25}. It has been reported in the literature that compounds bearing 1,3,4-oxadiazole ring are well acknowledged to possess significant antimicrobial activity. Looking at the pharmacological importance of above mentioned scaffolds and continuous interest in oxadiazole derivatives, one of our co-author has recently synthesized 1,3,4-oxadiazole derivatives containing *S*-triazine analogues as antimicrobial agents²⁶. We have interest in identifying newer structural elements consisting both acetamide and 1,3,4-oxadiazole nucleus to create new anti-bacterial and anti-fungal agents. Our laboratory has previously synthesized some 3,4,5-trimethoxy base analogous bearing 1,2,4-triazole nucleus and determined their *in vitro* biological efficacies²⁷ and the significant results led us to assess the antimicrobial screening of some 1,3,4-oxadiazole derivatives containing acetamide nucleus.



Research Article

Assessment of Nutritional Status of School Going Children in Gujarat

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Abstract

Objectives: To evaluate the nutritional health status of school going children in Gujarat
Methods: A cross-sectional study on apparently healthy adolescents (10 - 14 years, n = 604) from different SES, was conducted in Gujarat, Western India. The outcome parameters included anthropometric measures, body composition, serum 25 OHD and haemoglobin concentrations (in sub-sample). Chi-square test was used to estimate the percentage prevalence of stunting, wasting, % fat mass (FM), vitamin D status and anaemia amongst school going children.

Results: Girls were significantly taller and heavier than boys and also had significantly increased fat mass (FM) and bone mineral content (BMC) whereas boys had significantly increased muscle mass (MM) and fat free mass (FFM). 9% of both boys and girls showed wasting whereas 9 % of the boys and 6% of the girls were at the risk of being overweight ($p > 0.05$). Similarly 10% boys and 7% girls were stunted and 31% boys and 21% girls had subnormal height ($p < 0.05$). 63% boys and 43% girls were underfat; in contrast, 8% boys and 6% girls were overfat and 10% boys and 5% girls were obese ($p < 0.05$). We found a high prevalence of hypovitaminosis D, 34% boys and 30% girls had insufficient (between 20 ng/ml to 30 ng/ml) and 60% boys and 69% girls had deficient (< 20 ng/ml) serum 25OHD concentration. One fifth of the study population was suffering from mild/moderate anaemia.

Conclusion: Stunting and underfat were observed more often in boys as compared to girls. There exists a high prevalence of hypovitaminosis D.

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Introduction

Nutritional Status is defined as the condition of health of an individual as influenced by the nutrient intake and utilization in the body. A majority of adolescents in India suffer from nutritional deficiencies. Good nutrition is significant to meet the deficiencies that occurred during childhood so as to make up for the demand of growth and development, provision of sufficient stores of energy for illnesses, and prevent onset of nutrition-as-

sociated diseases in adulthood^[1]. Furthermore, anthropometric measurements and body composition can be used for early diagnosis of nutrient deficiencies or inadequate nutrient intake. This can further aid to improve nutritional status through a nutrition plan before the disease occurs.

Adolescence is marked by peak bone mass accrual^[2], during which vitamin D deficiency may become the cause for producing devastating skeletal manifestations by limiting bone accretion during the growth phase^[3]. Rapid growth during ado-

Effect of mid-day meal on nutritional status of adolescents: A cross-sectional study from Gujarat

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ABSTRACT

Objective: To evaluate the effect of mid-day meal (MDM) on the nutritional status of adolescents and compare it with healthy comparison group. **Settings and Design:** A cross-sectional study on apparently healthy adolescents (10-14 years) receiving MDM and not receiving MDM (comparison group) was conducted in two cities (Ahmedabad and Patan) of Gujarat, Western India, from January 2012 to March 2014. **Materials and Methods:** A total of 401 adolescents (200 boys) were selected randomly, using computerized random number generation, from two private and two municipal/government schools. Anthropometric measurements were performed. Height, weight, and body mass index Z scores were computed using ethnic data. Diet was recorded by 24 h recall and nutrient intakes were computed (C-diet V-2.1) as a percentage of the recommended dietary allowance (RDA). Student's *t*-test and Chi-square tests were used to compare differences in nutritional status. **Results:** Percentage of stunting (24% boys and 19% girls) and wasting (17% boys and 18% girls) was significantly higher in adolescents receiving MDM ($p < 0.001$), while the percentage of risk of being overweight, i.e., BMI for age Z (BAZ) > 1 or above 85th percentile (18% boys and 12% girls) was predominant in non-MDM receiving adolescents ($p < 0.001$). Compared to non-MDM, MDM receiving adolescents consumed significantly reduced quantity of nutrients ($p < 0.05$). On comparing RDA based on the 24 h dietary recall, it was seen that MDM receiving boys met 60% energy, 78% protein, 50% calcium, and 53% of micronutrient requirements while MDM receiving girls met 59% energy, 67% protein, 44% calcium, and 48% of micronutrient requirements. Non-MDM receiving adolescents had close to RDA or above intake for the most nutrients ($p < 0.05$ for all). **Conclusion:** Although MDM scheme restricted the percentage of stunting to some extent, the percentage of wasting was critical in terms of public health significance. MDM receiving adolescents were vulnerable to energy, protein, and micronutrient deficiencies.

Key words: Adolescents, Nutritional status, Micronutrients, Mid-day meal, Stunting, Wasting

Adolescence is a period of critical transition in human growth and development, characterized by a rapid growth rate, peak bone mass accrual and the onset of puberty [1,2]. The socio-economic status (SES) plays a major role in determining an individual's access to health-care facilities, housing, environmental factors, and education. Adolescents belonging to underprivileged SES have been reported to have inadequate nutrition, lower calcium intakes, poor access to health care, and failure to receive immunization [3,4]. Thus, adolescents belonging to lower SES are often undernourished, having impaired immunity and exhibit high susceptibility to infections along with an increased likelihood of stunting, iron deficiency and dental caries [3,5].

With an aim to overcome, these socio-economic differences, malnutrition, micronutrient deficiencies and providing the basic right to food along with right to education, the mid-day meal (MDM) Scheme, a national program for nutritional support to primary education in India, was started in August 1995 by the

then Prime Minister of India, P.V. Narsimha Rao and later revised in 2006; though it was introduced by K. Kamaraj in 1960s in Tamil Nadu [6-9].

Growth is a significant indicator of nutritional status and health as poor diet and frequent infections can lead to growth retardation [10]. Hence, to evaluate the effect of MDM program, it is important to assess the nutritional status of adolescents receiving MDMs. Most studies examining MDM are performed on children in a broad age group of 5-15 years [11-13]; we have focused on adolescence, a period that is marked by a rapid growth spurt along with an increased demand of nutrient intake. Good nutrition during adolescence is significant to meet the deficiencies that occur during childhood, for making up the demand of growth and development, for the provision of sufficient stores of energy for illnesses, and to prevent onset of nutrition-related diseases in adulthood [14]. Moreover, information on nutrient intake in adolescents receiving MDM and their status as compared to healthy adolescents is scarce [12,15]. Thus, the aims of this study



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Record of Sloth Bear (*Melursus ursinus ursinus*, Shaw, 1791) from Aravalli District, Gujarat

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ABSTRACT

Sloth bear is amongst the four bear species found in India, mostly occurring in the lowland forests with patchy distribution throughout its range. The habitat is highly fragmented in Gujarat state of western India, restricting the natural dispersal of bears within the landscape. During our regular field survey, we found an evidence of sloth bear presence in an area where it was not reported since last few decades. The area is located between two forest patches with dry deciduous vegetation where the recent record of sloth bear indicates that this area can be a potential corridor for sloth bear dispersal and needs further monitoring and conservation.

Key Words: Sloth Bear, Vagheshvari, Sign Surveys, Interviews, New Record.

INTRODUCTION

Bears are symbolized by eight species in the world, among those Sloth bear *Melursus ursinus ursinus*, Shaw 1791 is endemic to Indian subcontinent only. In Gujarat, Sloth Bears are considered to be found in northern and north-eastern districts like Banaskantha, Sabarkantha, Dahod, Vadodara and Narmada districts (Table 1). Recently with the help of forest staffs, we have reported sloth bear presence in Aravalli district of Gujarat. Sloth bear is vulnerable according to IUCN 2016, listed as Schedule I under the Wildlife Protection Act, 1972 and Appendix I of CITES.

Sloth bear mainly prefers low land and hilly terrain of dry deciduous forests (Brander, 1982; Phillips, 1984; Sukhadiya *et al.*, 2013), preferably feeds on termites, black ants, red ants, honey, some fruits like *Ziziphus* spp., *Aegle marmelos*, *Cassia fistula*, *Semecarpus anacardium*,

Ficus spp., *Diospyros melanoxylon*, *Buchanania lanzan*, *Bridelia squamosa*, *Schleichera oleosa*, *Syzygium cumini*, *Psidium guajava*, *Mangifera indica*, *Arachis hypogea* and flowers like *Madhuca indica*. It was also observed to consume animal matters (Laurie and Seidensticker, 1977; Gokula *et al.*, 1995; Baskaran *et al.*, 1997; Joshi *et al.*, 1997; Akhtar *et al.*, 2004; Mewada and Dharaiya, 2010; Palei *et al.*, 2014).

In mid July, the forest field staff of Aravalli forest division has reported that they were observed a female sloth bear with cubs in the Vagheshvari forest round of Aravalli division during their routine forest patrolling. The area is politically known as Vagheshvari beat of Vagheshvari round, part of Bhiloda range of Aravalli wildlife division. This zone is geographically located at 23.843729° N latitude, 73.217246° E longitude at outer most



ASSESSMENT OF AIR QUALITY BY AIR QUALITY INDEX OF AN URBAN AREA OF ARID ZONE OF INDIA

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ABSTRACT

Air Pollution become a major problem worldwide raising several issues for wellbeing and survival of human as well as environment. Sulphur dioxide, Nitrogen oxides, Suspended particulate matter and Respirable particulate matter are some of the major air pollutants. Present study has been carried out in Patan city, located in Gujarat state. Air samples were collected to evaluate major air pollutants like SO₂, NO_x, SPM and RSPM from four different zones, such as industrial, residential, commercial and suburb using the ambient fine dust sampler. The concentration of SO₂, NO_x, SPM were recorded high 1.68 µg m⁻³, 10.42 µg m⁻³ & 155.64 µg m⁻³ respectively in industrial area and concentration of RSPM found high 90.84 µg m⁻³ in commercial area. The findings were used to calculate Air Quality Index for further monitoring ambient air in the city. The study shows the concentration of gaseous and suspended solid pollutants found below the Indian Standard values. AQI revealed that the ambient air quality of Patan is fairly clean; however rapid industrialization and increase in vehicular load in the city might change the situation in future. The study suggests that the urban cities in arid climate should regularly monitored for their air qualities to reduce the effects of desertification and climate change.

Key words: Ambient air pollutants, Vehicles, SPM & RSPM, desertification, climate change

1. INTRODUCTION

Increase with the population, the developmental activities like Industrialization and Urbanization cause degradation and drastic change in every component of environment namely Hydrosphere, Lithosphere, Atmosphere and Biosphere through the Pollution. Air pollution has become the most crucial problem to mankind in the past few decades ^[1]. Various pollutants are entering in to the atmosphere through natural and made activities which cause disease, toxicity and environmental decay. These air pollutants can be in solid, liquids or gaseous form ^[2]. There is also increasing evidence that the adverse effect of air pollution not only on the respiratory system but it also on the cardiovascular system ^[3]. Although the net effect of air pollutants on health is not clear but the Committee Of the Medical Effects of Air Pollution (COMEAP) which set up by the UK government has found the strongest link between health and pollution to be for PM₁₀, SO₂ and O₃ ^[4]. Keeping the air quality acceptable has become a challengeable task for decision makers as well as for NGOs. Particulate matter and gaseous emissions of pollutant emission from Industrial activity as well as auto exhausts

Assessment of human–sloth bear conflicts in North Gujarat, India

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Abstract: Human–sloth bear (*Melursus ursinus*) conflict can be an important human safety issue where people and sloth bears co-exist. We characterized aspects of sloth bear attacks on humans using standardized surveys and interviews in Banaskantha, Sabarkantha, and Mehsana districts of North Gujarat, India. We interviewed 71 victims from 202 villages in the study area during 2008–2009; most attacks occurred during late monsoon (Oct) and early winter (Nov). Sloth bears typically attacked victims by charging, knocking them to the ground, and then rearing up on their hind legs. Most human injuries occurred on the arms (52%), legs (38%), and head (32%). Most victims were males (82%) traveling alone. We recommend education programs to reduce human injury through mitigation techniques. These efforts could include placing signs with information about sloth bear behavior and occurrence in the area and advising locals about when to enter forests, especially when alone, to reduce conflicts and facilitate coexistence of humans and sloth bears.

Key words: attack pattern, human–bear conflicts, human injuries, India, *Melursus ursinus*, North Gujarat, safety issues, sloth bear

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The sloth bear (*Melursus ursinus*) is 1 of 4 bear species found in India and the only species occurring in the state of Gujarat. Garshelis et al. (1999) compiled population densities from wildlife-protected areas (National Parks and Wildlife Sanctuaries) throughout India and determined that Jessore Wildlife Sanctuary and Balaram–Ambaji Wildlife Sanctuary in Gujarat have some of the highest sloth bear densities in India. Sloth bears inhabit a variety of vegetation cover types including teak (*Tectona grandis*) and sal (*Shorea robusta*) forests, lowland evergreen forests, grasslands, and highlands

to an elevation of 1,700 m (Garshelis et al. 1999, Dharaiya 2009). The sloth bear's diet mainly consists of ants, termites, and sugar-rich fruits (Bargali et al. 2004).

Sloth bears are exposed to multiple threats, including increased habitat degradation and fragmentation due to an increasing human population, decreased food resources, poaching and illegal trade, and human–bear conflict (Cowan 1972, Garshelis et al. 1999, Bargali et al. 2005). Habitat fragmentation is considered to have facilitated the recent increase in human–bear conflicts in North Gujarat (Dharaiya 2009). Bear encounters are dangerous because sloth bears can be aggressive and unpredictable (Bargali et al. 2005, Dharaiya 2009). In addition to human mortality or permanent physical injury that sometimes occurs, injuries inflicted to the head and face by sloth bears can result in social and economic hardships (Ratnayeke et al. 2014).

We present data collected about sloth bear attacks on humans by using surveys collected from victims from 202 villages in the Banaskantha, Sabarkantha, and Mehsana districts of North Gujarat. Previous studies have shown the spatial and temporal patterns of sloth bear attacks (Dharaiya 2009, Mewada 2010). Our objective was to characterize patterns of sloth bear attacks (including timing of attacks, people more vulnerable to attacks, and the location of the human body most susceptible to injury) to in turn inform villagers and reduce the likelihood of attacks.

Study area

The study area included Banaskantha, Sabarkantha, and Mehsana districts in northern Gujarat State, India (Fig. 1), which occurs within the sub-biotic province 4B3 (hilly forests) and 4B4 (arid to semi-arid zones; Singh 2001). The climate is sub-tropical with 3 main seasons. The monsoon or rainy season is typically from early June through September, winter is from October to February, and summer is from March to June. The climate is sub-tropical with temperatures from 10°C during January to 45°C in June, with occasional temperatures below 0°C in parts of Sabarkantha and Banaskantha districts.

The study area consists of dry deciduous forest with small patches of scrub, open, and dense forests. Banaskantha and Sabarkantha districts contain forest cover of 8.5% and 10.9%, respectively (Fig. 1). In contrast, forest cover in Mehsana is 2.5% (Anonymous

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Ultrasonic, optical and IR studies of binary mixtures of morpholine with some aromatic hydrocarbons at $T = (303.15, 308.15 \text{ and } 313.15) \text{ K}$



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ABSTRACT

In this paper, the speed of sound, (U), and refractive index (n_D) of four binary systems (morpholine + aromatic hydrocarbons) are measured along the whole composition range, at 303.15, 308.15 and 313.15 K and at normal pressure. Furthermore, the FT-IR measurements of these mixtures are carried out at 298.15 K to study the complex formation between morpholine and aromatic hydrocarbons. From the experimental data, deviation in speed of sound, (ΔU), isentropic compressibility, (K_S), excess isentropic compressibility, (K_S^E), acoustic impedance, (Z), deviation in acoustic impedance, (ΔZ), and deviation in refractive index (Δn_D) are calculated and satisfactorily fitted using the Redlich-Kister polynomial equation. These values are reported as a function of mole fraction, (X_1) or volume fraction (ϕ_1) of morpholine. Moreover, theoretical speed of sound and average deviations is calculated using well established equations like Nomoto (NMT), Ideal Mixing Rule (IMR) and Jacobson's Free Length Theory (FLT). A comparative study of nine mixing rules of refractive index studies namely Arago-Biot, Dale-Gladstone, Lorentz-Lorentz, Eykman, Weiner, Heller, Newton, Oster and Eyring-John has been reported to investigate their validity for these mixtures over the entire mole fraction of morpholine at three temperatures. Comparison of these nine mixing rules has been presented in terms of average deviation. The FT-IR results show that the maximum interactions are observed in morpholine + benzene binaries, and these results are supported by the speed of sound and refractive index data.

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1. Introduction

Properties such as density, viscosity, refractive index, and heat of mixing of binary liquid mixtures over the whole composition range are useful for understanding of the thermodynamic and transport properties, of practical chemical engineering processes [1]. In recent years, measurements of thermodynamic, acoustic and transport properties have been adequately employed in understanding the nature of molecular systems and physico-chemical behavior in liquid mixtures [2]. Ultrasonic and optical properties of binary liquid mixtures are fundamentally related to the binding forces between the atoms or molecules. However, the knowledge of refractive index properties at different temperatures of liquid and liquid mixtures is an important factor for determination of structure and characterization of molecular binaries [3–4]. Hydrogen bonds constitute a very interesting class of intermolecular interactions, which are of extreme importance in many fields of chemistry and molecular biology [5]. The importance of binary (or multicomponent) solvent systems in analytical sciences has been pointed out by many researchers [6–7]. Therefore it is apparent that knowledge

of thermophysical properties, such as speed of sound, refractive index, and related properties is useful for understanding and justifying the behavior of mixed liquids and their analytical applications [8].

Morpholine is a cyclic molecule which contains both the amine and the ether group and is particularly suitable for extraction, extractive distillation and solvent application in the petrochemical industry [9]. The aim of this work is to analyze the interaction and structure of systems formed by morpholine and aromatic hydrocarbons namely benzene, toluene, m-xylene and mesitylene through the measurements of physical properties. Aromatic hydrocarbons are widely used as a starting material to synthesize other chemicals and also as a solvent in extraction processes. The perusal of the literature reveals that the thermophysical properties of binary mixtures containing morpholine with aromatic hydrocarbons are not yet explored. So, we report here the speed of sound and refractive indices of morpholine with benzene, toluene, m-xylene and mesitylene at the temperatures 303.15, 308.15 and 313.15 K. Using these experimental data, deviation in speed of sound (ΔU), excess isentropic compressibilities (K_S^E), deviation in refractive index (Δn_D) and molar refraction (ΔR_m) are calculated and fitted to the Redlich-Kister polynomial equation. Results have been used to explain the nature of intermolecular interactions between these mixing components. Furthermore, for better understanding of intra and intermolecular interactions in the pure liquids and liquid mixtures, the interpretation is given in terms of H-bonding and FT-IR stretching frequencies.

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VISCOMETRIC STUDY OF INTERMOLECULAR INTERACTIONS IN BINARY MIXTURE OF RICINOLEIC ACID WITH SOME HALOBENZENES AT 303.15, 308.15 AND 313.15K

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Abstract

Deviation in viscosity ($\Delta\eta$) and Excess Gibbs energy of activation of viscous flow (ΔG^{\ddagger}) were calculated from experimentally obtained viscosity (η) values for binary mixture of Ricinoleic acid with some halobenzenes (fluorobenzene, chlorobenzene and bromobenzene) at temperatures (303.15 to 313.15) K and at atmospheric pressure. Various viscosity correlating interaction parameters like Dolezalek-Schulze (D_{12}), Grunberg-Nissan (G_{12}), Tamura-Kurata (T_{12}), Katti-Chaudhri (W_{vis}/RT) and McAllister relation (M_{12} and M_{21}) were also calculated. The Kendall-Munroe relation, Bingham relation and Arrhenius-Eyring relation were also calculated and their validity was checked by comparison of average percentage deviation between calculated values and experimental values. The results show negative values for deviation in viscosity ($\Delta\eta$) and positive values for excess Gibbs energy of activation for viscous flow (ΔG^{\ddagger}). These values indicate the presence of strong interaction between selected binary mixture components. The computed results were fitted with the Redlich-Kister polynomial equation.

Keywords: Density · Viscosity · Excess Gibbs energy · Interaction parameter · Ricinoleic acid · Halobenzene

Introduction

The study of changes of thermodynamic properties of mixtures and the degree of deviations from ideal mixing behavior is an excellent way for getting information about the presence of intermolecular forces and their molecular structural orientation in binary mixture. The thermodynamics properties of binary liquid mixture and their study in terms of models plays vital role for the designing of various industrial processes and the search for models capable for correlating the molecular structures [1,2]. Ricinoleic acid (12-Hydroxy-9-cis-octadecenoic acid) is a light colored, unsaturated omega-9 fatty acid and obtained from mature castor plant. It constitutes for about 90% of the castor oil. It is widely used in various industries like coatings, plastics, inks and cosmetics. It also prevents the growth of numerous species of virus, bacteria, yeasts and molds. So it is widely used in the treatment for ringworm, keratosis, skin inflammation, abrasions, fungal-infected skin, acne and chronic pruritus etc. [3]. The literature survey shows that there is no data available about viscosity and its related properties. So this study will help in selection of proper composition of halobenzenes with Ricinoleic acid for various application in industries.

Experimental Section

Materials

Ricinoleic acid (purity of 95% supplied by Royal Castor Pvt. Ltd., Sidhpur, Gujarat, India), and fluorobenzene, chlorobenzene and bromobenzene (all AR grade with >99.5% purity supplied by S.D. Fine chemicals, India) were used after purification using standard methods of distillation and fractional distillation [4,5]. The final purity of Ricinoleic acid was found to be 98% after purification and it is checked by gas chromatography.

Apparatus and Procedure

Sample Preparation

The binary mixtures were prepared by mixing the two liquid components by weight with an electronic analytical balance (Reptech RA-2012) with accuracy of $\pm 0.0001g$. The liquid mixtures were prepared in

A STUDY ON THERMODYNAMIC PARAMETERS AND STABILITY CONSTANTS OF Y(III) AND Th(IV) COMPLEXES WITH CAPTOPRIL

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Abstract

Complexation behavior of ML & ML_2 type complexes where $M=Y(III)$, $Th(IV)$ and $L=Captopril$ have been studied with use of Modified form of Bjerrum method in aqueous media at different temperatures and various ionic strengths. The stability constants for $Y(III)$ and $Th(IV)$ metal complexes have been calculated by using Fortran IV Program and BESTFIT model. The Thermodynamic parameters studied shows negative ΔG° , negative ΔH° and positive ΔS° values indicates that the complex formation is feasible at 303.15K, 313.15K and 323.15K. The stability of these complexes is studied in the presence of systematic errors.

Keywords: Metal complexes, BEST, Bjerrum method, Stability

Introduction

Captopril was developed from peptide bradykinin potentiating factor (BPF) in 1970 by Sergio Ferreira [1]. Captopril is a white crystalline powder which have slight sulfurous odor. It is soluble in water, methanol and ethanol and sparingly soluble in chloroform and ethyl acetate. Captopril is an angiotensin-converting enzyme (ACE) inhibitor used for the treatment of hypertension and some type of congestive heart failure.

It is also used for prevention of kidney function in diabetic nephropathy. It has also been investigated for the use of the treatment of cancer [3]. Captopril has adverse drug reaction profile is same as other inhibitors, with cough being the most common ADR (Adverse Drug Reaction) [4].

Many binary and ternary complexes of transition and inner transition metals have been studied in aqueous media by pH- metrically [5-10].

The stability constants of binary complexes of $Y(III)$ and $Th(IV)$ metal with captopril and their thermodynamic parameters are studied at 303.15K, 313.15K and 323.15K and at different ionic strength using pH metric titration technique in aqueous medium.

Experimental

Reagents: Ligand captopril was obtained from Torrent Pharmaceutical, Ahmedabad, India. $Y(III)$ and $Th(IV)$ Metals were procured from Sigma-Aldrich, USA. All the reagents used were of A.R. grade. All metals dissolved in doubly distilled water and the solutions were standardized gravimetrically. Perchloric acid (Baker Analyzed) is standardized with standard NaOH (BDH, Analar grade) Sodium Perchlorate (Fluka) is used for maintaining ionic strength as an inert electrolyte.

Apparatus

A sytronics digital μ -pH system 361, with combined glass electrode was used for pH measurements with readability ± 0.01 pH unit and temperature probe with readability $\pm 0.1^\circ\text{C}$. For maintaining temperature High Precision Water bath with readability $\pm 0.1^\circ\text{C}$ was used. The Irving and Rossotti method has been applied here [11].

Titration set:



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REFRACTIVE INDEX STUDY OF INTERMOLECULAR INTERACTION BETWEEN BINARY MIXTURES OF TERPINOLENE WITH SOME HALOBENZENES AT 303.15, 308.15 AND 313.15K

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ABSTRACT

Refractive indexes (n_D) have been experimentally measured for binary mixtures of Terpinolene + Halobenzenes (fluorobenzene, chlorobenzene and bromobenzene) at entire composition range at 303.15, 308.15 and 313.15K at atmospheric pressure. Various secondary properties and their deviation properties like deviation in refractive index (Δn_D), molar refraction (R_m) and deviation in molar refraction (ΔR_m) have been calculated. Various theoretical refractive index calculating relations like Arago-Biot, Dale-Gladstone, Lorentz-Lorentz, Eykman, Weiner, Heller, Newton, Oster and Eyring-John relation has been also calculated. All these calculated results were fitted with the Redlich-Kister polynomial equation. The results support for the presence of strong intermolecular interactions between components of these binary mixtures.

KEYWORDS: Refractive indexes, Molar refraction, Theoretical relations, Intermolecular interaction, Deviation Properties

INTRODUCTION

Terpinolene (para-Mentha-1,4(8)-diene) is a monoterpene hydrocarbon. It is one of the constituent component of essential oils of many plant species like citrus juices and oil, black current, tea, guava, papaya, pepper, ginger, lovage oil, lovage seed, lovage root and in many more species [1]. As a component of essential oil, it is widely used in pharmaceutical level due to its anti-fungal and many more medicinal characteristics [2]. Moreover, due to its sweet, fresh piney citrus, old lemon peel nuance odour and taste, it is also uses in alcoholic beverages, baked goods, chewing gum, frozen dairy, gelatins, puddings, hard candy products [1].

The study of thermophysical properties such as refractive index, molar refraction and their deviation in binary mixture helps us to understand their intermolecular interaction behavior between binary mixtures' components [3, 4]. These thermophysical data helps us in separation process of the component from its extract as well as in organic synthesis, mass transfer phenomena etc.

EXPERIMENTAL SECTION

Materials

In the present study, Terpinolene (AR grade with $\geq 90\%$ purity, from Aldrich Chemicals, USA) and Halobenzenes (AR grade with $\geq 99.5\%$ purity, from S.D. Fine Chemicals, India) were used. Before using these chemicals in experiments, they were further purified using standard distillation and fractional distillation method [Ref. 5,6]. Their final purity was checked by gas chromatography technique (Table 1).

Apparatus and Procedure

The binary mixtures were prepared by mixing two components by their mass using electric analytical weigh balance (Reptech-RA-102) having accuracy of ± 0.01 mg. The mixtures were prepared in airtight stopper glass ampoules and kept in dark place to avoid evaporation of solvents and photolytic effect. The average uncertainty of mole fraction was estimated to be ± 0.0001 .

The measurement of refractive indexes of pure components and their binary mixture were carried out using Abbe's refractometer (SER No. 995033). During the measurement, the temperature was maintained by circulating water through refractometer using water pump. A thermostatic water bath (Model No. 14L-SS, Equiptron water bath company, India) with accuracy of $\pm 0.01^\circ\text{C}$ was used. The Abbe's refractometer was calibrated with 1-bromonaphthalene, methanol and double distilled water.



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SOLUTION STATE STUDY ON STABILITY AND THERMODYNAMIC BEHAVIOR OF BINARY METAL COMPLEXES OF PREGABALIN

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ABSTRACT

Solution state studies on Binary metal complexes of type ML_2 where $M = Y(III)$, $Th(IV)$ and $L =$ Pregabalin are carried in aqueous medium at different temperature 303.15K, 313.15K, 323.15K and at different ionic strength 0.1M, 0.2M, 0.3M, 0.4M by using modified Bjerrum method. For the calculation of formation constants of these metal complexes Fortran IV program based on BESTFIT model is used. The calculated thermodynamic parameters showed negative values of ΔG , ΔH and ΔS . These values support the idea that formation of binary metal complexes is feasible at selected temperatures. The stability of these binary metal complexes is studied in the presence of systematic errors. Formation and stability of these complexes is governed by effect of temperature, ionic strength, charge and size of metal ion. $Th(IV)$ complexes are found to be more stable than $Y(III)$ in present set of experimental conditions.

KEYWORDS: Binary complexes, Bjerrum method, Stability, pH metric

INTRODUCTION

Pregabalin is a white powder freely soluble in water. Pregabalin is found to be selective, high-affinity ligand for an alpha-2-delta subunit of voltage-gated calcium channels [1], which are thought to play an important role in modulating neuropathic pain [2] [3]. Pregabalin is proven to be effective for the treatment of neuropathic pain associated with diabetic peripheral neuropathy (DPN), post herpetic neuralgia (PHN), fibromyalgia, and spinal cord injury. In trials studying pregabalin as drug in treatment of DPN and PHN, pregabalin has shown to reduce the often difficult-to-treat pain experienced by DPN and PHN patients consistently and to improve their overall health status [4] [5]. It is also used in the treatment of epilepsy [6]. It has analgesic, anxiolytic, and anticonvulsant activity [7]. Many binary and ternary complexes of transition and inner transition metals have been studied in aqueous media by pH-metrically [8-13]. The formation constants of binary complexes of $Y(III)$ and $Th(IV)$ with pregabalin and their thermodynamic parameters are studied at 303.15K, 313.15K and 323.15K and at different ionic strength 0.1M, 0.2M, 0.3M, 0.4M using pH metric titration technique in aqueous medium.

EXPERIMENTAL SECTION

Materials

All reagents used in this experiment were of AR grade and used without further purification. Pregabalin was procured from Tripada Pharmaceutical, India. $Y(III)$ and $Th(IV)$ metals were obtained from Sigma-Aldrich, USA. All reagents are dissolved in doubly distilled water. The metal solutions were standardized gravimetrically. Perchloric acid was obtained from Baker analyzed and standardized with standard NaOH. As an inert electrolyte Sodium Perchlorate (Fluka) was used for maintain ionic strength.

Apparatus

A sytronics digital 361 μ -pH system is used for pH measurements. This is having combined glass electrode (readability ± 0.01 pH unit) and temperature probe (readability $\pm 0.1^\circ C$). High Precision Water bath (readability $\pm 0.1^\circ C$) was used for maintaining constant temperature. The Irving and Rossotti method has been applied for this experiment [14].

pH metric Titration

For pH metric titrations the following three sets were prepared:

- (i) Acid Titration set
- (ii) Ligand Titration set
- (iii) Metal-Ligand Titration set

All the above titration sets were constant maintained at 303.15K, 313.15K and 323.15K temperature and at 0.1, 0.2, 0.3, 0.4 $mol.L^{-1}$ ionic strength. Total volumes of all sets were keeping 50 ml. These sets were titrated with standardized 0.2 $mol.L^{-1}$ NaOH solution with the use of digital pH meter.



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VISCOSITIES OF BINARY MIXTURES OF P-CYMENE WITH HALOGENATED BENZENES (FLUOROBENZENE, CHLOROBENZENE AND BROMOBENZENE) AT 303.15, 308.15 AND 313.15 K

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ABSTRACT

Deviation in viscosities ($\Delta\eta$) have been calculated from the measured viscosities (η) at 303.15, 308.15 and 313.15 K for the binary mixtures of p-Cymene with fluorobenzene, chlorobenzene and bromobenzene along the whole composition range and at atmospheric pressure. Further, Excess Gibbs energy of activation for viscous flow (G^E) is also calculated. The viscosity data are correlated with the two body empirical equations like Grunberg-Nissan, Dolezalek-Schulze, Tamura-Kurata, Katti-Chaudhri and three body McAllister's equation and interaction parameters D_{12} , G_{12} , T_{12} and W_{12}/RT are also calculated. Excess properties are fitted using the Redlich-Kister polynomial equation. The results were interpreted in terms of the intermolecular interactions are present between the component molecules.

KEYWORDS: Viscosity, Gibbs energy of activation for viscous flow, Intermolecular interactions

INTRODUCTION

P-Cymene (1-Methyl-4-(Propan-2-yl) benzene) is a naturally obtained from oils of cypress and essential oils in various plant species. It is also found in citrus juices, pea oils, guava, papaya, pine apple, blue berry, eumine seed, pepper, peppermint oil etc. Due to its odour and taste, it is widely used in daily food products [1]. P-Cymene is also used in many natural therapy due to its medicinal characteristics [2]. The study of Thermophysical and transport properties of P-Cymene with some solvents help us to understand the nature and behavior of P-Cymene in binary mixture. The study of these parameters help us in various separation techniques, mass transfer phenomena as well as in various analytical techniques [3,4]. In present study, the viscosity and its related properties such as deviation in viscosity, Gibbs energy of activation for viscous flow were studied. Some theoretical viscosity of binary mixture calculating relations were also studied. The whole discussion is carried out in terms of intermolecular interaction between the components of binary mixture.

EXPERIMENTAL

Materials

P-Cymene (with >95% purity, Tokyo chemical industry Co. Ltd., Tokyo, Japan), Fluorobenzene (with 99% purity, S. D. Fine Chem. Ltd., India), Chlorobenzene (with 99% purity, S. D. Fine Chem. Ltd., India), Bromobenzene (with 99% purity, S. D. Fine Chem. Ltd., India) were used in this study after purification using standard methods [5]. All the components are purified by the standard methods available in literature [17,18]. The purification of the liquids was checked by comparing viscosities (η) with their corresponding literature values reported in Table I.

Apparatus and procedure

Binary mixtures were fresh prepared by gravimetrically with an electronic balance Reptech RA-2012 (Supplied by Reptech India) with an accuracy of ± 0.0001 g. The uncertainty in the mole fraction of the mixtures was estimated to less than ± 0.0001 .

Viscosities of pure chemicals and binary mixtures were determined by SV-10 Vibro Viscometer supplied by A & D Instruments India Pvt. Ltd. The instrument has of 2 thin sensor plates that are driven with electromagnetic force at the same frequency by vibrating at constant sine-wave vibration in reverse phase like a tuning-fork. The electromagnetic drive controls the vibration of the sensor plates to keep in constant amplitude. The driving electric current, which is exciting force, will be detected as the magnitude of viscosity produced between the sensor plates and the sample fluid. The instrument gives directly a value of dynamic viscosity with accuracy of ± 0.001 mPa.s. The temperature was maintained by thermostatic water bath (High Precision Water Bath, Cat No. MSW-274) supplied by MSW company, India. The thermostatic water bath was monitored to ± 0.010 °C with a calibrated thermometer.

An effective validated method for HPTLC-fingerprinting of alkaloids and glycosides from multiple plant parts of three *Terminalia* spp.

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ABSTRACT

Our study developed a HPTLC fingerprint profile of alkaloids and glycosides obtained from the methanol extracts of four different plant parts of *Terminalia arjuna*, *T. bellerica* and *T. chebula*, trees with cardio-protective values. The multiple qualitative phytochemical analyses of water, acetone, petroleum ether and methanol extracts from all the plant parts of *Terminalia* spp. detected the presence of alkaloids and glycosides, wherein the methanol extracts exhibited the presence of maximum alkaloids and glycosides. The chromatographic analysis of methanol extracts was carried out on silica gel 60F₂₅₄ HPTLC aluminium sheets with CAMAG Linomat 5 applicator. The plates were developed using ethyl acetate:toluene:formic acid (10:10:1; v/v/v) mobile phase. Alkaloids and glycosides were detected at 254 nm, 366 nm and 540 nm (after derivatization). These developed fingerprints would eventually be of great benefit in identifying or differentiating the alkaloids and glycosides in the form of marker compounds in the three *Terminalia* spp. mentioned.

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KEYWORDS

Alkaloids; Chromatography; Fingerprint; Glycosides; HPTLC; *Terminalia*, TLC

Introduction

The genus *Terminalia* belongs to the family Combretaceae. *T. arjuna* (Roxb.) Wight & Arn., *T. bellerica* Roxb., and *T. chebula* Retz. are the three most cardinal of all the species of genus *Terminalia*. These medicinally important tree species are prevalent mainly in Central Asia (Kapoor, 1990). These three species possess high medicinal values and are well known in Indian medicine industry. Barks of *T. arjuna* has been used to prevent cardiomyopathy, myocardium necrosis, atherosclerosis, and also used as a cardiostimulant in heart failure; simultaneously treating anaemia and several other venereal and viral diseases as well (Amalraj and Gopi, 2017). The fruits of *T. bellerica* have antimicrobial, antidiabetic and cardio protectant properties (Sabu and Kuttan, 2002; Elizabeth, 2005), and its bark contains a triterpenoid (belleric acid) and its glycosides (Nampoothiri et al., 2011). Additionally, it also contains secondary metabolites viz., ellagic acid, ethyl gallate, β -sitosterol, gallic acid, anolignan (a cardenolide cannogenol), termilignan, thannilignan, and a hexahydroxydiphenic acid

ester as well. The extracts obtained from different plant parts of *T. chebula* exhibit certain medicinal properties and known to be used in cardio tonic, diuretic, laxative, and hypoglycemic drugs. The seeds of *T. chebula* contain phytochemicals like chebulinic acid and tannic acid (Thanigaivel et al., 2017). Even though, a variety of phytochemicals (belonging to different classes such as hydrolysable tannins, alkaloids, triterpenoid acids and their glycosides, flavonoids, phenolics and phytosterols) was reported in *Terminalia* (Kalola and Rajani, 2006); however, the alkaloids and glycosides are of key interest from the pharmaceutical point of view. Several chromatographic methods have been reported for the detection and quantification of phytochemicals in *Terminalia* spp. (Juang et al., 2004; Devi et al., 2014; Ram et al., 2015), yet high performance thin layer chromatography (HPTLC) remains the preferred choice owing to its simplicity, sensitivity, stability, accuracy and suitability for efficient screening (Gantait et al., 2011; Nampoothiri et al., 2011; Panigrahi et al., 2017). Therefore, the present study focuses on the

(IJ-13) A Study on the Effects of Hospital Integration in India

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Abstract

The Hospital Industry has long been a trillion-dollar market. Due to the rapid global development in science and technology, the integration of the healthcare industry is inevitable. Hospital integration is the need of the day, so as to cope up with the internal and external environmental changes. Individual medical practitioners, laboratories and midwives are either forced to associate with nearby hospitals for their survival or hospitals are seeking more physicians and midwives in order to expand their markets. Additionally, allied healthcare services are integrating day by day as that of hospitals.

Consequently, hospitals have been trying to integrate with other allied healthcare services along with IT to make more profits and reduce expenses. This research tends to highlight the effects of these four different services integrating with hospitals, such as physicians, midwives, laboratory, and IT, on a cost to the patients, medical errors and patient / customer satisfaction.

The target sample was selected among NABH accredited hospitals (National Accreditation Board for Hospitals & Healthcare Providers) only, from the Western States of India. Secondly, this research highlights the benefits and sustainability of Hospital Integration over Non-Integrated Hospitals in the long run. The outcome of this research clearly indicates how integrated hospitals are able to reduce medical errors, cost to patients, and increase patient satisfaction.

Key words: Hospital Integration, Physician, Midwife, Laboratory, IT, Cost Reduction, Medical Errors & Customer Satisfaction.

Introduction

It is observed that most of the patients are not very satisfied with the treatment they receive at the hospitals, even though they pay a huge amount towards their treatment (Atun, et al., 2009). There are a number of reasons for patient's dissatisfaction towards hospitals and their staff, (Nielsen, 2014). This is because individual practitioners or small independent hospitals cannot give required treatment and services to many, due to increasing population. This has created a huge gap between demand and supply of physicians, which urges hospitals to step in for integration and help to minimize this gap.

Why are hospitals integrating?

Every industry works on different aspects, for the improvement in process and product for better customer

Scaling-up of boron sources for yield and quality of large seeded peanut cultivars under varied agro-ecological conditions in India

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ABSTRACT

Boron (B) deficiency is a common factor in light-textured soils causing poor pod filling and yield in large seeded peanut. Field trials were conducted in soils having 0.20–0.45 mg kg⁻¹ available B to find out the effectiveness of commercial-grade B sources in large seeded peanuts. B application induced early flowering, increased pods, yield and yield attributes, shelling and 100-seed weight. Soil application of 2.0 kg B ha⁻¹ as commercial-grade Agricol, Solubor and Borosol increased these parameters to a similar degree as obtained by borax, but were superior over their foliar applications. Similarly, the responses of foliar applications of 1.0 kg B ha⁻¹ as Chemiebor, Solubor and Borosol were more effective in humid areas. However, foliar applications led to scorching of peanut leaves during dry weather. Thus, soil application of 2.0 kg B ha⁻¹ is essential to enhance productivity and pod filling in large seeded peanut.

ARTICLE HISTORY

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KEYWORDS

agricol; boron sources; large seeded peanut; pod yield

Introduction

Peanut (*Arachis hypogaea* L.) is an important legume, grown under tropical to subtropical climates, used as oilseed as well as a food crop worldwide. India has the largest peanut area in the world where it is grown throughout on all soil types mainly as rain-fed crop, but the average peanut productivity of this crop is low as compared to the United States and China mainly due to mineral deficiencies and unreliable weather conditions. In the recent cultivars with large seeds, boron (B) and calcium (Ca) deficiencies are the important factors responsible for low yield (Singh et al. 2004, 2007). Most of the light-textured soils of India where peanut grown are deficient in B, and there is good response of B application right from acid to calcareous and sandy soils (Ansari et al. 2013; Singh et al. 2008a, 2008b, 2009; Vishwakarma et al. 2008). In B-deficient soils (having <0.4 mg kg⁻¹ available B), low pod filling, shriveled seeds and hollow darkening or off-color in the center of the seed are common symptoms of B deficiency causing 10–50% yield losses (Cox and Reid 1964; Singh 2001b; Singh et al. 2004). The application of 0.5–2.0 kg ha⁻¹ B normally alleviated the B-deficiency disorder, but there is no clear-cut recommendation of any agriculture-grade B fertilizers in India (Singh 1994, 2001a, 2001b, 2002; Singh and Chaudhari 1996; Singh et al. 2004). Also, there are genetic variations for the response of B in the field (Singh 2013).

Chitinolytic efficacy and secretion of cell wall-degrading enzymes from *Trichoderma* spp. in response to phytopathological fungi

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 Biocontrol

ABSTRACT

Chitinolytic activity and major antifungal enzyme secretion from *Trichoderma* spp. were studied. Soil samples were collected from different environmental niche of North Gujarat Region, India, and 12 different species of *Trichoderma* were obtained and identified. Among 12 isolates, 4 isolates were identified as *Trichoderma harzianum*, 5 isolates were identified as *Trichoderma viride*, and remaining 3 isolates were as of *Trichoderma hamatum*. These isolates were identified using species-specific primers amplification by polymerase chain reaction. All identified isolates were screened for chitinase activity using colloidal chitin derived from commercial chitin on the media supplemented with bromocresol purple. According to the results of chitinase activity screening assay, *T. viride* was found to be more potential isolate for chitinase production. From biocontrol assay using dual culture method, *T. viride* was found to be more potent antagonist against fungal plant pathogens such as *Aspergillus niger*, *Fusarium oxysporum*, and *Sclerotium rolfsii*. *T. viride* was selected for further study of biocontrol potential and production of cell wall-degrading enzymes. *T. viride* was inoculated in media containing basal media and mycelia of fungal pathogens for cell wall-degrading enzyme production. It was found that *T. viride* secretes three major cell wall-degrading enzymes, i.e., chitinase, protease, and β -glucanase. Optimum production of all three enzymes was found at 96 h incubation. Details of antifungal protein secretion are mentioned in this paper.

1. INTRODUCTION

Genus *Trichoderma* and efficient biocontrol strain are being industrialized as effective biological fungicides, and their biocontrol mechanism of biological control involves the role of secondary metabolites with prospective applications as new antibiotics [1,2]. They produce many antifungal enzymes including chitin-degrading enzymes which used economically as a basis of these kind of proteins. Many reports suggested that chitinolytic enzymes producing species of *Trichoderma* are prove most effective agents as different biological control of plant infections or diseases [3-8]. Chitinase enzymes are chitinolytic proteins which hydrolyze the β -1, 4-glycosidic linkages within the N-acetyl glucosamine monomers in the structure of chitin and are extensively distributed in nature [9].

The biocontrol mechanisms of *Trichoderma* involve several events such as competition for nutrition, production of antibiotic, and mycoparasitism [10,11]. Mycoparasitism has been proposed as most effective and very important incompatible machinery exhibited by

different *Trichoderma* spp. [12]. After recognition of host, different events with *Trichoderma* spp. are occurred like coiling around hyphae and enter the cell wall by cell wall digestive enzymes action [13]. Cell wall digestive enzymes produced by mycoparasites allow them to make holes into its respective host and consumed nutrients for their own development. Chitin is major structural components having regularly arranged β -1, 3-glucan material in most phytopathogenic fungi cell wall. Two enzymes, chitinases and β -1, 3-glucanases, play a significant role in the mycoparasitism competitor interaction between *Trichoderma* spp. and its respective hosts [12].

A extensive reviews of research have been aimed at explaining the mechanism of secretion of chitinase and β -1,3-glucanase by different *Trichoderma* spp. on variety of carbon sources media. Most information has been known for expression of chitinase and β -1,3-glucanase enzymes by different *Trichoderma* spp., but the factors which are affecting secretion of these enzymes and the characters of the inducers and repressors are not well understood yet [5-12]. The antagonist mechanism of *Trichoderma* spp. inducing secretion of chitinolytic, proteolytic, and glucolytic enzymes and their controlling mechanism is still a hypothesis, inspite of numerous studies and reports [14]. In time course of mycoparasitism, the cell wall-degrading enzymes act synergistically and exerted their action on pathogenic fungi. Thus, considerate the induction process of these enzymes is essential for selection of most significant *Trichoderma* spp. for biocontrol purpose.

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Short Communication

Open Access

Role of Technology in Management of Health Care of Elderly

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Abstract

The latest trend in demography is the rapid ageing of population throughout the world. According to WHO, the elderly population will almost double from 12% to 22% within a span ranging from 2015 to 2050. A similar trend is anticipated for the US. The data seems to be encouraging in terms of increase in life expectancy and reduced mortality due to advancements in medical science. But the flipside is that, the increased number of elderly commands increase in number of, or visits by caregivers to manage the increased demand for Quality of life for the elderly. Another study focused on the increased stress level with emotional and physical fatigue among care givers. A partial solution to this problem can be provided by technological interventions through the branch of Gerontechnology. This paper is an attempt to enlist and analyze the technology, which can augment the Quality of life of elderly along with reducing the burden on formal and informal caregivers.

Keywords: Gerontechnology; Artificial intelligence; Caregiver; Quality of life

Introduction

In this era Technology plays an important role in our life. It has become an integral part of our routine. In an urge to be more efficient, all the progressive sectors like engineering, medical science, education etc. have initiated the use of high end and latest technology to provide better service in less time. Our daily schedule is now hugely assisted by gadgets which are enabled with technology. Smart phones, smart gadgets are helping us to make our work efficient with accuracy and reliability. Population from all age groups has adapted technology on the basis of their need and use. With increasing competition and professionalism at workplace for the younger generation, the elderly population feel more isolated than ever [1,2]. This is more problematic in Asian countries, where dependency on younger members of the family is more prominent for elders. Somehow the solution to this issue can be provided by the proper and judicious incorporation of technology in routine life for elders. It may increase their efficiency and reduce dependency for basic activities as, purchasing grocery, booking appointments, travelling, safety concerns, health concerns etc.. An upcoming branch, Gerontechnology, focuses on these issues.

Gerontechnology

Gerontechnology is a combination of two words gerontology and technology. Gerontology means study of aging and technology means use of science to fulfil needs. Gerontechnology helps old age people to reduce their hurdles in daily life needs. Gerontechnology is a combination of different fields like healthcare, transportation system, education and information technology. It can be used to carry out different types of activities as: 1) the assessment of motor and cognitive abilities using advanced technology and systems to identify and address major deficits; 2) continuous evaluation of the performance of elderly people at home by using wearable gadgets to identify the onset of possible problems related to reduced performance; 3) increasing the

level of autonomy at home by using technological aids to compensate possible deficits [3-5].

According to "One Hundred Year Study on Artificial Intelligence (AI100)," by Stanford University, over the next fifteen years the number of elderly in the USA will grow by over 50%. Home health aides will grow 38% over the next ten years (The National Bureau of Labour Statistics projections). In spite of the broad opportunities and advancements in this area, as, basic social support, IT enabled interaction and communication devices, home health monitoring, simple in-home physical aids such as walkers, little has happened over the past fifteen years. But the coming generational shift will accompany a change in technology acceptance among the elderly. Presently, someone who is in his 70s was born in 1940s and may have first experienced some form of personalized IT in middle age or later, while a fifty-year-old today is far more technology-friendly and savvy. Thus, there will be a growing interest and market for already available and maturing technologies to support physical, emotional, social, and mental health being [6,7].

Few examples to highlight this are:

- Increased independence by automated transportation (driverless cars etc.)
- Information sharing among family members to keep a track on elder member in the family.
- Monitoring daily activities and movements by smart devices and mobile applications
- Detection in mood or behaviour changes and alert to family members and care givers in case of perceived emergent conditions.

The Study Panel anticipated an explosion of low-cost sensing technologies that can provide substantial capabilities to the elderly in their homes. But, it will need integration across various areas of AI such as, Natural Language Processing, reasoning, learning, perception, and robotics in order to create a system that is useful and usable by the elderly. These innovations will also introduce questions regarding privacy within various circles, including friends, family, and care-



On distributional range extension of two species of brachyuran crabs *Parasesarma persicum* and *Austruca iranica* in Indian waters

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Original Article

Abstract

The study records the presence of two brachyuran species viz. *Parasesarma persicum* Naderloo and Schubart, 2010 and *Austruca iranica* (Pretzmann, 1971) belonging to families Sesamidae and Ocypodidae respectively, for the first time from Indian waters. Both species were previously recorded from Persian Gulf, Gulf of Oman and adjacent area. In the present study a detailed morphological description of the species is given.

Keywords: Brachyuran crabs, mangroves, sesamidae, ocypodidae, Gujarat


Introduction

Brachyuran crabs of family Sesamidae and Ocypodidae play an important role in the ecological functioning of mangrove and mudflat habitat (Khan *et al.*, 2005). Genus *Parasesarma* De Man, 1895 of family Sesamidae currently consists of 32 species

mainly occurring in the Indo-West Pacific region (Ng *et al.*, 2008; Rahayu and Ng, 2009, 2010; Naderloo and Schubart, 2010) out of which only two species *Parasesarma plicatum* (Latreille, 1803) and *Parasesarma pictum* (De Haan, 1835) are reported from India (Chhappgar, 1957; Dev Roy and Das, 2000; Khan *et al.*, 2005; Dev Roy, 2013). The brachyuran crab species of genus *Austruca* Bott, 1973 of family Ocypodidae are commonly known as fiddler crabs and distributed in tropical and subtropical regions (Crane, 1975; Zeil *et al.*, 2006; Ng *et al.*, 2008; Barnes, 2010). A total of 6 species of *Austruca* were so far reported from Indian waters (Crane, 1975; Chhappgar, 1957; Khan *et al.*, 2005; Trivedi *et al.*, 2012; Dev Roy, 2013). In the present study, two brachyuran crab species viz. *Parasesarma persicum* Naderloo and Schubart, 2010 and *Austruca iranica* (Pretzmann, 1971) are reported for the first time from Indian waters.

Material and Methods

The present study was carried out as a part of research project on documentation of crustacean fauna of Gujarat. Total 14 male and 1 female specimens of *P. persicum* and 4 male and 3 female specimens of *A. iranica* (Pretzmann, 1971) were collected from different coastal areas of Gujarat state comprising of mangrove and mudflat habitats. Hand picking method was adopted for specimen collection during the low tide time. Specimens were


**On the distribution range of
Chaenostoma sinuspersici (Naderloo &
Türkay, 2011) (Decapoda: Brachyura:
Macrophthalmidae) in Indian waters**Jigneshkumar N. Trivedi¹Kauresh D. Vachhrajani¹  orcid.org/0000-0002-6840-4752¹ Marine Biodiversity and Ecology Lab., Department of Zoology, Faculty of Science,
The Maharaja Sayajirao University of Baroda, Vadodara-390002, Gujarat, India.ZOOBANK <http://zoobank.org/urn:lsid:zoobank.org:pub:5CBAF7D7-265F-4352-B850-1C290A9F867A>**ABSTRACT**

Chaenostoma sinuspersici (Naderloo & Türkay, 2011) (Macrophthalmidae) is recorded for the first time in Indian waters. The species has so far been only reported from the western Indian Ocean and Arabian Sea.

KEY WORDS

Range extension, species complex, rocky shore, Gujarat, first record.

The genus *Chaenostoma* (Stimpson, 1858) of family Macrophthalmidae is composed of small sized crabs which are common on the rocky shores of tropical and subtropical regions (Litulo, 2005; Davie, 2012). *Chaenostoma* currently contains six species: *Chaenostoma boscii* (Audouin, 1826), *Chaenostoma punctulatus* (Miers, 1884), *Chaenostoma sinuspersici* (Naderloo & Türkay, 2011), *Chaenostoma java* Naderloo, 2013, *Chaenostoma orientale* Stimpson, 1858 and *Chaenostoma crassimanus* Stimpson, 1858 (Stimpson, 1858; Ng *et al.* 2008; Naderloo and Türkay, 2011; Naderloo, 2013; Shih *et al.*, 2015; Teng *et al.*, 2016). Another species, *Chaenostoma lisae* (Poupin & Bouchard, 2010) is now considered as junior synonym of *C. crassimanus* (Shih *et al.*, 2015; Teng *et al.*, 2016). *Chaenostoma sinuspersici* was described from Persian Gulf and has a widespread distribution in Indo-West Pacific (Naderloo and Türkay, 2011; Teng *et al.*, 2016). In the present study, *C. sinuspersici* is reported first time from Indian waters. The following abbreviations are used throughout the text: G1 = male first gonopod, CL = carapace length, and CW = carapace width. All measurements are given in millimeters (mm).

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A new species of the genus *Ancylocheles* Haig, 1978 (Crustacea: Decapoda: Anomura: Porcellanidae) from Gujarat, northwestern India

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Abstract

A new species of porcellanid crab, *Ancylocheles peterngi* n. sp., is described on the basis of material collected during crustacean faunal surveys along the coasts of the Gujarat State, northwestern India. The new species resembles the sole congeneric species, *A. gravelei* (Sankolli, 1963), but is distinguished by the morphology of the carapace, third thoracic sternite and antenna.

Key words: Porcellanidae, *Ancylocheles*, new species, coral reef, Saurashtra coast

Introduction

The anomuran crabs of the family Porcellanidae are common inhabitants in intertidal and shallow subtidal regions of rocky and coral reef habitats. Of a total of about 280 valid species known worldwide, 31 species belonging to 11 genera are hitherto reported from India (Osawa & McLaughlin 2010; Prakash *et al.* 2013; Kumaralingam *et al.* 2015). *Porcellana gravelei* Sankolli, 1963 was originally described from Ratnagiri in the Maharashtra State, India. Haig (1978) later revised the taxonomy of *Porcellana* Lamarck, 1801 and established four new genera including *Ancylocheles* to which only *Porcellana gravelei* is currently assigned. *Ancylocheles gravelei* has been recorded from Pakistan and Australia as well as some localities in India (Haig 1965, as *Porcellana*; Tirmizi *et al.* 1989; Hiller *et al.* 2010).

During the survey of crustacean fauna in the coasts of Saurashtra in the Gujarat State, India, the second species, which is referred to the genus *Ancylocheles* but different from *A. gravelei* in some morphological characters, was obtained. In the present paper, the species is described as new to science.

The specimen examined of the new species are deposited in the Zoology Museum, Department of Zoology, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India, under the registration numbers ZL-AR-CR 18–20. The morphological terminology used in the description follows Osawa & Chan (2010) and Osawa (2015). Carapace length (CL) and carapace width (CW) were measured along the longitudinal midline and between the widest points of the carapace, respectively. All the measurements are recorded in millimeter (mm).

Taxonomic account

Family Porcellanidae Haworth, 1825

Genus *Ancylocheles* Haig, 1978

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A new species of genus *Parhyale* Stebbing, 1897 (Crustacea, Amphipoda, Hyalidae) from Gujarat State, India

ALAN A. MYERS¹, JIGNESHKUMAR N. TRIVEDI², SWAPNIL GOSAVI² & KAURESH D. VACHHRAJANI²¹*School of Biological, Earth and Environmental Sciences, University College Cork, Cork Enterprise Centre, Distillery Fields, North Mall, Cork, Ireland. E-mail: havayia@gmail.com*²*Marine Biodiversity and Ecology Laboratory, Department of Zoology, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India. E-mail: jntrivedi26@yahoo.co.in; swapnil.gosavi4@gmail.com; kauresh@gmail.com*

Abstract

A new species of amphipod, *Parhyale piloi* sp. nov., is described from India. The taxon is fully described and figured and is compared with known species with which it could be confused.

Key words: Amphipoda, *Parhyale*, taxonomy, new species, marine, India

Introduction

Species of amphipod genus *Parhyale* Stebbing, 1897, are common inhabitants of marine intertidal and littoral zones, distributed in tropical and warm temperate regions (Bousfield and Hendrycks 2002). In the intertidal zone, individuals are mostly found hiding underneath stones, with attached vegetation and are also found inhabiting the burrows of isopods (Salman 1986). *Parhyale* is very close to *Hyalae* Rathke, 1837 but differs in having a small, vestigial inner ramus on the third uropod. *Parhyale* currently contains 16 species (Momtazi and Maghsoudlou 2016) out of which three species, *P. fasciger* Stebbing, 1897 (Arabian sea); *P. hawaiiensis* (Dana, 1853) (Bay of Bengal, Arabian sea) and *P. inyacka* (Barnard, 1916) (Bay of Bengal) are reported from Indian waters (Sivaprakasam 1970; Surya Rao 1972; Momtazi and Maghsoudlou 2016). In the present study, *Parhyale piloi* sp. nov. is described on the basis of material collected from an intertidal coral reef habitat near Shivrajpur village located on Saurashtra coast of Gujarat state, India.

Materials and methods

Specimens were collected from intertidal coral reef habitats by hand picking. Specimens were first placed in 5% seawater formaldehyde and later transferred to 10% alcohol. They were dissected and body parts were mounted on microscope slides using glycerine. Specimens were examined under a Leica stereo microscope with an attached drawing tube. Material is deposited in the Zoological Survey of India, Western Zone Regional Center (ZSI, WRC), Pune, Maharashtra and in the Zoology Museum (ZL-AR-AM), Department of Zoology, Faculty of Science, the Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India.

Abbreviations used in figures: Ep 1–3 = epimera 1–3; F = female; G1, 2 = gnathopods 1, 2; Hd = head; Lab = labium; Lbr = labrum; Lc = lacinia mobilis; M = male; Md = mandible; Mx1, 2 = maxilla 1, 2; Mxp = maxilliped; P3–7 = pereopods 3–7; U1–3 = uropods 1–3; T = telson.

Systematic section

Suborder Senticaudata Lowry & Myers, 2013

**RESEARCH ARTICLE****Anurans in Polo Reserved Forests of Gujarat state, India: Two New Geographical Records****Ashish Jangid*, Rohit Prajapati, Nishith Dharaiya**

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Study Area: Sabarkantha district, Gujrat, India.

Coordinates: 23.73°- 24.15° N; 73.1°- 73.4° E

Key words: Amphibian, Sono- taxonomy, Frog, Toad, Morphometry, Habit Classification

Abstract

Anurans are very mysterious fauna of animal kingdom. The current study represents the preliminary checklist of frogs and toads of Polo forest, a reserved forest of north Gujarat, mostly covered by dry deciduous vegetation. Our literature survey revealed that the herpetofauna including anurans is least explored fauna in northern Gujarat except few stray notes and checklist prepared before almost two decades hence there are vital chances in the change in species composition with respect to lesser- known fauna like amphibians. The area was surveyed by line and strip transects as well as visual encounter and sono-taxonomical methods in order to record the presence of anuran species. The study shows ten species of anurans belonging to four families; among which two are newly recorded species in this area. The study can be an initiation to arrange baseline data regarding anuran's checklist, which can be extended to all the herpetofauna and other diversity too. Taxonomy of unidentified anuran species can also be determined in future.

Introduction:

Gujarat is one of the diversified landscaped states of India, which is covered by dry deciduous forest in north, west and eastern parts, moist deciduous forest from the southern part, coastal belt in the west and desert covering from north to western edge (Champion & Seth, 1968). Anuran fauna is ever supposed as tremendous but mysterious fauna. Amphibians belong to the superclass Tetrapoda. Class amphibia classified into three orders viz. apoda, anura and urodela (Boulenger, 1890; Daniel & Sekar, 1989; Dutta, 1997).

The current study depicts the status of anurans (frogs and toads) in Polo forest of Sabarkantha district, Gujarat state. Polo is one of the most cash forests with a higher amount of timber vegetation, which has some very good patches of *Tectona grandis* and many other timber plants. The study area is having a good population of amphibians due to Vanaj irrigation dam in the central part of the forest. It is famous tourism destination due to its archaeological importance. Sarkar (1984), Naik & Vinod (1993), Sarkar & Ray (2000) were the pioneer of describing the anurans of north Gujarat including Sabarkantha. After Sarkar & Ray (2000), a very long gap made us more enthusiast towards the inventory of anurans checklist. Variations among

species population could be based on temporal changes (Hanski, 1982). The present research will provide the baseline information on the anurans in the study area and fill the gap of information as well as give direction for future research on herpetofauna in the study area. We have documented ten species of amphibians, including two toads and eight frogs among which two were considered as a new record from this area.

Methodology:

The study area is located in the north-eastern part of Gujarat state, Sabarkantha district a wildlife division. The forest covers approximately 400km² of the area. The area was surveyed in core and buffer zone of the forest with around 600 km² of dry deciduous vegetation. The study area is entitled as reserved forest (Rodgers *et al.*, 2000), which shares one boundary with Fulwari ki naal wildlife sanctuary of Rajasthan state.

It is a preliminary work carried out during our field survey for sloth bear occurrence through strip transects during which the amphibians were also been recorded through visual encounters. Moreover, we also used sono-taxonomical methods to locate the anurans (Sharma, 2015).

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Original article

An annotated checklist of hermit crabs (Crustacea, Decapoda, Anomura) of Indian waters with three new records



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ABSTRACT

The annotated checklist of hermit crabs occurring in the Indian waters has been compiled based on published literature and specimens collected by us along the Indian coastline from 2010 to 2016. The checklist records 112 species belonging to 26 genera and five families. The east coast of India, with 81 species is more diverse than the west coast of India (73 species). Maximum species diversity was recorded from coastal areas of Tamil Nadu state (50 species) whereas the least number of species were reported from coastal areas of Maharashtra state (7 species). Distribution of three species belonging to the family Diogenidae namely *Areopaguristes perspicax* (Nobili, 1905), *Clibanarius virescens* (Krauss, 1843), and *Diogenes lophochir* (Morgan, 1989) is for the first time recorded in Indian waters.

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Introduction

The coastline of India is ~7,516.6 km long, out of which 5,422.6 km is located along the mainland whereas 2,094 km is located in the islands [Andaman and Nicobar Islands (1,962 km); Lakshadweep Islands (132 km)] (Ahmad 1972; Kumar et al 2006). The coastal area of the country can be divided into two parts, the west coast which stretches over four coastal states (Gujarat, Maharashtra, Goa, Karnataka, and Kerala) and one island group (Lakshadweep Islands), whereas the east coast stretches over four states (Tamil Nadu, Andhra Pradesh, Orissa, and West Bengal) and one island group (Andaman and Nicobar Islands) (Ahmad 1972; Kumar et al 2006). The hermit crab fauna of Indian water is one of the scarcely studied groups of decapod crustaceans. The first publication on hermit crab species from Indian waters was by Heller (1865) who collected specimens from Nicobar Island during his survey on the Austrian ship "Novara" and identified 14 species out of which, the identification of *Coenobita olivieri* Owen, 1839 is still doubtful (see Reddy and Ramakrishna 1972). Henderson (1893, 1896) examined the material available in Madras Museum as well as material collected during a survey using HMS "Investigator" in

the seas around India and identified several species including new species from Indian waters. Alcock (1905) prepared a catalogue of hermit crabs collected during different expeditions in the seas around India and listed several species including new species from Indian waters. Southwell (1909) examined the hermit crab specimen collected by Mr James Hornell from Okha Mandal (Gujarat State) and identified three species: *Diogenes investigatoris* Alcock, 1905, *Clibanarius humilis* (Dana, 1851), and *Clibanarius infra-spinatus* (Hilgendorf, 1879). Henderson (1915) examined hermit crab material collected from Chilka Lake and identified seven species including one new species: *Clibanarius olivaceus* Henderson, 1915. Kemp (1915) also recorded six species of hermit crab from Chilka Lake. Sundararaj (1927) recorded a few species of hermit crab from the Gulf of Mannar. Reddy (1935) identified 11 species of hermit crab from Port Novo (Tamilnadu) and adjacent areas. Gravely (1941) also recorded a few species of hermit crabs from coastal areas of Madras (Tamilnadu). Kamalaveni (1950) examined a small collection of hermit crab available in Indian museums and described one new species *Diogenes waltirensis* Kamalaveni, 1950. Kamalaveni (1950) also described a new genus *Neopagurus* Kamalaveni, 1950 (type species: *Neopagurus horai* Kamalaveni, 1950) which is now considered as a junior synonym of *Dardanus pedunculatus* (Herbst, 1804). Sarojini and Nagabhushanam (1972) have studied the hermit crab fauna of Waltair coast (Andhra Pradesh) and identified 22 species including one new species: *Pagurus indicus* Sarojini & Nagabhushanam, 1972. Sankolli (1962) described a new species *Pagurus kulkarnii* Sankolli, 1962 from the coastal

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Short Communication

In vitro regeneration of *Chlorophytum borivillianum* Santapau & R.R. Fern.

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ABSTRACT

An efficient *in vitro* regeneration protocol was established from *ex vitro* leaf explants of *Chlorophytum borivillianum* Santapau & R.R. Fern. Callus induction was achieved on Murashige and Skoog (MS) basal medium supplemented with 0.7 μM N⁶-benzylaminopurine (BAP) and 0.7 μM 2,4-dichlorophenoxy acetic acid (2,4-D). Around 70% calli regenerated into multiple (~7) shoots with an average length of 6.5 mm when the same were subcultured on 0.7 μM BAP and 0.7 μM 2,4-D. Interestingly, higher (0.8-0.9 μM) or lower (0.4-0.6 μM) concentrations of BAP and 2,4-D than the optimized one (0.7 μM) resulted in reduced regeneration with fewer shoots of shorter length. For *in vitro* rooting of shoots, various combinations of MS with BAP, 6-furfurylaminopurine (Kn) and α -naphthalene acetic (NAA) proved fruitful in comparison to MS without any plant growth regulator; though MS fortified with 3.5 μM BAP + 0.2 μM Kn + 6.8 μM NAA generated a maximum number (25.9) of *in vitro* roots per shoot. The regenerated plantlets were acclimatized (with ~90% survival) in a mixture of vermiculite, soil and organic matters (1:1:1; v/v/v). The present study established a reproducible practice on *in vitro* organogenesis that can be suggested for large-scale clonal propagation and an alternative source of steroidal alkaloids.

Keywords: Acclimatization, callus, rooting, safed musli, shoot organogenesis


Abbreviations: 2,4-D: 2,4-dichlorophenoxy acetic acid; BAP: N⁶-benzylaminopurine; Kn: 6-furfurylaminopurine; MS: Murashige and skoog; NAA: α -naphthalene acetic acid; PGR: plant growth regulator

Chlorophytum borivillianum Santapau & R.R.Fern., a well recognized medicinal plant that belongs to family, Anthericaceae, is described as a 'white gold' or 'Divya Aushadi' in Indian traditional systems of medicine. It is more popular with the trade name 'Safed Musli' (Maiti and Geetha, 2005). Out of more than 200 species of genus *Chlorophytum*, allocated around tropical world (predominantly in India and Africa) (Govaerts *et al.*, 2012), *C. borivillianum* exhibited maximum level of steroidal saponin even up to 17% of its dry weight featured on genotype (Bordia *et al.*, 1995). In Ayurveda, it comes under the group of 'Vajikaran Rasayana' owing to the aphrodisiac potential of its bioactive elements. It contains β -sitosterol, stigmasterol, sarasapogenin and diosgenin (Vidhu *et al.*, 2009). The root is preferred in the conventional system of medicine as a source of multiple

steroidal alkaloids. It is traded worldwide from local to global levels and its International demand has been assessed as 300-700 tons per annum, an amount that transcends its natural population (Haque *et al.*, 2011). This species has been listed in IUCN Red List due to the indiscriminate exploitation of its natural population for industrial isolation of steroidal elements. Recently, this species is evaluated as Critically Endangered species based on criterion A2cd ver. 3.1, as it has declined by 80% over a period of ten years (Ved *et al.*, 2015). An alternative approach for production of steroidal elements of the plant is indispensable that can complement the conventional seed-based (merely 5-13% germination) or vegetative (sluggish) propagation system. Keeping this in view, the present study aimed at *in vitro* induction of callus and its regeneration into shoot and root

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Concurrent production and relative quantification of vasicinone from in vivo and in vitro plant parts of Malabar nut (*Adhatoda vasica* Nees)

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Abstract The present study documents a simultaneous production and comparative assessment of extracted vasicinone from in vivo (leaves and stems) and in vitro (leaves, stems and calli) plant parts of *Adhatoda vasica* Nees, a well-known medicinal plant. High-performance thin layer chromatography (HPTLC) analysis of the above-mentioned plant parts, collected at their 60-day-old growth stage, was performed via methanolic extraction and with the aid of toluene:butanol:butyl acetate (9:0.5:0.5; v/v/v) solvent system. The method was validated with the help of aluminium sheet precoated with silica gel 60 F₂₅₄ TLC plates, following the ICH guidelines in order to maintain accuracy, precision and repeatability. Correlation coefficient, limit of detection and limit of quantification values were found to be reasonable. The outcome revealed a linearity that ranged between 2 and 6 µg/spot. During the comparison of estimated vasicinone quantity from in vivo and in vitro plant

parts, it was evident that in vitro samples produced relatively higher vasicinone than that of the in vivo counterparts. Maximum vasicinone (6.402 ± 0.010% of dry weight) production was quantified from in vitro leaves followed by calli (5.222 ± 0.092% of dry weight) and in vitro stems (2.007 ± 0.041% of dry weight). On the other hand, in vivo leaves and stems produced comparatively lower quantities of vasicinone (2.412 ± 0.139 and 1.933 ± 0.046% of dry weight, respectively) suggesting the in vitro clonal propagation as a superior approach in comparison to in vivo propagation. Nonetheless, simultaneous production from both the sources (in vivo and in vitro plant parts) provides a new avenue for augmented production of vasicinone.

Keywords *Adhatoda vasica* · HPTLC · Malabar nut · Medicinal plant · Vasicinone

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Introduction

Adhatoda vasica Nees (syn, *Justicia adhatoda* L.), commonly known as Malabar Nut (or Vasaka) is a perennial shrub and belongs to the family Acanthaceae. It grows in sub-Himalayan tracts and has conventionally been utilized in Ayurvedic and Unani medicine for more than 2000 years (Jayapaul et al. 2005). It is basically an evergreen shrub of 1–2.5 m height with opposite ascending branches producing a vile smell and bitter taste. Several ethnopharmacological studies on *A. vasica* reported the aerial portions of the plant (like stem, leaf, flower, fruit and seeds) to contain vasicine, vasicinone (Suthar et al. 2009), vasicine acetate and 2-acetyl benzyl amine (Ignacimuthus and Shanmugam 2010), adhatodine and vasicoline (Ahmad et al. 2009). *A. vasica* leaves and stems have been utilized

HIGH PERFORMANCE LIQUID CHROMATOGRAPHY METHOD FOR QUANTIFICATION OF ELLAGIC ACID IN *IN VIVO* AND *IN VITRO* PLANT PARTS OF *OROXYLUM INDICUM* (L.) VENT

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ABSTRACT

Objective: This study was performed to investigate the comparative analysis of ellagic acid content in *in vivo* (stem, leaf, and root) and *in vitro* (callus, *in vitro* developed root and shoot) samples of *Oroxylum indicum* (L.) Vent. an important medicinal plant.

Methods: For *in vitro* culture, seedling explants were inoculated on MS (Murashige and Skoog's, 1962) medium, supplemented with N6-benzylaminopurine (BAP) and Kn alone and combination with indole acetic acid (IAA). Analytical method high performance liquid chromatography (HPLC) was developed for the quantification of ellagic acid in *in vivo* and *in vitro* samples.

Result: BAP combination with IAA was best for shoot multiplication, BAP with 2,4-D were used for callus proliferation. HPLC analysis of these extracts revealed that the quantity of ellagic acid present in both the samples, but maximum ellagic acid content was obtained in leaves among all plant parts.

Conclusion: Hence, this study showed the *in vivo* as well as *in vitro* samples contain ellagic acid. That can be used for its large scale production in future.

Keywords: *Oroxylum indicum*, Ellagic acid, High performance liquid chromatography.

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INTRODUCTION

Oroxylum indicum (L.) Vent. commonly known as Shyonaka or Sonapatha, a member of Bignoniaceae. All parts of this plant are used in many Ayurvedic preparations. It has anti-inflammatory, diuretic, antiarthritic, antifungal, and antibacterial activity [1]. Previous reports have revealed that stem bark and leaves of this plant contain flavonoids, namely, chrysin, oroxylin-A, scutellarin, baicalein [2,3], and seeds of this plant contain ellagic acid [4]. It has been reported that baicalein possesses an anti-inflammatory [5], antiulcer [6], antioxidant [7], hepatoprotective [8], and immunomodulatory activity [9], while chrysin and baicalein both are reported to have antibacterial, antifungal, and antiviral activity [10,11].

Natural products which are obtained from the medicinal plant are important sources for biologically active drugs. Today the pharmacologically active ingredients of many Ayurvedic medicines are being identified and their usefulness in drug therapy being determined. Phytochemical studies have attracted the attention due to the development of new and sophisticated techniques. These techniques played a significant role in giving the solution to systematic problems and in the search for additional resources of raw materials for pharmaceutical industry [12].

Therefore, the present investigation was performed for quantification of ellagic acid from *in vivo* and *in vitro* samples by high performance liquid chromatography (HPLC) technique which will help in crude drug identification for various pharma industries.

METHODS

Plant materials and culture establishment

The plant parts of *O. indicum* (L.) vent were collected during the month of August-September 2012 from botanical garden of Hemchandracharya North Gujarat University (HNGU), Patan, Gujarat, India. The plant material was authenticated and identified from the Department of Botany, HNGU, Patan. *In vitro* plants were grown on

MS media supplemented with 30 g/L sucrose and 0.8% agar from seedling explant, viz., apical bud, axillary bud, and hypocotyl. Different concentration of N6-benzylaminopurine (BAP) and indole acetic acid (IAA) were used for shoot multiplication and shoot elongation. NAA and IBA alone or in combination were used for rooting while the different concentration of 2, 4 -D, BAP and Kn were used for callus induction.

Preparation of plant extract

The air-dried finely powdered plant samples (1.0 g each) of *in vivo* and *in vitro* samples, viz., *in vitro* root, *in vitro* shoot, and callus were soaked in 10 ml of methanol for 48 hrs at room temperature. The extracts were concentrated at 50°C and filtered through Whatman No.1 filter paper. The supernatants were collected, covered, labeled and used for the screening of quantitative analysis by HPLC method.

HPLC analysis

HPLC technique was carried out to quantify the flavonoids of selected plant. For this purpose, extract was prepared from *in vivo* and *in vitro* samples using methanol extraction method. Ellagic acid was quantified in methanolic extracts using the HPLC method. The composition and the gradient elution conditions used were described previously [13] with some modification. The separation was achieved by 250×4.6 mm i.d. Symmetry- C18 5 µm column and water:Methanol:acetonitrile:Orthophosphoric acid (60:30:38:1, v/v/v/v) used as a mobile phase. The flow rate was 1.0 ml/minutes (gradient program) at room temperature and injection volume was 10 µL used. Detection wavelength was set at 262 nm. Quantification was made by comparison with standard solutions (from 2.0 to 12 µg/ml) retention times (tR) (minutes) of ellagic acid was 3.29. The quantification of ellagic acid was estimated using calibrated Shimadzu LC-2010 quaternary reversed phase (RP-HPLC) system.

RESULTS AND DISCUSSION

Callus from hypocotyl and apical bud explants were significantly developed on MS media with 2, 4-D + BAP (2+2, 2+2.5). While highest



SHORT COMMUNICATION

An Efficient In Vitro Approach for Direct Regeneration and Callogenesis of *Adhatoda vasica* Nees, a Potential Source of Quinazoline Alkaloids

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Abstract The present study reports a comprehensive approach on in vitro direct regeneration and callus induction of *Adhatoda vasica* Nees from in vivo nodal segment (NS) explants. For direct initiation of shoots, 0.6–1.4 mg/l of N⁶-benzyladenine (BA) was employed in Murashige and Skoog (MS) medium. The earliest shoot initiation was recorded within 6 days of inoculation, whereas maximum number (7.4) and length (7.2 cm) of shoots with highest number (2.8) of leaves per shoot were recorded in MS medium plus 1.1 mg/l BA. Isolated shoots were transferred to MS medium, supplemented with diverse combinations of indole-3-butyric acid (IBA) (0.1–2.5 mg/l) and α -naphthalene acetic acid (NAA) (1–3 mg/l), for the purpose of root induction. Maximum (94%) rooting was recorded in MS medium fortified with 1 mg/l IBA and 0.25 mg/l NAA (8.4 roots/shoot with 5.6 cm length). The regenerated plantlets were acclimatized initially in soil and sand (1:1; v/v)

for 4 weeks recording a survival rate of > 95%. Finally, the surviving plantlets were established in sand, soil and farmyard manure (1:1:1; v/v) for another 4 weeks. For callus induction, NS explants were inoculated in MS medium fortified either with 2,4-dichlorophenoxy acetic acid (2,4-D) (0.1–2.5 mg/l) or with different combinations of BA (0.5 mg/l) and NAA (0.5–2.5 mg/l). Highest (46%) callus induction was recorded in MS medium with 1 mg/l 2,4-D that subsequently induced ~ 60 roots per callus, devoid of adventitious shoots.

Keywords Acclimatization · Callus · Multiple shoot · Regeneration · Rooting · Secondary metabolites

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Since antiquity, among the many explored plant species, medicinal plants attain major recognition for their indispensable contribution in ayurveda and modern pharmaceutical industries [1]. Biotechnological approaches, especially in vitro regeneration-based systems, are essential for sustainable supply of plants (or medicinally important plant parts) to the pharmaceutical industry for harvesting of pharmaceutically important secondary metabolites [2]. Furthermore, the amelioration of secondary metabolites through biotic/abiotic elicitation or *Agrobacterium*-mediated genetic transformation can be achieved by in vitro direct/indirect regeneration approaches. Owing to multiple merits, an ample number of in vitro protocols have been established for numerous medicinal plant species [3], which is still persistent. However, a singular in vitro approach focusing on large-scale production of leaves, shoots, roots and calli is always anticipated to meet the demands of plant-derived secondary metabolite sources, comprehensively.



BIOCHEMICAL STUDIES OF DIFFERENTIATING CALLUS CULTURES OF *OROXYLUM INDICUM* (L.) VENT.

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Abstract

Some biological parameters in respect to total sugar, protein, total amino acid, peroxidase, Polyphenol oxidase and IAA oxidase activity were determined during the process of shoot regeneration in the callus culture of *Oroxylum indicum* (L.) Vent. Following stages were taken into consideration to describe biochemical changes: callus, differentiating green callus, callus with shoot primordia, differentiating callus with multiple shoots and shoots of 6 month old plant. *In vivo* leaf used as control. Reducing sugar and amino acid found increased during initial stage and play important role during the *in vitro* growth and differentiation. Whereas, protein was found higher in differentiated stage and shows rapid structural build up. The biochemical changes in terms of enzyme activities varied during different stages of *in vitro* organogenesis.

Key words: *Oroxylum indicum*, biochemical, metabolites

Introduction

Oroxylum indicum (L.) Vent., belongs to the Bignoniaceae family grows wild in India, Sri Lanka, Phillipines and Indonesia (Anonymous, 1972), at an altitude of 1200m and found mainly in ravine and moist place in the forests (Bennet *et al.*, 1992; Dey, 1980). Every parts of this plant possesses medicinal importance. For high medicinal value, it is collected from its natural habitat in indiscriminate manner, so, this plant become vulnerable in Kerala, Maharashtra, M.P. and Chhatisgarh (Darshan and Ved, 2003; Jayaram and Prasad, 2008). A short span of viability and low germination rate, restrict the propagation of *Oroxylum indicum* by seeds (Dwivewdi and Boro, 2012). Various bioactive compounds like chrysin, oroxylin-A, scutellarin, baicalein are present in stem bark and leaves (Sankara and Nair, 1972-a; Sankara and Nair, 1972-b). Seeds of this plant are reported to contain ellagic acid (Vasanth *et al.*, 1991). The plant is used in many Ayurvedic preparations like Dasamoola, Chyawanaprasha, Brahma rasayana, Narayana Taila, Awalwha and Dantyardarishtha (Anonymous, 1998).

Plant has several biochemical processes starting from germination till the end of plant life. The growth speed,

types, development patterns at every stage is highly controlled by some total of biochemical pathways where it is in *ex vitro* or *in vitro* growth condition. Biochemical attributes are indicators of morphogenetic potential, growth and differentiation, representing differential gene action or expression or change in endogenous level of growth regulators in cell cultures and are used for analysis of gene function and metabolic regulation (Scandalios, 1974; Carrillo and Mata, 2000). Many investigations have been made about the physiological changes taking place during organogenesis in callus culture (Saka and Maeda, 1974; Ross *et al.*, 1973; Malik and Kumari, 1977; Santos *et al.*, 2008; Cheniany *et al.*, 2010). Estimation of different metabolites like sugars, protein, amino acid and oxidative enzymes are interpreted to understand of mobilization and utilization of storage reserves. Hence, present study was an attempt to observed biochemical changes during *in vitro* organogenesis of *Oroxylum indicum* (L.) Vent.

Materials and Methods

Callus cultures were derived from leaf obtained from 20-25 days old seedling on MS (Murashige and Skoog, 1962) medium supplemented with different concentration of BAP with IAA. For morphogenesis and shoot differentiation, callus was transferred on same medium with same hormonal concentration and combination. All

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GENETIC FIDELITY OF MICROPROPAGATED *Oroxylum indicum* (L.) VENT. BY RAPD MARKER

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Abstract

The present work was undertaken to assess the genetic fidelity of micropropagated plant as well as mother plant using random amplified polymorphic DNA (RAPD). Apical buds and axillary buds were used as explant for mass multiplication. Fourteen arbitrary decamer primers generated clear and distinct bands. Total genomic DNA extracted from fresh leaves of *in vitro* regenerated as well as mother plants. No genetic variation was found within the efficacy of the protocol developed for the production and conservation of the selected plant.

Keywords: *Oroxylum indicum*, Genetic fidelity, RAPD, Molecular marker.

Introduction

Oroxylum indicum (L.) Vent. which belongs to the family Bignoniaceae, is one of the most important plant, distributed throughout India and other country like Sri Lanka, Malaysia, China, Thailand, Philippines and Indonesia (Anonymous, 1972). This plant has been used in Ayurvedic formulation like Dashmularisht and Chyawanprash (Yasodha *et al.*, 2004). It is also important ingredient of Ayurvedic formulation such as Amartarista, Dantadyarista, Narayana Taila, Dhanawantara Ghrita, Brahma Rasayana, Awalwha (Anonymous, 1998).

The natural population of *Oroxylum indicum* is decreasing in its habitat due to high demand in many pharmaceutical industries, its indiscriminate collection, over exploitation and uprooting of whole plants it has been categorized as vulnerable in Karnataka and Andhra Pradesh and endangered in Kerala, Maharashtra, M.P. and Chhatisgarh (Darshan and Ved, 2003; Jayaram and Prasad, 2008). Its low seed viability and poor vegetative propagation is also a reason.

Therefore, to overcome all these problems, plant tissue culture is an alternative method for mass multiplication. However, there is possibility of developing somaclonal variation in *in vitro* cultures (Bindiya and Kanwar, 2003; Martins *et al.*, 2004). Apart from morphological observation, the genetic stability of the *in vitro* regenerated plant should be assessed by using molecular markers. A number of molecular markers can be used to detect genetic fidelity of *in vitro* developed plant. Out of these Random Amplified Polymorphic DNA

(RAPD) is the cheapest yet reliable and could be a powerful tool for the detection of genetic variability in plants (Fernando *et al.*, 1996; Cassells *et al.*, 1997). This technique does not require any prior knowledge of DNA sequence for primer design (Fang and Roose, 1997). Based on this fact, the present work was carried out for the assessment of genetic fidelity of micropropagated plants using DNA based markers RAPD. RAPD marker study on this plant was seen by Jayaram and Prasad (2008), but they have been reported genetic diversity of this selected plant from different geographic region. Hence, the present study was undertaken to study genetic fidelity of *in vitro* raised plant and mother plant.

Materials and Methods

A. Plant materials

The seeds from mature fruits were collected from selected plant during January-February, 2012-2013 at Hemchandracharya North Gujarat University, Patan, Gujarat, India. Collected seeds were pre-treated with aqueous solution of different growth regulators like Gibberellic acid (GA_3), Kinetin (Kn), 6-Benzylaminopurine (BAP) and Zeatin. The seeds were surface sterilized in 0.01% (v/v) Tween-20 for 2 minutes. Followed by 0.1% (w/v) $HgCl_2$ for 2 minutes. Each treatment was followed by repeated washing minimum of 3 times in autoclaved distilled water. Surface sterilized seeds were inoculated in glass tubes containing Murashige and Skoog (1962) (MS) Media supplemented with 30 g l⁻¹ sucrose and 0.8% agar without any plant growth regulators. Apical bud and axillary bud were excised from

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Research Article

High Performance thin layer chromatographic quantification of key cholesterol reducing compound (β -sitosterol) from leaf, bark, fruit and root of *Terminalia arjuna*, *T. bellerica* and *T. chebula*

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ABSTRACT

The present study aims at comprehensive production and quantification of the steroid β -sitosterol: a cholesterol reducer, extracted from the leaf, bark, fruit and root of three species of *Terminalia* (namely, *T. arjuna*, *T. bellerica* and *T. chebula*) by means of high performance thin layer chromatography (HPTLC). The fingerprinting analysis operated on silica gel 60F₂₅₄ HPTLC aluminium sheets with CAMAG Linomat 5 sample applicator projected a pH range of 0.63 to 0.69 with a linearity regression equation $Y = 3464.522 + 78570 \cdot X$ for β -sitosterol. The r-value appeared for this equation was 0.99495 with sdv of 4.37 screened at 540 nm. Moreover, the limit of detection and limit of quantification values of β -sitosterol were 200 ng/spot and 600 ng/spot, respectively; evincing the HPTLC technique to be a robust one. The quantified values of β -sitosterol was maximal (7.798 ng/ml) in fruits of *T. arjuna*, followed by 4.113 ng/ml in bark of *T. bellerica*. The bark of *T. chebula* also confirmed to possess 2.789 ng/ml of β -sitosterol. Except the fruits and roots, all other parts of *T. chebula* possessed comparable quantity of β -sitosterol. Thus, the present quantification would be of much help in the production of β -sitosterol in *Terminalia* species.

Keywords: β -sitosterol, HPTLC, Quantification, *Terminalia*

Abbreviations: HPTLC High-performance liquid chromatography; LOD Limits of detection; LOQ Limit of quantifications; TB *T. bellerica*; TC *T. chebula*; TA *T. arjuna*

INTRODUCTION

Terminalia genus comes under the family Combretaceae, encompassing around 100 species scattered all over the tropical regions of the world. Among these 100 species, *T. arjuna* (Roxb.) Wight & Ar. (TA), *T. bellerica* Roxb. (TB), and *T. chebula* Retz. (TC) are the three prime species. The name "*Terminalia*" was chosen since the leaves of the plant inclines to crowd more towards the ends of the

branches. All these three species are deciduous in nature and the inherent medicinal parts are leaves, stem or bark and fruits. In Ayurvedic herbal formulations, *Triphala* (meaning "three fruits") that includes *Embolia officinalis*, TB and TC, have revealed synergistic effects to reinforce many other metabolic processes. Among these three fruits, TB (vernacular name 'Beheda') has been the most effective antioxidant followed by *E. officinalis* and TC (Sabbu and Kuttan, 2002). The fruits of TB can be effective for the

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Short Communication

In vitro regeneration of *Chlorophytum borivilianum* Santapau & R.R. Fern.

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Received: January 3, 2017; Accepted: February 23, 2017

ABSTRACT

An efficient *in vitro* regeneration protocol was established from *ex vitro* leaf explants of *Chlorophytum borivilianum* Santapau & R.R. Fern. Callus induction was achieved on Murashige and Skoog (MS) basal medium supplemented with 0.7 μ M N⁶-benzylaminopurine (BAP) and 0.7 μ M 2,4-dichlorophenoxy acetic acid (2,4-D). Around 70% calli regenerated into multiple (~7) shoots with an average length of 6.5 mm when the same were subcultured on 0.7 μ M BAP and 0.7 μ M 2,4-D. Interestingly, higher (0.8-0.9 μ M) or lower (0.4-0.6 μ M) concentrations of BAP and 2,4-D than the optimized one (0.7 μ M) resulted in reduced regeneration with fewer shoots of shorter length. For *in vitro* rooting of shoots, various combinations of MS with BAP, 6-furfurylaminopurine (Kn) and α -naphthalene acetic (NAA) proved fruitful in comparison to MS without any plant growth regulator; though MS fortified with 3.5 μ M BAP + 0.2 μ M Kn + 6.8 μ M NAA generated a maximum number (25.9) of *in vitro* roots per shoot. The regenerated plantlets were acclimatized (with ~90% survival) in a mixture of vermiculite, soil and organic matters (1:1:1; v/v/v). The present study established a reproducible practice on *in vitro* organogenesis that can be suggested for large-scale clonal propagation and an alternative source of steroidal alkaloids.

Keywords: Acclimatization, callus, rooting, safed musli, shoot organogenesis

Abbreviations: 2,4-D: 2,4-dichlorophenoxy acetic acid; BAP: N⁶-benzylaminopurine; Kn: 6-furfurylaminopurine; MS: Murashige and Skoog; NAA: α -naphthalene acetic acid; PGR: plant growth regulator

Chlorophytum borivilianum Santapau & R.R. Fern., a well recognized medicinal plant that belongs to family, Anthericaceae, is described as a 'white gold' or 'Divya Aushadi' in Indian traditional systems of medicine. It is more popular with the trade name 'Safed Musli' (Maiti and Geetha, 2005). Out of more than 200 species of genus *Chlorophytum*, allocated around tropical world (predominantly in India and Africa) (Govaerts *et al.*, 2012), *C. borivilianum* exhibited maximum level of steroidal saponin even up to 17% of its dry weight featured on genotype (Bordia *et al.*, 1995). In Ayurveda, it comes under the group of 'Vajikaran Rasayana' owing to the aphrodisiac potential of its bioactive elements. It contains β -sitosterol, stigmasterol, sarasapogenin and diosgenin (Vidhu *et al.*, 2009). The root is preferred in the conventional system of medicine as a source of multiple

steroidal alkaloids. It is traded worldwide from local to global levels and its International demand has been assessed as 300-700 tons per annum, an amount that transcends its natural population (Haque *et al.*, 2011). This species has been listed in IUCN Red List due to the indiscriminate exploitation of its natural population for industrial isolation of steroidal elements. Recently, this species is evaluated as Critically Endangered species based on criterion A2cd ver. 3.1, as it has declined by 80% over a period of ten years (Ved *et al.*, 2015). An alternative approach for production of steroidal elements of the plant is indispensable that can complement the conventional seed-based (merely 5-13% germination) or vegetative (sluggish) propagation system. Keeping this in view, the present study aimed at *in vitro* induction of callus and its regeneration into shoot and root

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Kaziranga National Park — Plenty of Sloth Bears, but are there Other Bear Species?



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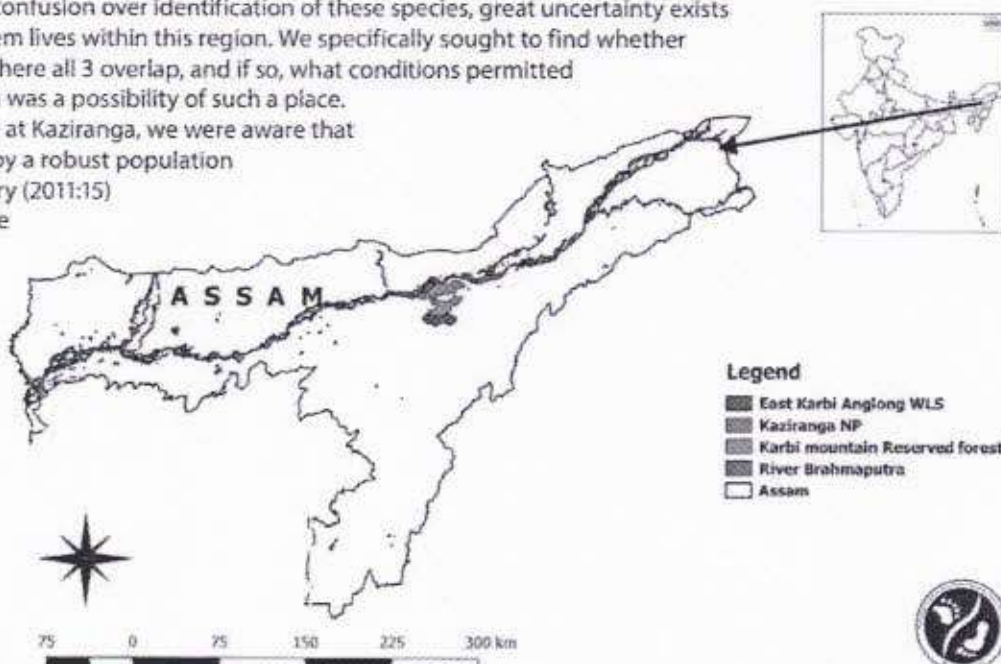
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India's Kaziranga National Park, located in the state of Assam in northeastern (NE) India is most known for its one-horned inhabitant, the Indian rhinoceros (*Rhinoceros unicornis*). But it contains a host of other fascinating wildlife as well, including tigers, leopards, elephants, water buffalo, gaur, sambar, and swamp deer. Kaziranga comprises a lush mixture of grasslands, marshlands, riverine forests, and mixed-deciduous and semi-evergreen tropical forests, crosscut by 4 rivers and interspersed with lakes. During the peak of the monsoon in July – August, much of the park is flooded. We were interested in what bear species occupy this park and surrounding areas.

Three bear species occupy NE India (Asiatic black, *Ursus thibetanus*, sloth, *Melursus ursinus*, and sun, *Helarctos malayanus*), but due to confusion over identification of these species, great uncertainty exists about where each of them lives within this region. We specifically sought to find whether there might be places where all 3 overlap, and if so, what conditions permitted this sympatry. Kaziranga was a possibility of such a place.

Before spending time at Kaziranga, we were aware that the park was inhabited by a robust population of sloth bears: Choudhury (2011:15) described the park as the "the most important site for the species in NE India." We were aware of no evidence for the presence of Asiatic black bears or sun bears within or adjacent to the park. However, there are old records of sun bear cubs formerly being found in tea farms bordering the park's grassland and Karbi Mountains areas (Choudhury 2011).



Kaziranga National Park, bordered by the Brahmaputra River to the north and Karbi Mountain range to the south, offers a possible intersection of habitats favorable to 3 bear species.

Biological Research

Sloth Bears Feed on Cicadas in Jassore Sloth Bear Sanctuary, Gujarat, India

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Sloth bears feed primarily on termites, ants, and some types of fruits. Their presence and density in an area is thought to be closely tied to the abundance of these foods. Jassore Sloth bear Sanctuary (180 km²), Banaskantha district of Gujarat, India, has the highest sloth bear population density in the state (State Population of Sloth Bears and Panthers 2016). The sanctuary is characterized by dry deciduous forest, with an abundance of *Prosopis chilensis*, an introduced mesquite tree used for shade, fodder, and firewood.

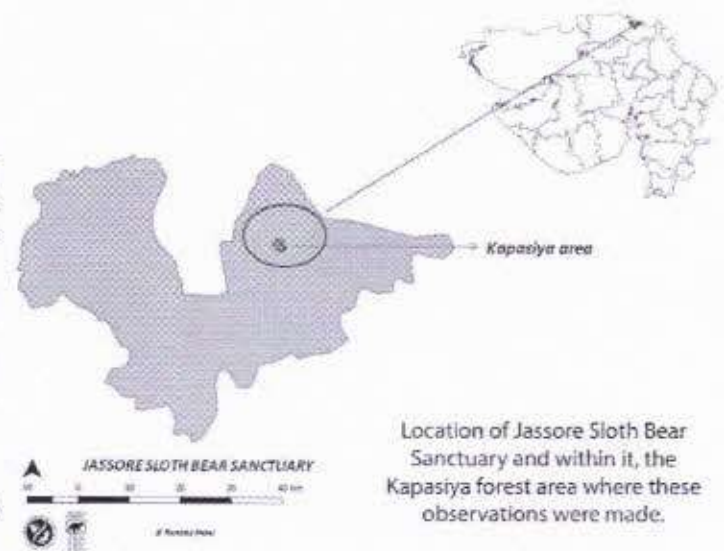
Most sloth bears in Jassore Sloth Bear Sanctuary occur in Kapasiya forest, a section of the sanctuary (43 km²). This forest was taken over by *Prosopis chilensis* from a plantation started 30 years ago (Singh 2001); the seed pods were spread by sheep and goats, and in this arid landscape, this tree outcompeted and suppressed native fruit-bearing species. In May 2016, we surveyed the sanctuary for sloth bear signs and collection of scat.

We collected 52 scats from the sanctuary, 13 of which were in Kapasiya forest. We washed the scats thoroughly in the laboratory to separate the food remains, which we dried and observed under a dissecting microscope. We found seeds of *Cassia fistula*, black ants, honey bee and bee's wax, seeds of *Diospyros melanaxylon*, and figs (*Ficus spp.*). Also, 9 of the 13 scats collected from Kapasiya forest were composed mostly of the mouth parts, appendages and wings of a large insect. Since we observed that cicadas were common in the area during our surveys, we collected some and compared them to the insects in the scats, and confirmed presence of *Platypleura spp.* We also observed a high sloth bear activity in the area, as evidenced by many fresh diggings and some fresh claw marks on trees.

To our knowledge, this is the first observation of cicada remains in sloth bear scat. Sloth bears are known to occasionally feed opportunistically, as scats have included rare items like a snake (Hasted, 1903) and livestock



Much *Prosopis*-infested habitat contains little native fruit-bearing trees.



Location of Jassore Sloth Bear Sanctuary and within it, the Kapasiya forest area where these observations were made.

Nandita Patel

Synthesis of some new pyrazole nucleus fused 2-thioxo-4-thiazolidinone derivatives and evaluation of their antimicrobial activities

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ABSTRACT

Novel 5-((3-(4-substituted phenyl)-1-phenyl-1H-pyrazol-4-yl) methylene)-2-thioxothiazolidin-4-one derivatives based on 2-thioxothiazolidin-4-one were synthesized in good yields using a simplified experimental conditions. The structure of synthesized compounds was established with the help of common physico-chemical analysis and various spectroscopic techniques like FT-IR, mass and ¹H NMR. The results of characterization are in good agreement with the proposed structures of all the synthesized compounds. Further, the antimicrobial (antibacterial, antimycobacterial and antifungal) activities of all the synthesized derivatives were carried out against various strains like, *Escherichia Coli* (MTCC 443), *Pseudomonas Aeruginosa* (MTCC 1688), *Staphylococcus Aureus* (MTCC 96), *Streptococcus Pyogenes* (MTCC 442), highly virulent *Mycobacterium Tuberculosis* H₃Rv, *Candida Albicans* (MTCC 227), *Aspergillus Niger* (MTCC 282) and *Aspergillus Clavatus* (MTCC 1323) by serial broth dilution method. The results of antimicrobial screening showed that all the compounds possess mild to very good activity towards selected strains.

Keywords: 2-Thioxo-4-thiazolidinone, 1-phenyl-3-(p-substituted phenyl)-1H-pyrazole-4-carbaldehyde, antibacterial activity, antifungal activity, antimycobacterial activity.

1. INTRODUCTION

Among the class of thiazolidones, 2-thioxothiazolidin-4-ones have been found to be important in structurally as well as pharmacologically due to the presence of =N-C-S linkage which imparts biological activity to the structure [1]. Presently available thiazolidones, rhodanine and N-methyl rhodanine are reported to have significant anti-tubercular and anti-tumor activity [2-6] and are also useful in the treatment of diabetic complications [7-8]. These drugs are also under clinical trials as a potential antimicrobial, and antifungal drugs [9-13].

In recent years, several 4-functionally substituted N-aryl pyrazole derivatives have been identified as antimicrobial [14],

anti-inflammatory [15], anti-tubercular [16], antitumor [17], antidepressant and anticonvulsant [18], anti-angiogenic activity [19], anti-proliferative [20] as well as possessing antiviral activities [21].

Looking to the aforementioned importance of 2-thioxothiazolidin-4-ones derivatives, we intended to synthesize novel entity such as 5-((1-phenyl-3-(p-substituted phenyl)-1H-pyrazol-4-yl) methylene)-2-thioxothiazolidin-4-ones (3a-h) using 2-thioxothiazolidin-4-one and 1-phenyl-3-(p-substituted phenyl)-1H-pyrazole-4-carb aldehyde (2a-h).

2. EXPERIMENTAL SECTION

2.1. General. The melting points of the products were determined by open capillary method using Mettler Toledo FP 62 melting point apparatus (Mettler Toledo-Switzerland) and were used without correction. The FT-IR spectra were recorded on a Perkin Elmer Spectrum GX FT-IR System (USA) using KBr pellets. ¹H spectra were recorded on 200 MHz Bruker Avance DPX NMR spectrometer using DMSO-d₆ as a solvent and TMS as an internal standard. The mass spectra were recorded on a Shimadzu QP2010 spectrometer (equipped with a direct inlet probe) operated at 70 eV. Elemental analysis was carried out on Perkin Elmer CHNS (O) analyser (PE- 2400 Series II-USA). Purity of the desired compounds were checked by analytical TLC on a silica gel GF 254 plate using ethyl acetate/ methanol (8:92) as a solvent system.

2.2. Biological assay.

2.2.1. Antibacterial activity. The newly synthesized compounds were screened for their antibacterial activity against gram positive

bacteria *Staphylococcus aureus* (MTCC-96) and *Streptococcus Pyogenes* (MTCC-442) and gram negative *Escherichia Coli* (MTCC-443) and *Pseudomonas Aeruginosa* (MTCC-1688). Thiazole inhibits protein synthesis in bacteria by binding to the complex formed between 23S rRNA and ribosomal protein L₁₁, thereby restricting the action of GTP dependent elongation factors. Antibacterial activity was carried out by serial broth dilution method. The standard strains used for the antimicrobial activity was procured from the Institute of Microbial Technology, Chandigarh. The compounds (3a-h) were screened for their antibacterial activity in triplicate against *E. Coli*, *S. Aureus*, *P. Aeruginosa* and *S. Pyogenes* at different concentrations of 1000, 500, 200, 100, 50, 25, 12.5 µg/ml as shown in (Table 1). The growths of bacterial cultures were monitored after 24 and 48 h. The lowest concentration, which showed no growth after spot subculture was considered as MIC for each drug. The highest



A FACILE SYNTHESIS AND BIOLOGICAL SIGNIFICANCE OF 2-PYRROLIDINONES DERIVATIVES

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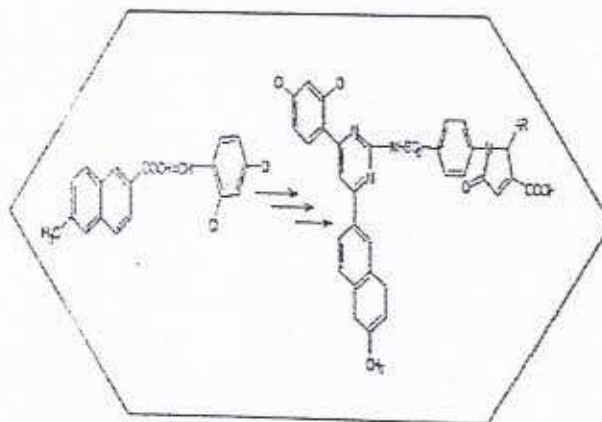
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ABSTRACT

2-Pyrrolidinones are one of the heterocyclic compounds with very important biological activities. In this view, it was proposed to synthesize some novel 2-Pyrrolidinones from Schiff bases. Here the synthesis of 2-Pyrrolidinones using 4-amino-N-(4-(2,4-dichlorophenyl)-6-(6-methylnaphthalen-2-yl)pyrimidin-2-yl)benzenesulfonamide and succinic anhydride under basic condition in presence of ethanol. The structures of synthesized were assigned on the basis of elemental analysis, IR and ¹H NMR spectroscopy data. These compounds were screened for their anti-bacterial activity.

KEYWORDS: 2-Pyrrolidinones, Antibacterial activity, Schiff bases.

INTRODUCTION

Substituted 2-pyrrolidinones have seen wide use in medicinal chemistry, both as model compounds to study interactions of larger compounds and as pharmaceuticals. Heterocyclic compounds are the well-known class of compounds for its biological applications out of

Biogenic Synthesis of Silver Nanoparticles from Medicinal Plant and its Antimicrobial Activity

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Abstract : Plant mediated biologically synthesized of nanoparticles is gaining importance due to its eco-friendliness. The synthesized metal nanoparticles are an expanding research area due to the potential applications for the development of novel technologies and very less toxic applications. In our research work, we describe a cost effective and environment friendly technique for green synthesis of silver nanoparticles and evaluate their Antibacterial activity. Synthesis and characterization of silver nanoparticles was carried out by using bark extract of *Moringa pterygosperma* plant reducing agent as well as capping agent. The Synthesized nanoparticles were characterized with UV-Visible spectrometry (UV-Vis), Fourier transform infrared spectroscopy (FT-IR), Scanning electron microscopy (SEM) and X-ray diffraction spectroscopy (XRD). The antibacterial activity of silver nanoparticles has been observed.

Keywords : *Moringa pterygosperma* plant extract as a reducing agent, Antibacterial activity, AgNO₃ salt.

Introduction

The prefix "nano" is a Greek word "nanos" which signifying "dwarf" (one billionth of meter 10⁻⁹m), is becoming extensively common in scientific literature. The natural world abound with lots of examples of the system with nanoscale structure, such as milk (nanoscale colloid), proteins, bacteria, cells, viruses etc. Furthermore, so many materials have complex structure at nanoscale state and are seems smooth to the naked eyes.

The prospect of exploiting natural resources for metal nanoparticle synthesis has become to be a competent and environmentally beneficent attain [1]. Green synthesis of nanoparticles is an Eco-Friendly approach which might have the way for researchers across the globe to explore the potential of disparate herbs in order to synthesize nanoparticles[2].

Here, we did research on medicinal plant. Synthesis and characterization of silver nanoparticles was carried out by using bark extract of *Moringa pterygosperma* plants reducing agent as well as capping agent. The Synthesized nanoparticles were characterized with UV-Visible spectrometry(UV-Vis),Fourier transform infrared spectroscopy (FT-IR),Scanning electron microscopy (SEM)and X-ray diffraction spectroscopy (XRD).The antibacterialactivity of silver nanoparticles has been observed.



Biogenic Synthesis of Silver Nanoparticles using *Bauhinia Variegata* Bark Extract and its Antibacterial Efficacy

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Abstract: Biological entity is gaining significant importance due to its large area of medicinal applications. A green approach has been carried out due to its eco-friendly nature, cost-effective and very less toxic effect. 80% of the world populations preferred plant based ayurvedic preparations since very long time due its fewer side effects. Silver nanoparticles have numerous applications in medicinal domain. Here, in the present study a green rapid biogenic synthesis of Silver Nanoparticles using *Bauhinia variegata* plant demonstrated. Extract is made up of Bark of the plant. In this synthesis silver is reduced by bark extract which act as reducing agent as well as capping agent. During the reactions color change shows formation of silver nanoparticles at preliminary conformation. UV study reveals the final confirmation for the formation of silver nanoparticles by Intense Surface Plasmon Resonance (SPR) band at 452 nm. The properties of the prepared silver nanoparticles characterized by Fourier Transform Infra-red spectroscopy (FTIR), UV-visible spectrophotometer, Transmission Electron Microscopy (TEM), X-ray Diffraction (XRD) and Scanning Electron Microscopy (SEM). Synthesized silver nanoparticles exhibited very effective Antibacterial activity against pathogenic bacteria.

Keywords: nanoparticles, *Bauhinia variegata* plant bark, reducing agent.

1 Introduction

About 80% of the world population using traditional medicinal plants as a primer health care. Every plant possess specific characteristic according to that it is used for the several treatments. In recent years, noble metal nanoparticles have been the subject of focused research due to their unique optical, electronic, mechanical, magnetic and chemical properties that are significantly different from those of bulk materials [1]. Among them Silver nanoparticles have been well recognized for combating bacterial drug resistance problems, biogenic silver nanoparticles can acts as effective and alternative bacteriostatic agents [2].

Chemically synthesized silver nanoparticles involve toxic chemical residues which show adverse effect in biomedical applications. Therefore biogenic synthesis by plant extract introduce selectively as alternative method for the synthesis of silver nanoparticles. It is evidently found that plant act as reducing agent as well as stabilizing agent and capping agent too. The biological synthetic approach for silver nanoparticles is advantageous over physicochemical

method because it is simple, cost effective, environmental-friendly, and easy to scale up for mass production [3]. Using several methods, like Solution combustion method for Synthesized La_2O_3 nanoparticles using Propylene glycol and Glutaric acid as fuel and chelating agent [4]. Biosynthesis of nanoparticles is a sort of bottom-up approach, where the main reaction occurring is reduction [5-8]. The advantage of using plant materials in nanoparticles synthesis is it does not need any elaborate processes such as intracellular synthesis, compound purification steps and the maintenance of microbial cell cultures [9].

This present demonstration study involves bark of *Bauhinia variegata* using double distilled water as a solvent and 1 mM AgNO_3 solution. *Bauhinia variegata* shows anti-inflammatory [10], chemo protective [11] and hepatoprotectivity [12]. The plant containing major chemical constituents were to be found such as Tannins, Saponin, flavones, flavonol glycoside, triterpene, phenanthraquinone. *Bauhinia variegata* exhibited excellent antibacterial activity against pathogenic bacteria.

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On distributional range extension of two species of brachyuran crabs *Parasesarma persicum* and *Austruca iranica* in Indian waters

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Original Article

Abstract

The study records the presence of two brachyuran species viz. *Parasesarma persicum* Naderloo and Schubart, 2010 and *Austruca iranica* (Pretzmann, 1971) belonging to families Sesamidae and Ocypodidae respectively, for the first time from Indian waters. Both species were previously recorded from Persian Gulf, Gulf of Oman and adjacent area. In the present study a detailed morphological description of the species is given.

Keywords: Brachyuran crabs, mangroves, sesamidae, ocypodidae, Gujarat

Introduction

Brachyuran crabs of family Sesamidae and Ocypodidae play an important role in the ecological functioning of mangrove and mudflat habitat (Khan *et al.*, 2005). Genus *Parasesarma* De Man, 1895 of family Sesamidae currently consists of 32 species

mainly occurring in the Indo-West Pacific region (Ng *et al.*, 2008; Rahayu and Ng, 2009, 2010; Naderloo and Schubart, 2010) out of which only two species *Parasesarma plicatum* (Latreille, 1803) and *Parasesarma pictum* (De Haan, 1835) are reported from India (Chhapgar, 1957; Dev Roy and Das, 2000; Khan *et al.*, 2005; Dev Roy, 2013). The brachyuran crab species of genus *Austruca* Bott, 1973 of family Ocypodidae are commonly known as fiddler crabs and distributed in tropical and subtropical regions (Crane, 1975; Zeil *et al.*, 2006; Ng *et al.*, 2008; Barnes, 2010). A total of 6 species of *Austruca* were so far reported from Indian waters (Crane, 1975; Chhapgar, 1957; Khan *et al.*, 2005; Trivedi *et al.*, 2012; Dev Roy, 2013). In the present study, two brachyuran crab species viz. *Parasesarma persicum* Naderloo and Schubart, 2010 and *Austruca iranica* (Pretzmann, 1971) are reported for the first time from Indian waters.

Material and Methods

The present study was carried out as a part of research project on documentation of crustacean fauna of Gujarat. Total 14 male and 1 female specimens of *P. persicum* and 4 male and 3 female specimens of *A. iranica* (Pretzmann, 1971) were collected from different coastal areas of Gujarat state comprising of mangrove and mudflat habitats. Hand picking method was adopted for specimen collection during the low tide time. Specimens were

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Research Paper

Production of biopolymer from dairy waste: An approach to alternate synthetic plastic

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Abstract

Plastics are inevitable part of our modern life and used in different sectors of society like packaging, consumer products and many more. Synthetic polymers are almost not degradable by natural processes in the environment. Present work illustrates an effort to isolate bio-polymer producing bacterial strains from dairy industrial influents. Ten bacterial colonies were isolated which were stained using Sudan Black B dye in order to test their ability to produce bio polymer like granules. Out of ten, five strains were found to produce bio-polymer like granules. These five isolates were further grown at different pH, incubation periods, salt concentration and different carbon sources to know the optimum growth and production. Bio-polymer like granules was extracted by sodium hypochlorite chloroform method and estimated the accumulation of granules. Two strains were found with highest bio-polymer accumulation when the buttermilk was used as one of the cheaper carbon sources. The study shows that PHB accumulation depends on residual biomass is inversely proportionate with the PHB accumulation in the cell.

Keywords: PHB, Bacteria, Strain, Colony, Granules.

Introduction

Rapid industrial development emits wide range of chemicals and materials used in the production process directly and most of them are harmful to the environment. Moreover non degradable polythene based plastic used in our day to day activities are unfriendly to the environment. Since synthetic plastics marked their first form in 1950s, they have emerged to be among the most needed material in our daily life. In harsh conditions petroleum based plastics are reportedly stable against chemical degradation and microbial decomposition, thus rendering them durable, highly resistant and persist for very long time in the environment¹. Due to their excellent properties and wide range of application, synthetic plastics have ace the commodity market and helped in establishing technologies related to plastics manufacturing. Various types of wastes produced from agriculture industry, dairy industry, oil industry has turn into a major environmental issue². These wastes contain useful ingredients for the development of Polyhydroxyalkanoates through microorganism. The polyhydroxyalkanoates (PHA) can be further converted in to Polyhydroxybutyrate (PHB) which is a biodegradable plastic raw material³.

Polyhydroxyalkanoates (PHAs) are polyesters which are naturally synthesized and found to be accumulated in intra-cellular membrane of numerous bacteria as intracellular energy storage materials during unbalanced growth⁴⁻⁷. PHA is polyester of hydroxy fatty acids which is naturally produced by many bacteria as an intracellular carbon and energy reserve material⁸.

The family of PHAs includes several polymeric esters such polyhydroxybutyrate, polyhydroxybutyrate co-hydroxyvalerates (PHBV), polyhydroxybutyrate co hydroxyhexanoate (PHBHx) and

Estimation of Carbon Emission Through Vehicle Load In Patan City

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ABSTRACT

Increasing human population, industrialization and urbanization is rapidly spreading over the urban areas and deteriorating the environmental quality continuously. Air pollution became a major problem in compared to the other types of pollution due to its harmful effects on man and materials and difficult remedial measures. The major sources of the air pollution are industries and vehicles that emitting many air pollutants to the ambient environment as well as the life on the Earth. Present study was carried out to know the role of vehicles on the air quality of Patan city of Gujarat. The study has been carried out in four zones of the city, viz., residential zone, industrial zone, commercial zone and suburb zone. All the sites were investigated for the carbon emission by scrutinizing the vehicle load with their fuel use pattern and then it was calculated using carbon calculator. It was found that the vehicles operated by diesel are contributing more carbon to the atmosphere in Patan city in compare to petrol and gas operated vehicles.

Keywords : Air Pollution, Carbon emission, Vehicles.

I. INTRODUCTION

At the global level, the rapid growth in motor vehicle activity has serious energy security and climate change implications. The transport sector already consumes nearly half of the world's oil. But in urban areas – both developing and developed countries, it is predominately mobile or vehicular pollution that contributes to air quality. Two-wheelers account for about 72 percent of the total vehicular population in city (Mahadevappa *et al.*, 2012). In developing countries the air quality crisis in cities often attributes in large measures (40–80%) to vehicular emission. Despite the improved performance of technology is presently insufficient to counteract the growth of vehicles (Anon., 1997). Increase in the number and use of private vehicles led to the deterioration of ambient air quality due to pollutants released through auto mobile exhausts which has a direct impact on human and the environment.

Currently, in India, there is a high influx of population to urban areas, which has led to sharp increase in traffic. The major contributors to this widespread air pollution in urban areas is vehicular emission which is of great concern, as these are ground level sources and have maximum impact on the general population. The slow

growth of road infrastructure and high growth of vehicles imply that Indian roads are reaching a saturation point in utilizing the existing capacities, hence, leading to congestion and further contributing to air pollution load (Pranav Raghav Sood *et al.*, 2012). In urban areas mobile or vehicular pollution is predominant and significantly contributes to air quality problems. Road traffic produce volatile organic compounds, suspended particulate matter, oxides of sulphur, oxides of nitrogen, and carbon monoxide, which makes adverse health effects on the exposed population (Sopan T. *et al.*, 2005). Recent evidence indicates that motorized vehicles are a major source of air pollution in urban areas, on the other hand transportation engineers aim at steps to reduce congestion and trying to improve the flow conditions at various road network in urban streets (Bhawna Dubey *et al.*, 2013). Every year, more than 3080 million tons of CO₂ and other pollutants are releasing into the earth's atmosphere.

In human Population, road transportation, vehicular traffic and industries which have resulted in further increase in the concentration of gaseous and particulate. (Agbaire *et al.*, 2009). Air pollution is an inevitable harmful by product of rapid industrialization and urbanization that is responsible for variety of deleterious

**RESEARCH ARTICLE****Anurans in Polo Reserved Forests of Gujarat state, India: Two New Geographical Records**

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Study Area: Sabarkantha district, Gujrat, India.
Coordinates: 23.73°- 24.15° N; 73.1°- 73.4° E

Key words: Amphibian, Sono- taxonomy, Frog, Toad, Morphometry, Habit Classification

Abstract

Anurans are very mysterious fauna of animal kingdom. The current study represents the preliminary checklist of frogs and toads of Polo forest, a reserved forest of north Gujarat, mostly covered by dry deciduous vegetation. Our literature survey revealed that the herpetofauna including anurans is least explored fauna in northern Gujarat except few stray notes and checklist prepared before almost two decades hence there are vital chances in the change in species composition with respect to lesser-known fauna like amphibians. The area was surveyed by line and strip transects as well as visual encounter and sono-taxonomical methods in order to record the presence of anuran species. The study shows ten species of anurans belonging to four families; among which two are newly recorded species in this area. The study can be an initiation to arrange baseline data regarding anuran's checklist, which can be extended to all the herpetofauna and other diversity too. Taxonomy of unidentified anuran species can also be determined in future.

Introduction:

Gujarat is one of the diversified landscaped states of India, which is covered by dry deciduous forest in north, west and eastern parts, moist deciduous forest from the southern part, coastal belt in the west and desert covering from north to western edge (Champion & Seth, 1968). Anuran fauna is ever supposed as tremendous but mysterious fauna. Amphibians belong to the superclass Tetrapoda. Class amphibia classified into three orders viz. apoda, anura and urodela (Boulenger, 1890; Daniel & Sekar, 1989; Dutta, 1997).

The current study depicts the status of anurans (frogs and toads) in Polo forest of Sabarkantha district, Gujarat state. Polo is one of the most cash forests with a higher amount of timber vegetation, which has some very good patches of *Tectona grandis* and many other timber plants. The study area is having a good population of amphibians due to Vanaj irrigation dam in the central part of the forest. It is famous tourism destination due to its archaeological importance. Sarkar (1984), Naik & Vinod (1993), Sarkar & Ray (2000) were the pioneer of describing the anurans of north Gujarat including Sabarkantha. After Sarkar & Ray (2000), a very long gap made us more enthusiast towards the inventory of anurans checklist. Variations among

species population could be based on temporal changes (Hanski, 1982). The present research will provide the baseline information on the anurans in the study area and fill the gap of information as well as give direction for future research on herpetofauna in the study area. We have documented ten species of amphibians, including two toads and eight frogs among which two were considered as a new record from this area.

Methodology:

The study area is located in the north-eastern part of Gujarat state, Sabarkantha district a wildlife division. The forest covers approximately 400km² of the area. The area was surveyed in core and buffer zone of the forest with around 600 km² of dry deciduous vegetation. The study area is entitled as reserved forest (Rodgers *et al.*, 2000), which shares one boundary with Fulwari ki naal wildlife sanctuary of Rajasthan state.

It is a preliminary work carried out during our field survey for sloth bear occurrence through strip transects during which the amphibians were also been recorded through visual encounters. Moreover, we also used sono-taxonomical methods to locate the anurans (Sharma, 2015).

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Edge and Total Edge Product Cordial Labeling of Some New Graphs

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Abstract

In this paper we investigate edge product cordial labeling and total edge product cordial labeling for cycle with one chord, cycle with twin chords, triangular ladder graph and comb graph.

Keywords: Cordial graph, product cordial graph, edge product cordial graph, total edge product cordial labeling.

AMS Subject Classification(2010): 05C78.

1 Introduction

We begin with simple, finite, connected and undirected graph $G = (V(G), E(G))$ with order p and size q . For all standard terminology and notation we follow Clark and Holton [2]. We will give brief summary of definitions which are useful for the present investigations.

Definition 1.1. A graph labeling is an assignment of integers to the vertices or edges or both subject to certain condition(s).

For an extensive survey on graph labeling and bibliographic references we refer to Gallian [3].

In 1987, Cahit [1] introduced the cordial labeling as a weaker version of graceful and harmonious labelings. Some labeling schemes are also introduced with minor variations in cordial theme. In 2004, Sundaram *et al.* [6] have introduced product cordial labeling in which the absolute difference in cordial labeling is replaced by product of the vertex labels.

The edge analogue of product cordial labeling was introduced by Vaidya and Barasara [7] and they named it as edge product cordial labeling which is defined as follows.

Definition 1.2. For a graph $G = (V(G), E(G))$, an edge labeling function $f : E(G) \rightarrow \{0, 1\}$ induces a vertex labeling function $f : V(G) \rightarrow \{0, 1\}$ defined as $f(v) = \prod f(e_i)$ for $\{e_i \in E(G) | v_i \text{ is incident to } v\}$. Now denoting the number of vertices of G having label i under f as $v_f(i)$ and the number of edges of G having label i under f as $e_f(i)$.

Then f is called edge product cordial labeling of graph G if $|v_f(0)v_f(1)| \leq 1$ and $|e_f(0)e_f(1)| \leq 1$. A graph G is called edge product cordial if it admits edge product cordial labeling.



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Data Article

A dataset of LC-MS QTOF analysis of potato and mustard crop residue smoke water



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ABSTRACT

This data article comprises of the total LC-MS QTOF analysis of smoke water prepared from potato and mustard crop residue. LC-MS QTOF analysis revealed a total of 39 compounds from potato crop residue smoke water, whereas mustard crop residue smoke water exhibited 42 compounds. Molecular formula, mass, RT (retention time) and Area are described in the data presented here. Additionally, different database ID of the identified compounds are mentioned in the data table of potato and mustard crop residue smoke water.

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Specifications table

Subject Area	Biology
More specific subject area	Agricultural Biochemistry
Type of Data	Table, Image and Graph
How data was acquired	LC-MS QTOF (Agilent Technologies, USA, Model: 6540)
Data format	Raw and analyzed Data
Experimental factors	Sample was filtered through 0.2 μm filter

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An Epidemiological Study of Measles Incidence and Vaccination Coverage in Urban Slums of Ahmedabad, India

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ABSTRACT

Background: Measles is the public health problem in India, causing mortality and morbidity in children. Measles vaccination is included in the Immunization program but low coverage is still a major problem. There is a lack of data on measles incidence and coverage in vulnerable population for measles. **Methodology:** A cross-sectional study was carried out to find out the incidence and vaccination coverage based on parents recall in identified 30 slums of Ahmedabad by using cluster sampling method. 3000 children, less than five years of age were included by selecting 100 children from each cluster. Pre-designed and pre-tested standardized questionnaire of UNICEF was used to assess symptoms of measles and history of the Immunization. **Result:** The measles incidence was found 20.8% based on symptoms and 3.03% based on confirmed diagnosis by doctors as per parents recall in the past six months. The overall vaccination coverage was found at 64.62%. The most common presenting symptom was found fever with rash in children with measles. **Conclusion:** No gender difference was found in vaccine coverage, measles incidence and status of treatment received. Vaccine efficacy found to be 42% which is very low and high incidence of measles was reported which shows the need for an effective targeted program for the urban slums.

Key words: Immunization, Measles, Symptoms, Vaccine efficacy, Cluster, Ahmedabad.

INTRODUCTION

Measles is an infectious disease caused by Morbillivirus,¹ which usually affects children with more than 80% secondary attack rate. However, multiple outbreaks of the disease have even been reported among adults in urban slums, disaster relief camps, during international travel, etc.²⁻⁴ The disease is characterised by the presence of fever, cough, and coryza, followed by the appearance of a typical rash.⁵ The disease is transmitted by the airborne route. Being a viral disease large proportions of cases are self-limiting, still, multiple deaths have been reported because of disease-associated complications.⁶ In developing countries like India, more than 2 million children die of measles every year. Live attenuated measles vaccination is an effective means of reducing the incidence of measles in many countries and presently the age of immunisation with measles vaccine is nine months with two doses of measles vaccination have been suggested as a strategy to control measles. Measles vaccination was introduced in India under the universal immunisation (UIP) during 1985-86. Vaccination coverage increased to 87% in 1994-95 resulting in a decline in measles incidence from 160216 cases in 1985 to 61381 cases in 1996.⁷ In spite of extensive immunisation coverage under the universal immunisation program (UIP) in Gujarat, measles still remains a major cause of childhood morbidity and mortality. Gujarat is one of the industrialised states of India. Ahmedabad is the biggest city in Gujarat. Urbanisation has led to

migration from a rural area which resulted in the growth of urban slums. Overcrowding, lack of hygiene and sanitation facilities may lead to spread of infectious diseases like measles. Lack of awareness and health seeking behaviour further leads to low vaccine coverage of measles thus children living in urban slums are vulnerable to measles. Poor treatment seeking behaviour due to cultural beliefs leads to higher chances of complications of measles and might be resulted in death. There is a paucity of measles incidence and vaccination coverage data due to non-reporting of the cases.⁸⁻¹⁰ For effective immunisation programme, its implementation and monitoring baseline data are required and with this background the present study was conducted to assess the incidence of measles and vaccination coverage in the slums of Ahmedabad city.

MATERIALS AND METHODS

A community-based cross-sectional study was carried out adopting cluster sampling method. A sample size was calculated by expecting coverage of about 70% vaccination¹¹ for children less than 5 years of age and expecting all the unvaccinated children to have got an attack of measles by the age of five years uniformly through the five years. Thus, 6% cases of measles in the study population per year assumed with an relative precision of 25 percent and design effect of 5 at 95 percent significance level (alpha risk of

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THE ROLE OF INNOVATION IN ENTREPRENEURSHIP IN FAMILY FIRMS: A CASE STUDY ON DEVELOPED AND DEVELOPING COUNTRIES

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ABSTRACT

Its important parameter of entrepreneurship to identify the new market trends, which helps the entrepreneurs to grasp the market with new innovative products or though setting up new firms with socially and economically viable in the society matured enough such as the European. The study deals with to identify the innovative indicators based on 4 A's framework in family firms from developing and developed countries. The overall purpose of this study is to expand the understanding on how a family influence or 'familiness', influences innovation within family-owned firms.

Keywords: Innovation, Family Firms, Developed Countries, Developing Countries, Entrepreneurial Orientation.

INTRODUCTION

This study points out the research gap based on the extent and nature of the impact of innovative activities in the family business or firms. In order to identify "the collection of resources that are different to a firm due to the family indulgence" (Habbershon and Williams, 1999:1), otherwise known as 'familiness'. In addition to this, the investigation offers a comprehensive understanding of innovation activities in FB by exploring in parallel different aspects such as types, magnitudes, strategies, and sources of innovations in developing and developed countries.

Research Context

One of the major areas of the study is to understand the series of innovation in family business within a context which is still unexplored, whereby it addresses several calls made by scholars in the field. For instance, when studying the relationship of entrepreneurship and growth in Uganda, another developing country, Balunywa (2008) found that macroeconomic policies, including political stability and free market economic prices, are essential for growth, yet they are not the only condition as the role of entrepreneurs (including FB owners) is pivotal. The



Range Extension of Two Brachyuran Crabs (Crustacea: Decapoda), *Acanthonyx inglei* Tirmizi & Kazmi, 1988 (Epiplatidae) and *Scalopidia indica* Ng & Castro, 2013 (Scalopidiidae) in India

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Abstract

Two species of brachyura, *Acanthonyx inglei* Tirmizi & Kazmi, 1988 (Epiplatidae) and *Scalopidia indica* Ng and Castro (Scalopidiidae) are recorded for first time from the coastal waters of India. *Acanthonyx inglei* has so far been reported only from Pakistan, while *Scalopidia indica* has so far been reported from Andaman Sea.

Keywords Range extension · Crustacea · Brachyura · First record · India

Introduction

Amongst the various groups of crustaceans occurring in India, the brachyuran crabs are one of the most extensively studied. Dev Roy (2013), reported total of 808 species of marine brachyuran crabs belonging to 62 families in India, out of which of 226 species are known to occur on the west coast and 461 species on the east coast. In last few decades, there has been a consistent increase in reportage of new species and new records of marine brachyuran crabs from India (Trivedi et al. 2014, 2015a, b, 2016; Ng et al. 2015; Ng and Kumar 2015a, b, 2016; Trivedi and Vachhrajani 2016a, b; Suvarna Devi and Kumar 2017). In the present study, we report the occurrence of marine brachyuran crabs, *Acanthonyx inglei* Tirmizi & Kazmi, 1988 (Epiplatidae) and *Scalopidia indica* Ng & Castro, 2013 (Scalopidiidae) from India.

Materials and methods

The specimens were collected from by-catch discarded by commercial fishing trawlers operating in the coastal waters of the states of Gujarat and Tamil Nadu, India. The specimens were cleaned, photographed, preserved in 70% alcohol and deposited in the Zoology Museum (ZL-AR-CR) of Department of Zoology, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India. The specimens were measured in millimetres (mm). **Abbreviations:** CW: carapace width; CL: carapace length; P2–P5 for pereopods 2 to 5, respectively; G1: male first left gonopod; G2: male second left gonopod; coll.: collector.

Results and discussion

Order Decapoda Latreille, 1802.

Family Epiplatidae MacLeay, 1838.

Genus *Acanthonyx* Latreille, 1828.

Acanthonyx inglei Tirmizi & Kazmi, 1988 (Figs. 1 and 3a, b).

Acanthonyx aff. *Elongatus* Tirmizi & Serène, 1971: 22, Fig. 1, pl. 2A, B.

Acanthonyx elongatus inglei Tirmizi & Kazmi, 1988: 162, Figs. 50, 51.

Material examined. One male (ZL-AR-CR-101) (CW 11.85 mm including branchial teeth, CL 15.50 mm, including

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Elasmopus sivaprakasami sp. nov., a new species of amphipod (Senticaudata, Maeridae) from Gujarat State, India

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Abstract

A new species of amphipod, *Elasmopus sivaprakasami* sp. nov., is described from India. It is found to be conspecific with material described from southern India nearly fifty years previously, but attributed at that time to a species described from Japan.

Key words: Amphipoda, *Elasmopus*, taxonomy, new species, marine, India

Introduction

The genus *Elasmopus* Costa, 1853 contains over 100 species and is widespread in tropical and warm temperate waters. A key to world species is presented by Vader and Krapp-Schickel (2012). *Elasmopus* is represented in India and Sri Lanka by ten species: *E. dubius* Walker, 1904; *E. erythraeus* (Kossmann, 1880); *E. pecteniscrus* (Spence Bate, 1862); *E. rapax* Costa, 1853; *E. rishikondensis* Kanakadurga, Rao & Shyamasundari, 1981, *E. sivaprakasami* sp. nov.; *E. spinibasus* Sivaprakasam, 1969; *E. spinidactylus* Chevreux 1907; *E. spinimanus* Walker, 1904 and *E. visakhapatnamensis* Kanakadurga, Rao & Shyamasundari, 1981.

Elasmopus sivaprakasami sp. nov. belongs to a group of five species of *Elasmopus* (from Australia, New Zealand, Japan and India) with a dorsal hump on urosome segment 1. *Elasmopus sivaprakasami* sp. nov. is fully described and figured and distinguished from its closest congeners. A species described from India by Sivaprakasam (1970) under the name *E. japonicus* Stephensen (1932) is shown to be conspecific with *E. sivaprakasami* sp. nov.

Materials and methods

Specimens were collected from intertidal coral reef habitats by hand picking. Specimens were first placed in 5% seawater formaldehyde and later transferred to 10% alcohol. They were dissected and body parts were mounted on microscope slides using glycerine. Specimens were examined under a Leica stereo microscope with an attached drawing tube. Material is deposited in the Zoological Survey of India, Western Zone Regional Center (ZSI, WRC), Pune, Maharashtra and in the Zoology Museum (ZL-AR-AM), Department of Zoology, Faculty of Science, the Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India.

Abbreviations used in figures: AF = accessory flagellum; Ep 1–3 = epimera 1–3; F = female; G1, 2 = gnathopods 1, 2; Hd = head; Lab = labium; Lbr = labrum; M = male; Md = mandible; Mx1, 2 = maxilla 1, 2; Mxp = maxilliped; P3–7 = pereopods 3–7; U1–3 = uropods 1–3; Us = Urosome; T = telson.



On new record of brachyuran crab *Scopimera crabicauda* Alcock, 1900 (Crustacea: Decapoda) from India

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Short Communication

Abstract

The brachyuran crab *Scopimera crabicauda* Alcock, 1900 belonging to family Dotillidae, was recorded for the first time in Indian waters. The specimens were collected from different coastal areas of Beyt Dwarka (22° 27' 50" N; 69° 08' 22" E), Gulf of Kachchh, Gujarat. The species is so far reported from Persian Gulf, Iran, Oman, Qatar, UAE and Pakistan. Morphological description of the species is given in the report.

Keywords: *Scopimera*, Gujarat, brachyuran crab, sandy-muddy habitat, India.

Introduction

Brachyuran crabs belonging to the family Dotillidae Stimpson, 1858 are smaller in size and mostly found on the shores of estuaries, mudflats, sandy habitat or backwaters in the tropical and sub tropical Indo-Pacific region (Alcock, 1900; Kemp, 1919). Under the family Dotillidae, around 59 species are reported, out of which 14 are under genus *Scopimera* De Haan, 1833

(Ng *et al.*, 2008; Wong *et al.*, 2010). The genus is represented by three species *viz.* *Scopimera pilula* Kemp, 1919, *Scopimera investigatoris* Alcock, 1900 and *Scopimera proxima* Kemp, 1919 in Indian waters (Alcock, 1900; Kemp, 1919) and the present study reports the presence of a fourth species *Scopimera crabicauda* Alcock, 1900 for the first time from Indian waters.

Material and methods

The study was carried out as part of a research project on documentation of crustacean fauna of Gujarat, India comprising of mudflat habitats. Hand picking method was adopted for specimen collection during low tide. Specimens were washed properly to remove sediment and photographed (Canon 1000D; 18-55 mm lens). Specimens were then preserved in 70% alcohol and deposited in the Zoology Museum of Department of Zoology, Faculty of Science, The Maharaja Sayajirao University, Vadodara, Gujarat, India. The carapace width (CW) and carapace length (CL) of the crabs were measured in mm. The abbreviation G1 is used for male first left gonopod.

Results and discussion

In the present study, brachyuran crab species *Scopimera crabicauda* Alcock, 1900 belonging to family Dotillidae is reported for the first time from Indian waters.

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Redescription of *Arcotheres placunae* (Hornell & Southwell, 1909) (Crustacea: Decapoda: Brachyura: Pinnotheridae) from India and Pakistan

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Abstract

The identity of *Arcotheres placunae* (Hornell & Southwell, 1909) (Pinnotheridae), a pea crab associated with the window pane shell, *Placuna placenta*, has been confused as the types are lost and the original figures are inaccurate and do not match the description given of the species. In the present study, fresh specimens of the species were collected from the type locality (Gulf of Kachchh, Gujarat, India), and the species is here redescribed and refigured, and its affinities with similar species is discussed. To stabilize the taxonomy of *A. placunae*, a neotype is chosen from amongst the fresh material.

Key words: taxonomy, pea crab, *Placuna placenta*, type locality, Gulf of Kachchh, Gujarat, South Asia

Introduction

The pinnotherid genus *Arcotheres* Manning, 1993, currently comprises 26 species, all of which occur in the Indo-West Pacific (Bürger 1895; Gordon 1936; Manning 1993; Campos 2001; Campos & Manning 2001; Ah Yong & Ng 2007; Ng *et al.* 2008, 2017; Ng & Kumar 2015). The genus was originally diagnosed for species that have a subquadrate to subhexagonal carapace, a dactylus of the third maxilliped that is digitiform and may extend to or just overreach the tip of the propodus, a pereopod 4 that is asymmetrical (either left or right side longer), and the dactyli of pereopods 4 and 5 are longer and different in structure compared to those of pereopods 2 and 3 (Bürger 1895; Campos 2001; Campos & Manning 2001). Ng *et al.* (2017) observed that the asymmetry in the length of pereopod 4 is less pronounced in some species such as *A. borradalei* (Nobili, 1906) and *A. ridgewayi* (Southwell, 1911), and that most (possibly all) species of *Arcotheres* that have the basis-ischium of pereopod 5 proportionately more slender than those in other genera.

One poorly known species is *Arcotheres placunae* (Hornell & Southwell, 1909), originally described (as *Pinnotheres placunae*) from 34 specimens obtained from the shells of the window pane oyster, *Placuna placenta* (Linnaeus, 1758) (Mollusca: Pectinoida: Placunidae) from Balapur Bay, Beyt Dwarka Island in Gulf of Kachchh, Gujarat state, India. Several authors (Ah Yong & Ng 2007; Naderloo & Türkay 2012) have commented that the figures of the female type specimen are poor and do not fully match the original description. The types, however, appear to be lost. Schmitt *et al.* (1973: 81) commented that they cannot be located and are apparently not in the Indian Museum where a search was made. There are also no type specimens of this species in the Natural History Museum (London), Australian Museum (Sydney) or South Australian Museum (Adelaide), which are known to have received material from the Indian Museum. Subsequent records of this species by Chhapgar (1957a, b) also do not help the situation as his figures also appear to be inaccurate.

This confusion has led to problems with identifying species of *Arcotheres* from the northwestern Indian Ocean,



An effective validated method for HPTLC-fingerprinting of alkaloids and glycosides from multiple plant parts of three *Terminalia* spp.

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ABSTRACT

Our study developed a HPTLC fingerprint profile of alkaloids and glycosides obtained from the methanol extracts of four different plant parts of *Terminalia arjuna*, *T. bellerica* and *T. chebula*, trees with cardio-protective values. The multiple qualitative phytochemical analyses of water, acetone, petroleum ether and methanol extracts from all the plant parts of *Terminalia* spp. detected the presence of alkaloids and glycosides, wherein the methanol extracts exhibited the presence of maximum alkaloids and glycosides. The chromatographic analysis of methanol extracts was carried out on silica gel 60F₂₅₄ HPTLC aluminium sheets with CAMAG Unomat 5 applicator. The plates were developed using ethyl acetate:toluene:formic acid (10:10:1; v/v/v) mobile phase. Alkaloids and glycosides were detected at 254 nm, 366 nm and 540 nm (after derivatization). These developed fingerprints would eventually be of great benefit in identifying or differentiating the alkaloids and glycosides in the form of marker compounds in the three *Terminalia* spp. mentioned.

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Alkaloids; Chromatography; Fingerprint; Glycosides; HPTLC; *Terminalia*, TLC

Introduction

The genus *Terminalia* belongs to the family Combretaceae. *T. arjuna* (Roxb.) Wight & Arn., *T. bellerica* Roxb., and *T. chebula* Retz. are the three most cardinal of all the species of genus *Terminalia*. These medicinally important tree species are prevalent mainly in Central Asia (Kapoor, 1990). These three species possess high medicinal values and are well known in Indian medicine industry. Barks of *T. arjuna* has been used to prevent cardiomyopathy, myocardium necrosis, atherosclerosis, and also used as a cardiotonic in heart failure; simultaneously treating anaemia and several other venereal and viral diseases as well (Amalraj and Gopi, 2017). The fruits of *T. bellerica* have antimicrobial, antidiabetic and cardio protectant properties (Sabu and Kuttan, 2002; Elizabeth, 2005), and its bark contains a triterpenoid (belleric acid) and its glycosides (Nampoothiri et al., 2011). Additionally, it also contains secondary metabolites viz., ellagic acid, ethyl gallate, β-sitosterol, gallic acid, anollignan (a cardenolide cannogenol), terminalignan, thannilignan, and a hexahydroxydiphenic acid

ester as well. The extracts obtained from different plant parts of *T. chebula* exhibit certain medicinal properties and known to be used in cardio tonic, diuretic, laxative, and hypoglycemic drugs. The seeds of *T. chebula* contain phytochemicals like chebulinic acid and tannic acid (Thanigaivel et al., 2017). Even though, a variety of phytochemicals (belonging to different classes such as hydrolysable tannins, alkaloids, triterpenoid acids and their glycosides, flavonoids, phenolics and phytosterols) was reported in *Terminalia* (Kalola and Rajani, 2006); however, the alkaloids and glycosides are of key interest from the pharmaceutical point of view. Several chromatographic methods have been reported for the detection and quantification of phytochemicals in *Terminalia* spp. (Juang et al., 2004; Devi et al., 2014; Ram et al., 2015), yet high performance thin layer chromatography (HPTLC) remains the preferred choice owing to its simplicity, sensitivity, stability, accuracy and suitability for efficient screening (Gantait et al., 2011; Nampoothiri et al., 2011; Panigrahi et al., 2017). Therefore, the present study focuses on the



ORIGINAL PAPER

Feeding patterns of Indian giant flying squirrel (*Petaurista philippensis*, Elliot 1839) with reference to seasonal variation in central Gujarat, India

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Abstract Indian Giant Flying Squirrel (*Petaurista philippensis* Elliot 1839) is widely distributed in South Asia and the only species of flying squirrel found in Gujarat. We studied the seasonal variation in its feeding behaviour at selected sites of Central Gujarat. Focal sampling was employed to study the behaviours and mainly feeding behaviours. Feeding analyses were consistent with other studies and indicated *Madhuca longifolia* as an important food resource. The diet of the species mainly consisted of pith, twig, seed, bark, petiole, young to mature leaves, flower and fruits of 20 species of plants of 15 families along with lichens, *Vanda tessellata* and *Dendrophthoe falcata*. *Madhuca longifolia* (25%) contributed most to the squirrel diet, followed by *Diospyros melanoxylon* (10%) and *Terminalia tomentosa* (9%). Among the plant parts consumed, pith formed the highest bulk as a food at 23%, followed by fruits (21%), bark (16%), twig (14%), flower (10%), seed (6%), leaf (6%), and bud (4%). The findings reveal the high dependency of flying squirrel on certain tree species. These tree species are well represented and distributed throughout central Gujarat, indicating that this area is important for the survival of this species and that the area

should be conserved for protection and future management of this species.

Keywords Arboreal rodent · Behaviour · *Madhuca longifolia* · Phenology · Western India

Introduction

Indian Giant Flying Squirrel (IGFS) *Petaurista philippensis* is solitary, nocturnal, and arboreal, and has a wide distribution in South Asia, the mainland of Southeast Asia and central and southern China. IGFS is widely distributed in India, inhabiting all the larger forests of the Peninsula; south of the Ganges (Prater 2005) from the evergreen to mixed moist and dry deciduous forest of western India, the Himalayan range and regions north of Maharashtra, Gujarat and Rajasthan (Koli et al. 2011; IUCN 2016).

IGFS is a forest species, inhabiting woodlands from plains to higher elevations of tropical and temperate forests (Prater 2005). In addition to natural forests, it has been recorded from cardamom plantations and fruit orchards in south India (Nandini and Parthasarathy 2008). Flying squirrels pollinate many species of trees, and epigeous and hypogeous fungi (Rosentreter et al. 1997). IGFS is predominately crepuscular and activity patterns vary by month (Kuo and Lee 2012). Diurnal hours are spent resting in nests.

Spatial and temporal fluctuations in the production of plants part leads to changes in the diet of animals (Agetsuma 1995; Kawamichi 1997), their ranging behaviour (Doran 1997), activity patterns (Dasilva 1992) and reproduction (Van Schaik and Van Noordwijk 1985). Some plant species provide alternative food sources during seasons of food scarcity and are vital for sustenance of

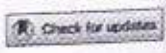
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Association of body fat with stress levels and dietary intakes in Indian women

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ABSTRACT
A cross-sectional study of 605 women (aged 18–50 years) conducted from January 2013 to June 2014 in Gujarat, India assessed stress, dietary intakes and body fat percentage (PBF), and the inter-relationship of PBF with stress, dietary fat, and carbohydrates. The population was categorized according to PBF cutoffs for Asians. A generalized linear regression model adjusted for age was performed to assess the relationship of stress, fat, and carbohydrate intakes with PBF. PBF had a significant positive association with stress level ($p = .02$) and carbohydrate intake ($p = .008$); fat intake was not significantly associated ($p = .8$). Women with moderate PBF consumed significantly less carbohydrates (mean = 152.3 ± 13.3 gm/1000 kcal/day, $p < .05$) and had lower stress scores (mean = 9.7 ± 4.2 , $p < .05$) than women with high PBF (mean carbohydrate intake = 156.2 ± 10.8 gm/1000 kcal/day; mean stress score = 10.9 ± 4.4) and very high PBF (mean carbohydrate intake = 156.8 ± 11.6 gm/1000 kcal/day; mean stress score = 11.2 ± 4.2). We conclude that PBF has a positive association with stress and dietary carbohydrate; women with higher stress and carbohydrate intake are more likely to accumulate higher body fat as compared to women with less stress and low carbohydrate intake.

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KEYWORDS
Body fat; carbohydrate intake; stress; women

Introduction

Excess body fat is the largest nutrition-related problem worldwide, particularly in developed countries and in countries in nutrition transition (Willett & Leibel, 2002). Increased energy consumption can lead to an increased storage of body fat (Saboo et al. 2014). Excessive body fat is strongly associated with the risk of several chronic disorders, such as cardiac disease, cancer, hypertension, insulin resistance, and adult-onset diabetes; thus, assessing body fat and understanding its associations is important for determining strategies for better health (Ranasinghe et al. 2013; Willett and Leibel 2002).

Genetic factors have a major influence on development of adiposity (Harris and North 2010). Nonetheless, diet and lifestyle factors are also key reasons for the high rates of excessive body fat in the population (Atkin and Davies 2000; Joint WHO/FAO Expert Consultation, 2003; Willett 1998; Willett and Leibel 2002). Rapid changes in diet and lifestyle have occurred with industrialization, which has been associated with inappropriate dietary patterns, i.e., increased consumption of energy-dense foods which are high in

Sloth bear attacks on humans in central India: implications for species conservation

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Abstract: Conflicts with wild animals are increasing as human populations grow and related anthropogenic activities encroach into wildlife habitats. A good example of this situation is the increase in conflicts between humans and sloth bears (*Melursus ursinus*) in India. Sloth bears are known for their aggressive and unpredictable behavior. More human fatalities and injuries have been attributed to sloth bear attacks than all recorded incidences of wildlife attacks in Buldhana Forest Division of Maharashtra, India. We interviewed 51 victims that were attacked by sloth bears between 2009-2017 to better understand the reasons for the attacks. Thirty-four of the attacks (66.7%) resulted in serious injuries, and there were 7 human mortalities (13.7%) reported. Most attacks occurred close to agricultural fields (66.7%) and during mid-day (1100–1400 hours). More attacks (64.7%) occurred when a person was working or resting in the field, or retrieving water for the field followed by attacks while watching over grazing livestock (13.7%). Individuals aged 31 to 40 years (35.3%) were the most common victims of sloth bear attacks. Half of the attacks were during monsoon season (July to October, 51%) followed by summer (March to June, 35%) and winter (November to February, 14%). In 39% of cases, a single bear was involved while females with 2 cubs were found to be involved in 37% of attacks. This research was incorporated into a comprehensive conflict mitigation plan, which included field staff training for monitoring sloth bear population, formulation of a Rapid Rescue Unit to manage conflict situations, and sloth bear education programs in the high conflict villages. People were made aware of the behavior and activity pattern of sloth bears and preventive measures to mitigate potential conflicts.

Key words: bear attacks, central India, human fatalities, human injuries, human-wildlife conflicts, *Melursus ursinus*, mitigation measures, sloth bears

As human populations grow, anthropogenic activities will continue to encroach into wildlife habitats. The increased proximity of humans and wildlife has led to increased human-wildlife interactions (Messmer 2000). The phrase human-wildlife conflict is now commonly used to describe situations that involve any negative interactions between humans and wildlife (Messmer 2009). As human populations increase, the resulting competition with wildlife for space and food resources pose a major challenge for conservation of several wild species worldwide (Distefano 2003, Madhusudan 2003, Woodruffe et al. 2005). As such, managers will need better information regarding the cause of these conflicts to help mitigate them (Messmer 2000).

Sloth bears (*Melursus ursinus*) inhabit India, Sri Lanka, and Nepal and are rare in Bhutan (Garshelis et al. 1999, Sharp et al. 2015). They are considered as vulnerable by the

International Union for Conservation of Nature and Natural Resources (Garshelis et al. 2008, Dharaiya et al. 2016). Sloth bear populations are declining due to habitat loss through land conversion. Furthermore, diminished food resources (Murthy and Sankar 1995) and direct competition between bears and humans for food resources are also considered a major species conservation threat as human-bear conflicts increase (Rajpurohit and Chauhan 1996).

The villages in and around Dnyanganga Wildlife Sanctuary (hereafter, Dnyanganga WLS) of northern Maharashtra, India are experiencing increased human-bear conflicts, which include regular encounters with sloth bears around their agricultural fields and villages. The collection of non-timber forest products (NTFP), which typically include fruits, flowers, leaves, mushrooms, and medicinal plants along with firewood and livestock grazing, increases the risk of having these encounters. The resulting



ORIGINAL RESEARCH PAPER

Ecology

HIGHWAY MORTALITY OF VERTEBRATE SPECIES IN THE ARAVALLI MOUNTAIN RANGE OF NORTH GUJARAT, INDIA

KEY WORDS: Mortality; Road-kills; Vehicles; Western India

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ABSTRACT

Vehicle induced mortality also known as a road kill of wild animals is well known in many developing countries including India but very few empirical studies describe the extent of this mortality on wildlife population. For our study, road kill was monitored in three major roads of North Gujarat between May 2005 (monsoon) to October 2006 (winter) and a total of 89 road kills were recorded. Mammals were the most effected taxa (58.42%) followed by reptiles (30.33%) and birds (11.23%). The time of observation was also noted which indicated the intensity of kill of the animal species during different times of the day. Conservation and management implications are essential to prevent the rapid loss of animal population due to road kills. Road-kill surveys such as this are needed to identify species for which road mortality is unsustainable, to determine the influence on threatened species, and to identify important spots of roads that are important to have speed limits for the protection of the resident faunal species.

INTRODUCTION:

Anthropogenic activities continue to affect wildlife by the loss of habitat and change in the extent of habitat beyond road (Spellerberg, 1998). Habitat fragmentation remains the primary cause of decline for many species of wildlife (Soule' et al. 1988; Lawrance, 1990). Road incursion is one of the common forms of habitat fragmentation (Groat B. & Hazebrook, 1996). Every year across the world millions of animals are injured or killed by vehicles. Roads may act as a barrier to animals' movement, produce edge effects or cause substantial mortality of wildlife (Andrews, 1990; Bennett, 1991). Collisions of animals with vehicles and trains are very common (Chhangani, 2004).

The research results have largely been descriptive and anecdotal reporting on surveyed or counts of animals killed by vehicles, their age, sex, characteristics of road kills and seasonal patterns. Although counts of dead animals can be useful for evaluating the magnitude of road-kills, they are inadequate for understanding the relationship between roads and wildlife (Clevenger et al., 2003).

We quantified road-kill occurrence among small terrestrial vertebrates in the North Gujarat. Seasonal and geographic patterns of road-kills were identified

Study Area:

The study was conducted in North-west India with the geographic co-ordinates (23°35'13"N to 24°30'57"N and 72°10'28"E to 73°24'47"E). The area encompasses the Sabarmati river watershed comprising of mountain landscapes of North Gujarat and adjacent state of Rajasthan in India. The forest area is highly fragmented with few good patches of forests at the foothills of terminating Aravalli mountain range occurring in Banaskantha and Sabarkantha. Topography comprises of hilly mountains with an elevations ranging from 10m to over 900 m (FSI, 1997). Surveys for wildlife killed by vehicles were conducted along a major road circuit. The circuit comprised the Ambaji to Palanpur NH14 (65 km) west to east, Ambaji to Himatnagar NH76a (110 km), Ambaji to Taranga SH54 (54 km) and Ambaji to West Balarum (50 km) which made a total of 279km (Fig. 1). The region experiences a high variation in temperature with a minimum as low as 5°C in winters to maximum of 46°C in summers. The monsoon season experiences an average rainfall of 765mm (FSI, 1997). The study area mainly comprised of moist, dry, deciduous, thorn and open scrub forests which were dominated by Butea monosperma, Wrightia, Accacia, Diasyprousetc.,



Figure 1: Map of Study area with highlighted Major Road

METHODS:

Quantitative surveys for road killed wildlife involved driving a vehicle and recording dead wildlife (road-kills) seen on the road within 3 m of edge of the road. The speed at which the survey was conducted varied throughout the circuit due to the range of speed zones present 40-60 km/hr. When an animal was found to be killed on the road surface, an attempt was made to identify the species, approximate time of kill, % of injury, number of individuals, microhabitat were also recorded. We further recorded the animals along with its photograph.

Dead fauna were identified to species level with the assistance of field guides (Menon, 2003) and their location was recorded. Monitoring was conducted for 53 weeks over a period of 11/2 years which include all the major seasons of the year. In 2005, mainly the monsoon and winter season was included in the study whereas in the year 2006, all seasons were surveyed. Road vehicle counts were undertaken twice a month in both holidays and working days, in all the four major roads of the circuit.

RESULTS:

Road-kill surveys

In total 89 individuals were found to be road killed comprising of 52 individuals of 15 mammalian species forming 10 different families, 27 reptiles of 13 species belonging to 8 different families and 10 individuals of 6 different avian species that represent 5 different families were recorded along the road kill circuit during 53 weeks of surveys. The overall mean was calculated to be 1.68 individuals per week. Mammals accounted for 58.43%, reptiles were found to be 30.33% whereas birds accounted for 11.24% of the total road-killed fauna. Indian flying fox, five striped palm squirrel and desert cat were the most commonly observed road killed animal species.

Small-size of frogs made them difficult to detect, which may have contributed to the low number of records. Frog road-kills dismember and desiccate rapidly on the road surface, rendering them virtually undetectable from a moving vehicle (authors' personal observations).

Fewer road-kills of all wildlife groups were recorded during (n=14) summer than during winter (n=30) and monsoon (n=45).

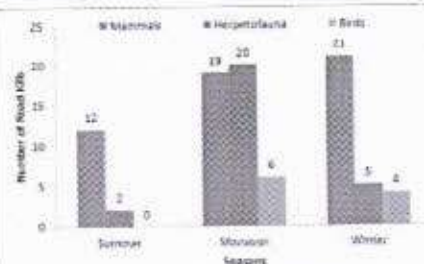


FIGURE 2 No. of Road kills recorded in different seasons



Is current information on organochlorine exposure sufficient to conserve birds in India?

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Abstract

Organochlorine compounds (OCs) pose a serious threat towards the wildlife due to their well-known adverse effects. India is the second largest producer of pesticides in Asia, with DDT production still ongoing, and is ranked amongst the leading countries of pesticide consumption. However, a significant data gap in avian biomonitoring studies has been identified in Asia. The objective of this review is to compile and discuss the available literature on concentrations of organochlorine pesticides and PCBs in Indian birds. The review of 18 articles showed that DDTs were the OCs most frequently analysed, followed by HCHs and PCBs (highest hepatic mean values: 11.6, 1.8 and 1.03 µg/g ww, respectively). The most frequently analysed matrix was whole body homogenates, followed by internal tissues. Plasma, eggs, feathers and guano were poorly sampled. The range of sampling years was 1980–2007. In general, hepatic OC concentrations were below the level known to cause adverse effects, although *p,p'*-DDE in eggs was found in concentrations associated with eggshell thinning. Most of the studies were carried out in Southern India (Tamil Nadu). Out of 106 species studied, house crow (*Corvus splendens*) was the most frequently monitored. However, the number of individuals sampled per species is generally low and different sample types are used, thus, huge limitations to compare OC exposure exist. This review shows that there is a clear deficit of data on OC concentrations and sublethal effects that needs to be addressed to understand the status of OC exposure, spatio-temporal trends and potential impacts in Indian avifauna.

Keywords India · Birds · POPs · Organochlorines · Pesticides · PCBs

Introduction

Persistent organic pollutants (POPs) and their fate in the environment continue to be an issue of special concern.

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Birds have been the first wildlife species reported to be affected by POPs, and there are articles documenting avian reproduction failures and population declines in North America and Europe since the 1950s (e.g., Hickey 1969; Nisbet 1989; Newton and Wyllie 1992). These declines were mainly caused by the exposure to organochlorine compounds (OCs), that is organochlorine pesticides (OCPs) such as dichlorodiphenyltrichloroethanes (DDTs) and pollutants such as polychlorinated biphenyls (PCBs) (e.g., Ratcliffe 1970; Newton and Wyllie 1992). This is mainly because these toxic compounds are slow in degradation, persisting for long periods of time, and they can bioaccumulate and biomagnify in successive trophic levels, creating a serious threat towards the wildlife and human population (Elliot et al. 2009; Hong et al. 2014). Concern towards OCs raised due to the adverse impacts they cause on the reproductive, immune, endocrine and nervous system in biota (Busmes et al. 2007; Cortinovis et al. 2008). These compounds are banned or restricted in their use in most countries, but they are highly persistent and wildlife exposure



RESEARCH ARTICLE

Assessment of Land Use Land Cover at Mining Areas in Panadhro, Kachchh using Remote Sensing and GIS

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Study Area: Panadhro, Kachchh, Gujarat, India

Coordinates: 23.6825°N; 68.7709°E

Key words: Supervised classification, Change detection.

Abstract

Land use and land cover is a very important factor to understand the relation between the human and the environment. Land cover change is a major keynote of global environmental change. The development of any region is dependent on the urbanization and industrialization; however, the development sometimes shows an adverse impact on the environment resulting in loss of biological wealth of an ecosystem. Panadhro and the surrounding villages like Fulara and Khanot of Kachchh district are having abundant of coal minerals. There are lots of changes in Land Use Land Cover (LULC) because of the exploration of the minerals in this area. Remote Sensing (RS) and Geographic Information System (GIS) are very effective tools for analysis of land use and land cover changes at a regional level. This research explains the use of RS and GIS technology for the detection of LULC changes in the study area. Image classification has been done by ERDAS imagine. It is observed that LULC changes have been detected in last 13 yrs. mainly in the open land followed by the water bodies. The study has been pointed out the various effects of coal mining activities on the land use.

Introduction:

Human activities bring the change in land use which affects all the components of the environment, but the effects of these changes are very slow and not measurable quickly by a normal person (Nagarajan & Poongothai, 2011). Land use is generally noticeable by socio-economic and political convince on the land by the human while the land cover is identified as the biophysical surface of the Earth. It is essential to study the land use land cover (LULC) changes. Remote sensing (RS) and geographic information system (GIS) are extensively used for the LULC change detection studies (Diallo *et al.*, 2009, Boakye *et al.*, 2008, Sarma *et al.*, 2008). Land use refers to human activities and the varied uses which are carried on over land and land cover refer to natural vegetation, water bodies, rock/soil, artificial cover and others noticed on the land classification (Yanli *et al.*, 2012). Information like maps and statistical data of land use land cover is essential for the planning, management and further utilization or conservation of land. According to Reis (2008), humans have misused the innate environment. Increasing population growth, industrialization, urbanization and

some other factors affect the LULC of a particular area. The information generated on landscape change and configuration help to analyze global ecological and environmental change.

Population growth and human activities like mining in Panadhro, Fulara and Khanot villages of Kachchh district, Gujarat- India are responsible for the LULC change and environmental degradation (Kaul & Sopan, 2012). Because of the population growth, there is a loss of agriculture land. Coal mining plays a fundamental role in the development and progress of this region, but it has some adverse impact on humans and environment. Panadhro of Kachchh district has ample amount of coal minerals (Singh *et al.*, 2011). There is a lot of changes in LULC because of the exploration of coal minerals and it adversely affects the environment of that region (Chitade & Katyar, 2010). Remote sensing (RS), integrated with the geographic information system (GIS), provides an effective tool for analysis of land use and land cover changes at a landscape level. Remote sensing as a direct adjunct to field, playing an important role to study and assess the natural resources (Abbas *et al.*, 2010). By

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Solar Light Induced Photocatalytic Degradation of Textile Disperse Dye Coralene Dark Red 2B in Effluents

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Abstract: Degradation of textile dye coralene dark red 2B was carried out using advanced oxidation method. The whole experiment was performed under solar light irradiation intensity in range of 400-500 Lux. Results show that degradation is affected by various parameters like intensity of solar light, concentration of dye, concentration of H₂O₂, Amount of TiO₂, effect of pH exposure time. Considering all affection parameters, a protocol for degradation of coralene Dark red 2B was developed. Degraded samples were subjected to HPTLC to find out end degraded products. Results show that there is complete degradation of dye and no visible spot are obtained in the TLC plotter when scanned. This method was applied to treatment of effluent samples taken from dye industry of Ankleshwar city and promising results were obtained.

Keywords: Coralene Dark red 2B, Solar light, HPTLC, Degradation

1. Introduction

The textile dyes are a voluminous resource of coloured organic compounds that present an increasing environmental crisis [1]. The textile industry uses approximately 21-377 m³ of water per ton of textile produced and thus generates large quantities of wastewater from different steps of dyeing and finishing process [2]. They pose serious environmental problems because of their colour, low biochemical oxygen demand and high chemical oxygen demand. Various chemical and physical processes, such as chemical precipitation and separation, electro coagulation and elimination by adsorption on activated carbon, etc., are currently used for treating textile wastewater [3].

Disperse dyes are synthetic dyes. Disperse dye is one kind of organic substance which is free of ionizing Group. Disperse dyes are less soluble in water and used for dyeing synthetic textile materials. Disperse dyes is mainly used for dyeing polyester yarn of fabric [4].

Advanced oxidation processes (AOPs) are the group of water and wastewater treatments in which the main oxidative agent is the hydroxyl radical (HO•). This oxidant is characterized by one of the highest oxidative potentials in nature and therefore many organic compounds may be decomposed by AOPs [5].

Degradation of the dye with photocatalytic system and the effects of different parameters such as concentration of solar light coating of catalyst with cement binder and role of different commercial catalysts on the degradation efficiencies is already studied [6]. Investigations have been reported on variation of the parameters such as catalyst dosage, varying dye concentration and pH of the dye solution, H₂O₂ concentration [7].

Improving the knowledge concerning the degradation pathways may be there for helpful to optimize the process by

identification of the byproducts and hence help in the determination of the metabolic degradation pathways.

HPTLC is a powerful analytical technique because of its reliability, simplicity, reproducibility and rapid measurement. Sample clean up, and its main advantage is that a large number of samples can be simultaneously analyzed. Choosing the appropriate mobile and stationary phases is the sole difficultness of the method. For a qualitative determination of a mixture of dyes, the TLC method is the best solution [8].

Here, in this paper solar assisted photo catalytic advanced oxidation method is used to degrade textile disperse dye coralene dark red 2B in effluents. Effluents were collected from shree Balaji, pvt.LTD Ankleshwar GIDC Gujarat.

These effluents are added by local industries of the area to water sources is big issue in that area.

HPTLC Method was developed to check the complete degradation and end products obtained after degradation.

2. Experimental

2.1 Chemicals

The commercially available water soluble azo dye Coralene dark red 2B (λ max-502nm) was obtained from Shree Balaji processor G.I.D.C, Ankleshwar Gujarat. The chemicals like TiO₂, H₂O₂ were obtained from Chitichem, vadodara and Samir tech-chem PVT, LTD. Vadodara, respectively.

Toluene, methanol and acetone were of analytical grade. As stationary phase Aluminum backed silica gel plate (20×10 cm) 60F254 were supplied by e Merck, USA.

2.2 Instruments

Optical density measurements of solution were studied on thermo scientific, Evolution-201 (Sr.no.-5A30253001, MA

Women in Technology, Issues and Challenges: A review

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Abstract

Inspirational female scientists and tech figures are not a new concept. It has been hearing more and more about the importance of women in science, technology, engineering and math (STEM) fields. Yet, while women make up nearly half of the total workforce, they represent only 26% of the STEM workforce, as of 2011. In 2016 women represented 59 percent of the workforce, but on average only represent 30 percent of the workforce at major technology companies. As the technology sector continues to grow, statistics highlight that women remain underrepresented for a variety of reasons, and though there has been a doubling down on the importance of STEM education over the last 10-15 years. There has only very recently been a big push to encourage girls and young women to take a seat at the tech table. Despite a lot of initiatives taken in the last decade to address under representation of women in both science, research and technology, women are facing considerable difficulties when perusing a career in science and technology. Without more women in technology, the year 2050 could be our most backward in a century.

Key Words- STEM, Scientist, Technology, Career, Mismatch

I. INTRODUCTION

A study by the Institute of Technology and Engineering in 2014 in US found that just one per cent of parents with daughters see them growing up to be engineers. So what would the technology industry and society look like in 2050 if there were more women in STEM? In a world of female technologists, one thing we might expect to see is the creation of more products focused on improving the quality of life for the individual. According to a study by Carnegie Mellon University, women innovators put more emphasis on the importance of integrating technology with people (1-7). Studies also show that women prefer more collaborative ways of working and building businesses. In a brave new world of women-powered development, then, one might also expect to see a focus on technologies that enable more joined up forms of innovation like holograms and virtual reality tools to give us a physical presence in online meetings (8-12). What is more, young women are still too often told that STEM isn't for them. When it is to consider the pool of future female talent in technology, it is clear there is still a lot of work to do. Although girls outperform boys in the majority of STEM subjects at graduate level, the number of young women choosing to study STEM at A levels and at university falls significantly behind that of their male counterparts. Just 8.5 per cent of the engineers in the UK are women and 62 per cent of 11-21 year-old girls believe STEM is just for boys. Such inaccurate perceptions hold girls back from considering a future in the

technology industry (13-14). Things are starting to change slowly. Awareness is being raised, which promotes diversity in technical fields from the classroom to the boardroom.

One of the factor that makes the difference in the degrees of science and engineering and patenting performance and is decided by the disciplines chosen, as engineering is a patent rich discipline and it is attracted by fewer women. Survey of 2010 suggested that women accounted 58 percent of biological science degrees and 39 percent of physical science degrees, 20 percent of engineering and computer science degrees in the United States (16). The United States is one of the countries that show lowest representation of women as far as women engineers are concerned in the world. It is even less than one half the proportion of Denmark, Poland, or Malaysia and even lower than many other developing countries (17).

Since 2001, the National Science Foundation in US has invested more than \$130 million to support ADVANCE projects at nearly 100 institutions of higher education and STEM-related, non for profit organizations across the US. Focuses on improving conditions for female STEM faculty, with a unique emphasis on women of color and women who are deaf and hard of hearing at the university. Some observations made even in developed countries like US (18) are

Molecular Docking Studies of Some Flavonoids of Ginkgo biloba with Proteins Probably Responsible for Alzheimer Disease

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Abstract

Alzheimer disease is one of the most common forms of dementia. β -amyloid and tau protein damage in brain is considered to be responsible for this disease. Some flavonoids like Luteolin, Apigenin, Kaemperol, Quercetin, Isorhamnetin, Glycitein, Fustin, Myricetin, Catechin and Rutin are selected for computational theoretical calculations using DFT theory at B3LYP/6-311+G*(d, p) basic set level using Gaussian 16W. The molecular docking investigations are carried out for the same flavonoids using Argus Lab (4.0.1) considering efficient shape-based search algorithm principle and a score function. Ginkgo biloba contains many active ingredients compound like flavonoids and terpenes which are known to slow down Alzheimer disease progression in patients. Binding energies are calculated for all the selected flavonoids with selected proteins. Results show that there is interaction between these flavonoids and selected proteins and this results support to concept of protein kinase binding theory.

Keywords: Alzheimer Disease; Flavonoid; DFT; Molecular Docking; Binding Energies

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Introduction

Alzheimer disease is one of most common form of dementia. Ginkgo biloba leaves extracts are known to slow down Alzheimer's disease (AD) progression in patients. Alzheimer's disease (AD) is a slowly progressive disease of the brain that is characterized by impairment of memory and eventually by disturbances in reasoning, planning, language, perception, reasoning, sensory processing, and conscious thought. According to WHO report, AD will grow nearly 34 million by 2025 and more than 106 million by 2050 and most affected will be seen in the developing countries. So there is immediate need to understand to tackle the life threatening disease. In brain of Alzheimer patients two distinct histological changes are observed in the nerve cells i.e. the formation of extracellular amyloid plaques and intracellular neurofibrillary tangles, so this leads to neurotoxicity. Scientists still are not able to understand what causes AD. But it is clear that this disease develops due of a complex series of events that take place in the brain over a long period of time. Moreover, some other causes include genetic, environmental, and lifestyle factors [1]. Ginkgo is a valuable tree; this tree is found in nearly every country around the globe in urban centers and in temples in Japan and China. Ginkgo biloba has a multitude of phytochemicals, including terpene lactones, biflavones, and flavonoid glycosides, which act on a variety of pathway and receptors [4]. Generally, ginkgo extracts for the preparation of ginkgo products are standardized to contain 24% flavonoids and 6% terpene. Flavonoids and terpene lactones are one of the important parameters to assess the quality of ginkgo products [5]. Flavonoids are found in higher vascular plants, particularly in the flower, leaves and bark. Flavonoids have remarkable antioxidants behavior through various ways including inhibition formation, activity of reactive oxygen species and interaction inhibition with enzymes [6-8].

There are ten types of flavonoids known as Flavones, Flavonols, Flavanones, Flavanonols, Isoflavones, Neoflavonoids, Flavanols or catechins, Anthocyanidins, Chalcones and Biflavones [9-12]. The structural and theoretical study of flavonoids gives great deeper insight into the therapeutic applications. Flavonoids and terpenes are active ingredients of Ginkgo biloba. Ginkgo biloba flavonoids Luteolin, Apigenin, Kaemperol, Quercetin, Isorhamnetin, Glycitein, Fustin, Myricetin, Catechin and Rutin are selected for their docking study with proteins kinase γ - β -amyloid and β - tau proteins using Argus lab 4.0.1. All the flavonoids were optimizing using DFT theory by B3LYP method at 6-31+G* basis set level in Gaussian 16W software. The aim of present study was to prove that flavonoids can be an appropriate drug molecule to treat Proteins responsible for Alzheimer disease with least side effects and maximum neuroprotective activity.



Refractive Indices and Excess Properties of Binary Mixtures of p-Cymene with Fluorobenzene, Chlorobenzene and Bromobenzene at T = 303.15, 308.15 and 313.15 K

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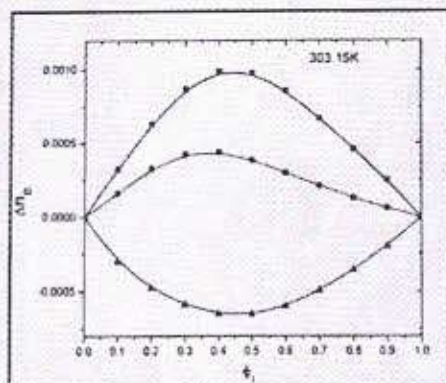
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ABSTRACT

Refractive indices (n_D) of binary mixtures of p-cymene with fluorobenzene, chlorobenzene and bromobenzene were measured using Abbe refractometer at 303.15, 308.15 and 313.15 K along the whole composition range and at normal pressure. From the experimental data, deviation in refractive indices (Δn_D), molar refraction (ΔR_m) and deviation in molar refraction (ΔR_m) were calculated. Excess properties were satisfactorily fitted using the Redlich-Kister polynomial equation to derive the standard deviations (σ). These values were reported as a function of volume fraction (ϕ_1) or mole fraction (X_1) of p-cymene. Theoretical study of nine mixing rules of refractive index has been carried out to investigate their validity for these mixtures over the whole mole fraction of p-cymene at all studied temperatures. Results indicated that there is a strong dipole-dipole interaction present in the p-cymene + fluorobenzene binary mixture when compared to chlorobenzene and bromobenzene binary mixtures.

Graphical Abstract



Deviation in refractive index (Δn_D) as a function of volume fraction (ϕ_1) for p-Cymene (1) + Fluorobenzene (2) (■), p-Cymene (1) + Chlorobenzene (2) (●), p-Cymene (1) + Bromobenzene (2) (▲) at T = 303.15 K.

Keywords: Refractive Index, Molar Refraction, Theoretical mixing rules, Intermolecular interaction.

International Journal of Scientific Research and Reviews

Synthesis, Characterization of Novel 3-Heteroarylindoles as Inherent to biological activity

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ABSTRACT:

2-(3-(1*H*-Indol-3-yl)-5-(*p*-tolyl)-4,5-dihydro-1*H*-pyrazol-1-yl)-4-substituted-5-(substituted diazenyl)thiazoles and 2-(1*H*-indol-3-yl)-9-substituted-4,7-disubstituted pyrido[3,2-*e*][1,2,4]triazolo[4,3-*a*]pyrimidin-5(7*H*)-ones were synthesized via reaction of hydrazonoyl halides with 3-(1*H*-indol-2-yl)-5-(*p*-tolyl)-4,5-dihydro-1*H*-pyrazole-1-carbothioamide and 7-(1*H*-indol-3-yl)-2-thioxo-5-substituted-2,3-dihydropyrido[2,3-*d*]pyrimidin-4(1*H*)-ones, respectively. Also, hydrazonoyl halides were reacted with *N*'-(1-(1*H*-indol-3-yl)ethylidene)-2-cyanoacetohydrazide to afford 1,3,4-thiadiazole derivatives. Structures of novel synthesis were expounded based on spectral data and elemental analysis besides possibly alternate synthesis routes.

KEYWORDS: thiazoles; pyrazoles; coupling reactions; molecular docking; biological activity.

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Sonolytic Degradation of Eosin Yellow

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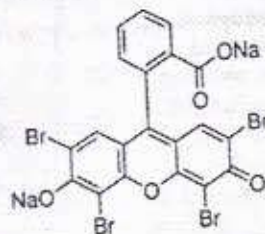
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ABSTRACT

Ultrasound response method is used to study degradation of eosin yellow in aqueous media in ultrasound fast cleaner. It was observed that the colour removal efficiency was influenced by pH, hydrogen peroxide, concentration, frequency of ultrasound. It was found that the dye degradation followed apparent first order kinetics. The rate constant increased by decreasing dye concentration and was affected by the pH of the solution with the highest degradation obtained at 7.5 pH and period of exposure was 90 min. The best and optimum condition for degradation of eosin yellow are developed. Process of degradation was followed spectrophotometrically at maximum wavelength of 517nm. A tentative mechanism is proposed for Sonochemical degradation method has been discussed.

Graphical Abstract:



Structure of eosin yellow

Keywords: Eosin yellow, Hydrogen peroxide, Sonolytic degradation.

INTRODUCTION

Eosin Y, a heterocyclic dye containing bromine atoms, is used in the fields of dyeing, printing, leather, printing ink and fluorescent pigment, etc. The direct release of wastewater containing Eosin Yellow will cause serious environmental problem due to its dark color and toxicity [1]. Synthetic dyes are extensively used in several industries including textile, paper, printing, cosmetics and pharmaceuticals [2-4]. The chemical effects of sonication arise from acoustic cavitation, namely the formation, growth and explosive collapse of bubbles in a liquid, which produces unusual chemical and physical environments. The collapse of bubbles generates localized "hot spots" with transient temperature of about 5000 K and pressures of about 1000 atm [5]. Under such extreme conditions, water molecules dissociate into $\cdot OH$ radical and H



On new record of brachyuran crab *Scopimera crabicauda* Alcock, 1900 (Crustacea: Decapoda) from India

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Short Communication

Abstract

The brachyuran crab *Scopimera crabicauda* Alcock, 1900 belonging to family Dotillidae, was recorded for the first time in Indian waters. The specimens were collected from different coastal areas of Beyt Dwarka (22° 27' 50" N; 69° 08' 22" E), Gulf of Kachchh, Gujarat. The species is so far reported from Persian Gulf, Iran, Oman, Qatar, UAE and Pakistan. Morphological description of the species is given in the report.

Keywords: *Scopimera*, Gujarat, brachyuran crab, sandy-muddy habitat, India.

Introduction

Brachyuran crabs belonging to the family Dotillidae Stimpson, 1858 are smaller in size and mostly found on the shores of estuaries, mudflats, sandy habitat or backwaters in the tropical and sub tropical Indo-Pacific region (Alcock, 1900; Kemp, 1919). Under the family Dotillidae, around 59 species are reported, out of which 14 are under genus *Scopimera* De Haan, 1833

(Ng *et al.*, 2008; Wong *et al.*, 2010). The genus is represented by three species viz. *Scopimera pilula* Kemp, 1919, *Scopimera investigatoris* Alcock, 1900 and *Scopimera proxima* Kemp, 1919 in Indian waters (Alcock, 1900; Kemp, 1919) and the present study reports the presence of a fourth species *Scopimera crabicauda* Alcock, 1900 for the first time from Indian waters.

Material and methods

The study was carried out as part of a research project on documentation of crustacean fauna of Gujarat. India comprising of mudflat habitats. Hand picking method was adopted for specimen collection during low tide. Specimens were washed properly to remove sediment and photographed (Canon 1000D; 18-55 mm lens). Specimens were then preserved in 70% alcohol and deposited in the Zoology Museum of Department of Zoology, Faculty of Science, The Maharaja Sayajirao University, Vadodara, Gujarat, India. The carapace width (CW) and carapace length (CL) of the crabs were measured in mm. The abbreviation G1 is used for male first left gonopod.

Results and discussion

In the present study, brachyuran crab species *Scopimera crabicauda* Alcock, 1900 belonging to family Dotillidae is reported for the first time from Indian waters.



Range Extension of Two Brachyuran Crabs (Crustacea: Decapoda), *Acanthonyx inglei* Tirmizi & Kazmi, 1988 (Epiplatidae) and *Scalopidia indica* Ng & Castro, 2013 (Scalopidiidae) in India

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Abstract

Two species of brachyura, *Acanthonyx inglei* Tirmizi & Kazmi, 1988 (Epiplatidae) and *Scalopidia indica* Ng and Castro (Scalopidiidae) are recorded for first time from the coastal waters of India. *Acanthonyx inglei* has so far been reported only from Pakistan, while *Scalopidia indica* has so far been reported from Andaman Sea.

Keywords Range extension · Crustacea · Brachyura · First record · India

Introduction

Amongst the various groups of crustaceans occurring in India, the brachyuran crabs are one of the most extensively studied. Dev Roy (2013), reported total of 808 species of marine brachyuran crabs belonging to 62 families in India, out of which of 226 species are known to occur on the west coast and 461 species on the east coast. In last few decades, there has been a consistent increase in reportage of new species and new records of marine brachyuran crabs from India (Trivedi et al. 2014, 2015a, b, 2016; Ng et al. 2015; Ng and Kumar 2015a, b, 2016; Trivedi and Vachhrajani 2016a, b; Suvarna Devi and Kumar 2017). In the present study, we report the occurrence of marine brachyuran crabs, *Acanthonyx inglei* Tirmizi & Kazmi, 1988 (Epiplatidae) and *Scalopidia indica* Ng & Castro, 2013 (Scalopidiidae) from India.

Materials and methods

The specimens were collected from by-catch discarded by commercial fishing trawlers operating in the coastal waters of the states of Gujarat and Tamil Nadu, India. The specimens were cleaned, photographed, preserved in 70% alcohol and deposited in the Zoology Museum (ZL-AR-CR) of Department of Zoology, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India. The specimens were measured in millimetres (mm). Abbreviations: CW: carapace width; CL: carapace length; P2–P5 for pereopods 2 to 5, respectively; G1: male first left gonopod; G2: male second left gonopod; coll.: collector.

Results and discussion

Order Decapoda Latreille, 1802.

Family Epiplatidae MacLeay, 1838.

Genus *Acanthonyx* Latreille, 1828.

Acanthonyx inglei Tirmizi & Kazmi, 1988 (Figs. 1 and 3a, b).

Acanthonyx aff. *Elongatus* Tirmizi & Serène, 1971: 22, Fig. 1, pl. 2A, B.

Acanthonyx elongatus inglei Tirmizi & Kazmi, 1988: 162, Figs. 50, 51.

Material examined. One male (ZL-AR-CR-101) (CW 11.85 mm including branchial teeth, CL 15.50 mm, including

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Sloth bear attacks on humans in central India: implications for species conservation

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Abstract: Conflicts with wild animals are increasing as human populations grow and related anthropogenic activities encroach into wildlife habitats. A good example of this situation is the increase in conflicts between humans and sloth bears (*Melursus ursinus*) in India. Sloth bears are known for their aggressive and unpredictable behavior. More human fatalities and injuries have been attributed to sloth bear attacks than all recorded incidences of wildlife attacks in Buldhana Forest Division of Maharashtra, India. We interviewed 51 victims that were attacked by sloth bears between 2009–2017 to better understand the reasons for the attacks. Thirty-four of the attacks (66.7%) resulted in serious injuries, and there were 7 human mortalities (13.7%) reported. Most attacks occurred close to agricultural fields (66.7%) and during mid-day (1100–1400 hours). More attacks (64.7%) occurred when a person was working or resting in the field, or retrieving water for the field followed by attacks while watching over grazing livestock (13.7%). Individuals aged 31 to 40 years (35.3%) were the most common victims of sloth bear attacks. Half of the attacks were during monsoon season (July to October, 51%) followed by summer (March to June, 35%) and winter (November to February, 14%). In 39% of cases, a single bear was involved while females with 2 cubs were found to be involved in 37% of attacks. This research was incorporated into a comprehensive conflict mitigation plan, which included field staff training for monitoring sloth bear population, formulation of a Rapid Rescue Unit to manage conflict situations, and sloth bear education programs in the high conflict villages. People were made aware of the behavior and activity pattern of sloth bears and preventive measures to mitigate potential conflicts.

Key words: bear attacks, central India, human fatalities, human injuries, human-wildlife conflicts, *Melursus ursinus*, mitigation measures, sloth bears

AS HUMAN POPULATIONS grow, anthropogenic activities will continue to encroach into wildlife habitats. The increased proximity of humans and wildlife has led to increased human-wildlife interactions (Messmer 2000). The phrase human-wildlife conflict is now commonly used to describe situations that involve any negative interactions between humans and wildlife (Messmer 2009). As human populations increase, the resulting competition with wildlife for space and food resources pose a major challenge for conservation of several wild species worldwide (Distefano 2003, Madhusudan 2003, Woodruffe et al. 2005). As such, managers will need better information regarding the cause of these conflicts to help mitigate them (Messmer 2000).

Sloth bears (*Melursus ursinus*) inhabit India, Sri Lanka, and Nepal and are rare in Bhutan (Garshelis et al. 1999, Sharp et al. 2015). They are currently listed as vulnerable by the

International Union for Conservation of Nature and Natural Resources (Garshelis et al. 2008, Dharaia et al. 2016). Sloth bear populations are declining due to habitat loss through land conversion. Furthermore, diminished food resources (Murthy and Sankar 1995) and direct competition between bears and humans for food resources are also considered a major species conservation threat as human-bear conflicts increase (Rajpurohit and Chauhan 1996).

The villages in and around Dnyanganga Wildlife Sanctuary (hereafter, Dnyanganga WLS) of northern Maharashtra, India are experiencing increased human-bear conflicts, which include regular encounters with sloth bears around their agricultural fields and villages. The collection of non-timber forest products (NTFP), which typically include fruits, flowers, leaves, mushrooms, and medicinal plants along with firewood and livestock grazing, increases the risk of having these encounters. The resulting



ORIGINAL RESEARCH PAPER

Ecology

HIGHWAY MORTALITY OF VERTEBRATE SPECIES IN THE ARAVALLI MOUNTAIN RANGE OF NORTH GUJARAT, INDIA

KEY WORDS: Mortality, Road-kills; Vehicles; Western India

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ABSTRACT

Vehicle induced mortality also known as a road kill of wild animals is well known in many developing countries including India but very few empirical studies describe the extent of this mortality on wildlife population. For our study, road kill was monitored in three major roads of North Gujarat between May 2005 (monsoon) to October 2006 (winter) and a total of 89 road kills were recorded. Mammals were the most effected taxa (58.42%) followed by reptiles (30.33%) and birds (11.23%). The time of observation was also noted which indicated the intensity of kill of the animal species during different times of the day. Conservation and management implications are essential to prevent the rapid loss of animal population due to road kills. Road-kill surveys such as this are needed to identify species for which road mortality is unsustainable, to determine the influence on threatened species, and to identify important spots of roads that are important to have speed limits for the protection of the resident faunal species.

INTRODUCTION:

Anthropogenic activities continue to affect wildlife by the loss of habitat and change in the extent of habitat beyond road (Spellerberg, 1998). Habitat fragmentation remains the primary cause of decline for many species of wildlife (Soule et al. 1988, Lawrance, 1990). Road incursion is one of the common forms of habitat fragmentation (Groat B. & Hazebroek, 1996). Every year across the world millions of animals are injured or killed by vehicles. Roads may act as a barrier to animals' movement, produce edge effects or cause substantial mortality of wildlife (Andrews, 1990; Bennett, 1991). Collisions of animals with vehicles and trains are very common (Chhangani, 2004).

The research results have largely been descriptive and anecdotal reporting on surveyed or counts of animals killed by vehicles, their age, sex, characteristics of road kills and seasonal patterns. Although counts of dead animals can be useful for evaluating the magnitude of road-kills, they are inadequate for understanding the relationship between roads and wildlife (Clevenger et al., 2003).

We quantified road-kill occurrence among small terrestrial vertebrates in the North Gujarat. Seasonal and geographic patterns of road-kills were identified

Study Area:

The study was conducted in North-west India with the geographic co-ordinates (23°35'13"N to 24°30'57"N and 72°10'28"E to 73°24'47"E). The area encompasses the Sabarmati river watershed comprising of mountain landscapes of North Gujarat and adjacent state of Rajasthan in India. The forest area is highly fragmented with few good patches of forests at the foothills of terminating Aravalli mountain range occurring in Banaskantha and Sabarkantha. Topography comprises of hilly mountains with an elevations ranging from 10m to over 900 m (FSI, 1997). Surveys for wildlife killed by vehicles were conducted along a major road circuit. The circuit comprised the Ambaji to Palanpur NH14 (65 km) west to east, Ambaji to Himatnagar NH76a (110 km), Ambaji to Taranga SH54 (54 km) and Ambaji to West Balaram (50 km) which made a total of 279km (Fig. 1). The region experiences a high variation in temperature with a minimum as low as 5°C in winters to maximum of 46°C in summers. The monsoon season experiences an average rainfall of 765mm (FSI, 1997). The study area mainly comprised of moist, dry, deciduous, thorn and open scrub forests which were dominated by *Butea monosperma*, *Wrightia*, *Accacia*, *Diasprous* etc.,

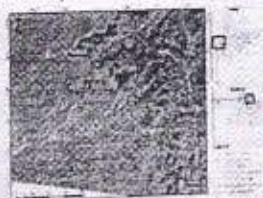


Figure 1: Map of Study area with highlighted Major Road Circuit

METHODS:

Quantitative surveys for road killed wildlife involved driving a vehicle and recording dead wildlife (road-kills) seen on the road within 3 m of edge of the road. The speed at which the survey was conducted varied throughout the circuit due to the range of speed zones present 40-60 km/hr. When an animal was found to be killed on the road surface, an attempt was made to identify the species, approximate time of kill, % of injury, number of individuals, microhabitat were also recorded. We further recorded the animals along with its photograph.

Dead fauna were identified to species level with the assistance of field guides (Menon, 2003) and their location was recorded. Monitoring was conducted for 53 weeks over a period of 1 1/2 years which include all the major seasons of the year. In 2005, mainly the monsoon and winter season was included in the study whereas in the year 2006, all seasons were surveyed. Road vehicle counts were undertaken twice a month in both holidays and working days, in all the four major roads of the circuit.

RESULTS:

Road-kill surveys

In total 89 individuals were found to be road killed comprising of 52 individuals of 15 mammalian species forming 10 different families, 27 reptiles of 13 species belonging to 8 different families and 10 individuals of 6 different avian species that represent 5 different families were recorded along the road kill circuit during 53 weeks of surveys. The overall mean was calculated to be 1.68 individuals per week. Mammals accounted for 58.43%, reptiles were found to be 30.33% whereas birds accounted for 11.24% of the total road-killed fauna. Indian flying fox, five striped palm squirrel and desert cat were the most commonly observed road killed animal species.

Small-size of frogs made them difficult to detect, which may have contributed to the low number of records. Frog road-kills dismember and desiccate rapidly on the road surface, rendering them virtually undetectable from a moving vehicle (authors' personal observations).

Fewer road-kills of all wildlife groups were recorded during (n=14) summer than during winter (n=30) and monsoon (n=45).

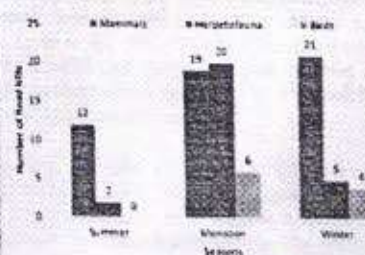


FIGURE 2 No. of Road kills recorded in different seasons.

REVIEW



Is current information on organochlorine exposure sufficient to conserve birds in India?

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Abstract

Organochlorine compounds (OCs) pose a serious threat towards the wildlife due to their well-known adverse effects. India is the second largest producer of pesticides in Asia, with DDT production still ongoing, and is ranked amongst the leading countries of pesticide consumption. However, a significant data gap in avian biomonitoring studies has been identified in Asia. The objective of this review is to compile and discuss the available literature on concentrations of organochlorine pesticides and PCBs in Indian birds. The review of 18 articles showed that DDTs were the OCs most frequently analysed, followed by HCHs and PCBs (highest hepatic mean values: 11.6, 1.8 and 1.03 µg/g ww, respectively). The most frequently analysed matrix was whole body homogenates, followed by internal tissues. Plasma, eggs, feathers and guano were poorly sampled. The range of sampling years was 1980–2007. In general, hepatic OC concentrations were below the level known to cause adverse effects, although *p,p'*-DDE in eggs was found in concentrations associated with eggshell thinning. Most of the studies were carried out in Southern India (Tamil Nadu). Out of 106 species studied, house crow (*Corvus splendens*) was the most frequently monitored. However, the number of individuals sampled per species is generally low and different sample types are used, thus, huge limitations to compare OC exposure exist. This review shows that there is a clear deficit of data on OC concentrations and sublethal effects that needs to be addressed to understand the status of OC exposure, spatio-temporal trends and potential impacts in Indian avifauna.

Keywords India · Birds · POPs · Organochlorines · Pesticides · PCBs

Introduction

Persistent organic pollutants (POPs) and their fate in the environment continue to be an issue of special concern.

Birds have been the first wildlife species reported to be affected by POPs, and there are articles documenting avian reproduction failures and population declines in North America and Europe since the 1950s (e.g., Hickey 1969; Nisbet 1989; Newton and Wyllie 1992). These declines were mainly caused by the exposure to organochlorine compounds (OCs), that is organochlorine pesticides (OCPs) such as dichlorodiphenyltrichloroethanes (DDTs) and pollutants such as polychlorinated biphenyls (PCBs) (e.g., Ratcliffe 1970; Newton and Wyllie 1992). This is mainly because these toxic compounds are slow in degradation, persisting for long periods of time, and they can bioaccumulate and biomagnify in successive trophic levels, creating a serious threat towards the wildlife and human population (Elliot et al. 2009; Hong et al. 2014). Concern towards OCs raised due to the adverse impacts they cause on the reproductive, immune, endocrine and nervous system in biota (Bustnes et al. 2007; Cortinovis et al. 2008). These compounds are banned or restricted in their use in most countries, but they are highly persistent and wildlife exposure

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Research Article

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Biosynthesis and Characterization of Silver Nanoparticles from *Withania Somnifera* (L.) Dunal (Ashwagandha) Root Extract

Tessy John¹, Kokila A Parmar², Shailesh C Kotval², Jayesh Jadhav²

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Abstract: Synthesis of silver nanoparticles from biological source is the most efficient approach because it is eco-friendly and less time consuming. In this study, silver nanoparticles were synthesized using *Withania Somnifera* (L.) (Ashwagandha) root extract as reducing agent. The synthesized nanoparticles were characterized under UV-Visible spectrophotometer, FTIR, SEM, XRD and TEM. UV-Visible spectrophotometer was used to monitor the formation of silver nanoparticles. The TEM analysis shows that the silver nanoparticles had an average size of 20 nm. X-ray diffraction analysis showed that the particles were crystalline in nature. The antibacterial activity of silver nanoparticles was performed on various gram-positive and gram-negative bacteria. These silver nanoparticles showed a significant cytotoxic effect against both MCF-7 and Hep-2 cells.

Keywords: silver nanoparticles, industrial electrolytes; ICP-AES; SFE-GC/MS; ERT; NAT; CYP 450; pesticides

1. INTRODUCTION


Nanotechnology is considered as one of the most emerging fields of Science and it deals with synthesis

SPECTROSCOPIC AND ANTIMICROBIAL STUDIES OF SOME NOVEL COMPLEXES OF
 d^{10} METAL IONS.Jabali J. Vora^{*}, Jwalant J.Vora[†], Hardikkumar D. Chaudhary[†],^{*}Department of Chemistry, Hemchandracharya North Gujarat University, Patan - 384 265.Gujarat, India[†]M.G. Science Institute, Navrangpura, Ahmedabad-380009, Gujarat, India

ABSTRACT: Complexes of kynurenic acid (KYNA) with d^{10} metals have been synthesized and their physicochemical properties were investigated using elemental analysis, IR, molar conductance, uv- visible and mass spectroscopy. Kynurenic acid acts as a chelating agent coordinating through the oxygen and nitrogen atoms of >O-H, >C=N groups, respectively. Thermal stability and mechanism of decomposition of complexes were determined by TGA – DSC techniques. The ligands and its complexes were screened for their antibacterial activities towards Bacillus, Salmonellatyhi A, Escherichia coli and Staphylococcus aureus.

Key words: Kynurenic acid, d^{10} metal complexes, Antibacterial activity.

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INTRODUCTION

The inter disciplinary area of coordination chemistry is very important.. There are a number of applications of chelate compounds in laboratory, medicinal chemistry, electronics, catalysis etc. Kynurenic acid (KYNA) (IUPAC name 4-oxo-1H-quinoline-2-carboxylic acid), a major tryptophan metabolite, is a glutamate receptor antagonist, which is also reported to inhibit nicotinic acetylcholine receptors. The co administration of endomorphin-1 (EM1) with KYNA causes an enhanced antinociceptive effect.

KYNA levels are elevated in the brain and cerebrospinal fluid of persons with schizophrenia and Alzheimer's disease, both of which are characterized by deficits in contextual learning and memory. That elevated concentration of endogenous KYNA interferes with contextual learning and memory and support the notion that increased concentration of KYNA may contribute to cognitive dysfunction. In addition, data provides new insight into how novel 'gliotransmitters' may modulate neuronal function and behaviour (Chess, et.al., 2009).

EXPERIMENTAL

The complexes were made between the ligand and d^{10} metals, according to the standard procedure (Haresh, et.al., 2015). 0.2M solution of perchloric acid was prepared .The exact strength was determined by pH metric-titration. Metal perchlorate solution was prepared from metal carbonate and perchloric acid. 25ml 0.2M metal perchlorate solution and 25ml 0.2M KYNA solution which is made in DMSO were mixed and refluxed for 2.5 to 3 hours at 90°C temperature and then cooled. This resulted in the solid product. The complex thus obtained was washed well with warm water and alcohol for the removal of unreacted metal salt and ligand. All the complexes were dried in oven at 40°C to 45°C temperature. In this way, the complexes of Zn(II), Cd(II), and Hg(II) were prepared and isolated as solid. An antibacterial study was carried using Agar Diffusion Method.



"STUDY ON CONSUMER PREFERENCES TOWARDS CASHLESS PAYMENT AT PATAN CITY"

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ABSTRACT Money as medium of exchange and its use for transaction on daily basis. Use of digital mode instead of hard cash makes economy cashless. Available cashless modes of payments are Mobile wallet, plastic money, and net banking. Though, digital payment has both the pros and cons but digital revolution and reforms of banking sectors, must be needed to learn about the use of digital payments modes. However, the system of cashless payment is not free from any challenges. So consumer's preferences about cashless payment need to be researched. Consumers have alternatives for transaction from different merchants, organisations, banks, Government etc. It is an attempt to find which modes and purpose have been emerged as topmost for making payment and highlighted factors affect to consumers and their preferences for digital payment. Primary data of 100 respondents collected using structured questionnaire and carried out different types of statistical analysis.

KEYWORDS : Preferences, Cashless payments, Payment Mode, digital payment.

1. INTRODUCTION

Payment which is carried out without using hard cash is known as cashless payment. That doesn't mean cash (money) is not used but it transfers digitally from buyer's account to seller's account.

1.1 Availability of different modes of payment methods are as follows:

Banking Cards: Banking cards like Credit and Debit cards are issued by the bank by providing the KYC (know your customer) information to the bank. Applying for a card and getting a pin for the same. Both are plastic cards that are used for cashless payment. (Using POS, AFPS)

Internet Banking: Bank's all facilities are used by account holder via digital mode. To take benefit of online service individual can do the cashless payment through his account. (Other options like IMPS, NEFT, RTGS etc...)

Mobile Wallets: Alternative to open a zero KYC or a full KYC wallet along with mobile number and the respective wallet application to be downloaded to smart phone. E-wallets are linked with bank account.

1.2 Purpose of using cashless Payment services.

- Money transfer
- Online shopping
- Utility bill payments like electricity bill, insurance, gas charges, telephone bill etc.
- Pay for transportation like bus, Train, Flight etc.
- For Entertainment like movie ticket, funfair ticket etc.
- For Purchasing food and beverages etc...

1.3 Advantages of making cashless transactions:

- Saves time:
- Ease of use:
- Security:
- Convenient and information stored less than one roof:
- Fringe Benefits: Attractive discounts, Offers, Rewards

2. LITERATURE REVIEW

Bamasak (2011) he was carried out study in Saudi Arabia found that there is a bright future for cashless payment through smartphones. Security of mobile payment transactions and the unauthorized use of mobile phones means privacy were the major concerns for the consumers.

Padashetty, D. S. & Kishore, K. S. (2013) "An empirical study on Consumer Adoption of mobile payments" research found that factors which affect the preference are trustworthiness, expressiveness and ease of use.

Dr. Hem Shweta Rathore (2016) in her research paper "Adoption of digital wallet by consumers" found that due to technology on hand its

saves time and more convenient to payment. Expressed that advanced installment utilizing wallet was profoundly helpful for shoppers in buying items through online without physical developments across places.

3. RESEARCH METHODOLOGY

3.1 Research Design: The Descriptive Research Design use for this research paper.

3.2 Objectives

- To find out the preferred mode and different purposes of payment for cashless transaction.
- To study the factors that most affect to consumers for Cashless Transaction.
- To identify impact of demographic variable on consumer preferences regarding cashless payment

3.3 Research Hypothesis

H01: There is no significant difference between Education qualification and preferred uses pattern of transaction.

H02: There is no significant difference between Education qualification and preference for factors to do cashless payment.

3.4 Data Collection: The primary data is collected through survey and the secondary data is collected from the newspapers, magazines, websites etc.

3.5 Sampling Method: The Random sampling method is used to collect the data from the respondents.

3.6 Sample Size: The sample size is 100 respondents from Patan city.

3.7 Data Analysis tools: The collected data analysed by frequency distribution, reliability statistics and ANOVA analysis.

3.8 Research Instrument: The data collected through structured questionnaire.

3.9 Limitations of the study

- The study is carried out in Patan city only.
- Consumer's preferences change as time change and technology change.
- Respondent may hide or give bias responses due to financial matters.

4. Data Analysis and Interpretation: The data is analysed and interpreted using SPSS.

4.1 Reliability Statistics: Cronbach's Alpha value is more than 0.7 which shows reliability and validity of collected data.



CASHLESS ECONOMY: PUBLIC OPINION REGARDING SECURITY OF DIGITAL PAYMENTS IN INDIA

Mr. Anand A. Patel

Research Scholar Hemchandracharya North Gujarat University Patan – Gujarat 384265.

Dr. Khuman L. Rathod*

Research Supervisor Associate Professor Hem. North Gujarat University Patan–Gujarat 384265. *Corresponding Author

ABSTRACT

Digital India is the dream and vision of existing Indian Government. To make India as cashless economy government emphasize on promotion & support of digital payment system. Millions of Indians are now entering into the digital payments arena through available various alternatives. Digital payments adoption is increasing day by day due to its advantages over traditional cash transaction. But in recent past we heard news regarding hacking, cybercrime and leak of data etc and such incidents force us to think about security of digital platform for financial purposes. India is moving towards cashless economy but prime obstacle is security and safety. This paper is an attempt to find out public opinion regarding security of digital payment and is it viable for India to achieve 100% cashless economy in recent time?

KEYWORDS : Opinion, Cashless payments, security, Payment Mode, digital payment.

2. CASHLESS ECONOMY:

Cashless economy means absence of physical cash in transaction or all transactions in economy is carried out digitally / electronically via different kind of available digital payment modes. Indian government promoting digitally empowered society and knowledge economy to Transform India in to faceless, paperless and cashless economy. India is foot step ahead to less cash economy and for that many digital payments platforms are available.

2.1 Availability of different modes of digital payment methods are as follows:

- A. Banking cards
- B. USSD
- C. AEPS
- D. UPI
- E. Mobile wallets
- F. Bank prepaid cards
- G. POS
- H. Internet banking
- I. Mobile banking
- J. Micro ATMs

2.2 Purpose of using cashless Payment services

- Fund transfer
- Shopping
- Utility bill payments like electricity bill, insurance, gas charges, telephone bill etc.
- Pay for transportation like bus, Train, Flight etc.
- For Entertainment like movie ticket, funfair ticket etc.
- For Purchasing food and beverages etc...

2.3 Role of Government of India in cashless economy

Indian government implemented Jan Dhan Yojana, BHIM application, Aadhar based payment system and also launches schemes like Lucky Grahak Yojna for customers & Digi Dhan Vyapaar Yojna for traders to promoting and attracting digital payment for Indians and reduce dependency on physical cash for transactions. Government also Started Awareness initiatives by DIGISHALA, Common Service Centres (CSCs) under Digital Saksharta Abhiyan (DISHA) etc.

2.4 Role of RBI in cashless economy

RBI renews, cease, revoke, cancelled or permitted the certificates of authorization to payment system operators under payment and settlement act.

RBI notification regarding cyber security frame work for bank

dated 2 Jun, 2016 contains.

- Prepare cyber security framework appropriate to bank depending on level of inherent risk.
- Set up a security operation centre for continuous surveillance of cyber threats.
- Ensure protection of all personal and financial data of customers at any cost.
- Prepare cyber crisis management plan to detect-response-recovery and containment of all kind of cyber threats and to achieve zero day attacks.
- Mandatory reporting of cyber incidents promptly and prepared indicators for assessment and measurements of cyber security framework.
- Taking necessary action to create awareness among all stakeholders.

2.5 SWOT analysis of India as cashless economy

SR NO	STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
1	Planned strategy	Cash as king (habit)	Economy growth	Cyber crime
2	Financial inclusion	Lack of digital literacy & Awareness	Reduce corruption	Theft of personal and financial data
3	Government support	Lack of infrastructure	Curbing black money	Fear of money loss
4	Increase in smart phone and internet users	Sluggish economy	Increase tax collection	Hacking (security of transaction)
5	Easy and convenient to use	Electricity supply (24*7)	Saving of huge Expenditures. (currency notes)	Threats from viruses, malwares, phishing etc.

3. LITERATURE REVIEW

Report by DSCI and Paypal (2018). They have reported India in the journey of digital payments achieving new highs in terms of transaction and it is in the stage of early adoption. But in India incidents of cyber attacks reported in banking organisation and discovered that from multiple accounts around 25 crore rupees was pilfered due to a bug in digital payment application. Customer trust and security should be first priority throughout transformation cycle in digital payment ecosystem. Also Report highlighted measures to mitigate security risk which are associated with digital



Impact of Direct to Home Services on Television viewing habits of Rural Consumers: A Comprehensive Study of Rural area of North Gujarat

Kavita A. Trivedi, Research Scholar, Rayalaseema University
Faculty – BBA Department (S. K. College of Business Management), HNG University, Patan 384 265 (Gujarat), INDIA

ABSTRACT

In this research paper we show the scope for further growth as television penetration in India. Presently, TV channels are distributed through cable TV, Direct to Home (DTH), terrestrial and Internet Protocol Television (IPTV) networks. Majority of the distribution is through cable TV and DTH platforms. The key entities in cable TV services are Broadcasters, Multi System Operators (MSOs) and Local Cable Operators (LCOs).

Keywords— DTH, Television, Data

I. INTRODUCTION

A DTH stands for Direct -To-Home Television, DTH is defined as the reception of satellite programs with a personal dish in an individual home. DTH takes away with the need for the local cable operator and puts the broadcaster directly in touch with the consumer[1]. The Indian economy at a GDP growth rate of eight percent, the average Indian's disposable income and purchasing power has risen to all-time-high levels. The Indian entertainment and media industry is growing at a worth of US\$ 10 billion and will be with a compound annual growth rate of 18 percent over the next five years. The DTH service addresses the needs of a burgeoning market for a wholesome family entertainment service for the over 125-million TV household markets in the country. Terms which were alien to Indians like DTH, Digital Cable, and IPTV are rapidly finding presence in the country's magazines and journals. As per the ASEAN bankers' research report (2007), India would overtake Japan as Asia's largest DTH by 2010 and the most profitable pay-TV market by 2015 .Over the last three years, the direct -to-home (DTH) satellite industry has come on strongly worldwide. It has grown from a niche delivery mechanism into a mainstream business. The spread of subscription-based DTH Satellite.

II. KEY PLAYERS IN DTH INDUSTRY (INDIA)

DD Direct+ of Prasar Bharati,
Dish TV of Zee Group
Tata Sky-the joint venture between Tata and Rupert Murdoch's Sky TV
Reliance Big TV
Airtel DTH
Videocon DTH
Sun Direct DTH
DTH Scenario at Gujarat:

Bharti Airtel one of the Asia's leading integrated telecom service provider was recognized as the Best telecom company in Gujarat at the 3rd edition of GESIA Annual awards, given away in Ahmedabad recently. Airtel was chosen for this award from among the leading telecom companies that currently operate in the state of Gujarat. Some of the competitive differentiators that contributed to Airtel's recognition as the best Telecom Company award are: The Airtel e-Gram connectivity infrastructure project is the largest e-governance rural connectivity initiative at the village level. Under this project, Airtel partnered with the Government of Gujarat and set up telecom infrastructure which provides a comprehensive VSAT based solution, connecting Panchayats and Common Service Centers (CSCs) across 13716 villages in the state.

III. TELEVISION VIEWING HABITS OF YOUNGSTERS IN INDIA[3]

When youngsters watch television with their parents their choice always differs. Because youngsters prefer to watch channels like Mtv, Channel V and more of reality and entertainment show. While parents usually watch daily soaps and news, which most of the youngsters do not prefer to watch. There is hardly anything left for the youngsters to watch today because nowadays many daily soaps have been increasing. But there are a couple of channels catering to young audiences between the age group of 18-25 years. The survey which was conducted to find out the television viewing habits among the youth gave us a lot of



IMPACT OF DIRECT TO HOME SERVICES ON BUYING HABITS OF RURAL CONSUMERS: - A comprehensive Study of Rural area of North Gujarat

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ABSTRACT

A DTH stands for Direct-To-Home Television, DTH is defined as the reception of satellite programs with a personal dish in an individual home. DTH takes away with the need for the local cable operator and puts the broadcaster directly in touch with the consumer. The Indian economy at a GDP growth rate of eight percent, the average Indian's disposable income and purchasing power has risen to all-time-high levels. The Indian entertainment and media industry is growing at a worth of US\$10 billion and will be with a compound annual growth rate of 18 percent over the next five years.

KEYWORDS: Home Services, Direct-To-Home Television, Indian economy.

INTRODUCTION:
The DTH service addresses the needs of a



burgeoning market for a wholesome family entertainment service for the over 125-million TV household markets in the country. Terms which were alien to Indians like DTH, Digital Cable, and IPTV are rapidly finding presence in the country's magazines and journals. As per the ASEAN bankers' research report (2007), India would overtake Japan as Asia's largest DTH by 2010 and the most profitable pay-TV market by 2015. Over the last three years, the direct-to-home (DTH) satellite industry has come on strongly worldwide. It has grown from a niche delivery mechanism into a mainstream business.

The spread of subscription-based DTH Satellite

Key players in DTH Industry (INDIA)

- DD Direct+ of Prasar Bharati,
- Dish TV of Zee Group
- Tata Sky-the joint venture between Tata and Rupert Murdoch's SkyTV
- Reliance BigTV
- Airtel DTH
- Videocon DTH
- Sun Direct DTH

DTH Industry in India Present and Future

India has a total television population of close to 135 million, out of which 80% have access to cable and satellite (i.e. 108 million).

The total DTH subscribers are close to 22 million. Thus the DTH has a market share of approximately 20%. The subscriber base for DTH in 2006 was meager 1 million. Now for an industry which is just 5 years old, it is a great achievement.

Let's have a look at how the DTH industry has grown in these 5 years. In 2005 Dish TV was the only player in the DTH industry and was registering subscriber growth, mainly in the areas where cable TV was not available. The subscribers were not ready for the cost of set top box. In 2007 CAS mandate was introduced in selected metro cities, where users had to invest in a set top box.

The first DTH service was launched in India on 2 October 2003 by Dish TV. The company decided not to compete against entrenched cable operators in metros and urban areas, and instead

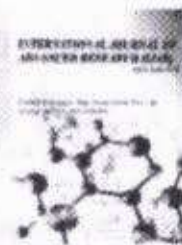


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RESEARCH ARTICLE

CATALYTICAL AND ANTICANCER STUDIES OF COMPLEXES OF 2-[(5-METHOXY-1H-BENZIMIDAZOL-2-YL)SULFONYL]-N-PHENYLACETAMIDE WITH ALKALINE EARTH METAL IONS.

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Alkaline earth metal complexes, 2-[(5-Methoxy-1H-Benzimidazol-2-yl)Sulfonyl]-N-Phenylacetamide (MBSPA), Antimicrobial Activity, Anticancer Activity, catalysis

Abstract

Many important biochemical compounds and drugs of natural origin contain heterocyclic ring structures. Among carbohydrates, essential amino acids, vitamins, alkaloids, glycosides etc. the presence of heterocyclic structures in such diverse types of compounds strongly indicates that these compounds possess different types of the pharmacological activity. The present work has been done in the search of some potential biochemically active derivatives of 2-mercaptobenzothiazole for medicinal as well as nutritional purposes. Currently used compounds which upon substitution at either functional group or linked with heterocyclic rings or molecules with metal ions, many times, capable of performing better. Synthesis of newer molecules is usually carried out by new linkage through functional groups present in molecules. After the synthetic procedure, the newer molecules require spectroscopic characterization in order to ascertain their structure. In the present work, 2-mercapto 5- methoxy benzimidazole molecule has been linked with N-(4-acetylphenyl)-2-chloroacetamide heterocycles and instrumental methods like C,H,N,S Analyzer, FT IR spectroscopy, MASS spectrometry, UV spectroscopy etc. have been used for structure elucidation and their important biological activities and also catalytic properties have been studied.

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Introduction:-

The compound 2-[(5-methyl-1H-Benzimidazole-2-yl)sulfonyl]-N- phenyl Acetamide (MBSPA) is the important intermediate required for the synthesis of omeprazole. The reactions were also performed in the presence of phase-transfer catalysts.

Experimental:-

Aniline, toluene, TEA (tri ethylamine), dichloromethane, acetone (all analytical grade) and 2-mercapto-5-methoxy-1H-benzimidazole were used for the preparation of ligand. Mg(II), Ca (II), Sr(II) and Ba(II) perchlorates in DMSO were prepared. The exact strength of 0.2M perchloric acid was determined by pH metric titration against 0.2M NaOH solution (standardized with 0.2N oxalic acid). Metal perchlorates were prepared by mixing solid carbonates

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Photo Catalytic Degradation of Cobalt Picrate in The Presence of Zinc Oxide

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ABSTRACT

Huge amount of work has been going on in the field of dye, herbicide, insecticide but little work is carried out in the field of metal complexes. Photo catalytic degradation of cobalt picrate was studied in the presence of heterogeneous semiconductor. Various parameters were studied such as effect of concentration, amount of semiconductor, effect of light intensity, effect of pH etc. on solution of cobalt picrate.

Keywords: Photo catalysis, degradation, Zinc oxide, cobalt picrate.

INTRODUCTION

Heavy metals are present in the effluents of different types of industries such as paint, electroplating, lather tanning, agriculture and battery manufacturing [1-3]. In present days treatment of waste water is a big challenge for scientists and researchers. Time to time several methods are developed to remove industrial waste, such as chemical precipitation and biological removal but out of them, advance oxidation process (AOP) has been widely used technology for treatment of waste water in last decades [4-6]. Advance oxidation processes like Fenton and photo-Fenton catalytic, H₂O₂/UV, semiconductor photo catalysis have been studied for the purpose such as decolourization of waste water [7-9]. In recent years, semiconductor is more attractive and important since it has a great competence to contribute to environmental issues [10]. Heterogeneous photo catalysts are widely used to degrade the toxic pollutants to its non-toxic form [11]. ZnO has more efficiency to degradation of pollutant rather than TiO₂ in certain conditions [12-15]. Photo catalytic degradation of Rhodamine B dye has been done using hydrothermally prepared ZnO and MoO₃, Cu₂O, V₂O₅ [16-17]. Photo catalytic degradation of acridine orange has been done in the presence of ZnO [18]. ZnO loaded activated carbon has highest activity to degradation of DB53 which was experimentally proved [19]. Photo catalytic degradation of acid red 18 was done by ZnO [20]. Photocatalytic degradation of crystal violet dye has been studied in the presence of doped TiO₂ and Fe₂Mo₃O₁₂ [21-22]. Photocatalytic reduction of Cr (VI) has been done by GO/TiO₂, and GO/ZnO [23]. In this present work we have focused on the optimization of degradation of cobalt picrate in the presence of zinc oxide (200 mesh) and various parameters were studied.

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/ Original Research Article

STUDY OF VARIATION IN BIOCHEMICAL COMPOSITION OF MUSCLE TISSUE OF MUD CRAB *Scylla serrata* COLLECTED FROM GUJARAT AND MAHARASHTRA STATE, INDIA

JAIVANSH SOMAIYA ; MADHURI PADAYA ; NIKETA MAHETA ; TRIVEDI JIGNESHKUMAR

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Abstract

In present study, biochemical composition of mud crab, *Scylla serrata* collected from seven local fish market of Gujarat and Maharashtra states was analysed to check the variation in their nutritive value. Total 10 individuals were collected from each fish market of study sites like Sartanpar, Bhavnagar, Bilimora, Amalsad, Versova, Gorai and Pen. Major biochemical components like moisture, protein, carbohydrate and total lipid content were estimated in body and claw muscles of the male and female specimens using standard protocols. Biochemical composition of studied species was variable amongst different study site. Moisture ($83.81 \pm 7.87\%$), protein ($47.7 \pm 21.74\%$) and lipid ($4.03 \pm 2.83\%$) were recorded maximum in body muscle of female collected from Bhavnagar whereas maximum carbohydrate ($11.72 \pm 2.35\%$) was recorded in body muscle of female collected from Amalsad. Present data shows that nutritive value of body muscle was higher compared to claw muscle tissue. The study also suggests that females were more nutritious as compared to male. Variation occurring in biochemical composition of *S. serrata* collected from various may be due to the effect of geographical area, the environmental factors and available food resources.

Keywords: Biological value of meat; protein; lipid; carbohydrate; *Scylla serrata*.

ORIGINAL ARTICLE

Assessing Probiotic Potential of Gut Microflora from Indian Major Carps

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ABSTRACT

The presence and distribution of enzyme-producing bacteria in the Proximal (PI), Middle (MI) and Distal (DI) segments of the gastrointestinal tracts of Indian Major Carp fresh water fishes (*Catla catla*, *Labeo rohita* and *Cirrhinus mrigala*) are studied. The data are represented as log viable counts per gram of intestine (LVC). Except for *L. rohita*, the heterotrophic bacterial community is found to be the most common in the DI area of all fish species investigated. Proteolytic and amylolytic bacteria are recorded as the most common in the DI, while cellulolytic and lipolytic populations are found more common in the DI of *C. mrigala* and *C. catla*, respectively. The most promising three bacterial isolates are found using a quantitative enzyme assay and identified using a 16S rRNA gene sequence analysis. VDC7 isolated from *C. catla* and VDR11 isolated from *L. rohita* both exhibited high similarities to distinct strains of *Bacillus marisflavi*, where as VDM3 obtained from *C. mrigala* is comparable to *Bacillus oceanisediminis*. The 16S rRNA gene sequences for isolates VDC7, VDR11 and VDM3 are assigned to the NCBI GenBank with accession codes KF377322, KX495267.1 and JQ660684.1, respectively. The current study may establish the way for further research into the potential applications of gut-associated extracellular enzyme generating bacteria as a Probiotic in fresh water aquaculture.

Keywords: Aquaculture, Exoenzymes, Probiotic

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INTRODUCTION

The microflora found in the gastrointestinal (GI) tracts of freshwater fish species has received a lot of attention [1-5]. The nutrient-rich GI tract of fish provides an ideal habitat for the growth of these bacteria [6]. The role of commensally intestinal microflora in fish has been better understood over the last decade [7-11]. The ability of the gut microflora to colonize and cling to the mucus layer in the digestive system determines whether it is autochthonous (indigenous) or allochthonous (transient) [12, 13]. The bacterial flora in fish's GI tract has a very broad and variable enzymatic capacity, and these enzymatic masses may favourably interfere with fish digestion [3]. Fish gut bacterial isolates have been shown to break down chitin [14-16], p-nitrophenyl-b-N-acetylglucosamine and protein [15, 17], as well as cellulose [11, 18-20]. Previous research in carps has advocated for the nutritional benefits of gut-associated bacteria in the host fish [21, 22]. The hunt for extracellular enzyme-producing beneficial gut bacteria to employ as probiotics for culturable brackish water fish species may be of relevance in this context. As a result, the primary goal of this work is to identify autochthonous extracellular enzyme producing bacteria in the GI tracts of three culturable Indian Major Carp Fish: proximal (PI), middle (MI) and distal (DI) (*Labeo rohita*, *Catla catla* and *Cirrhinus mrigala*). Furthermore, the study aimed to assess the potential of gut bacteria to produce protease, amylase, cellulase and lipase as well as to identify the most promising bacterial strains using 16S rRNA gene sequence analysis.

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Predicting green product consumption using theory of planned behavior and reasoned action



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ABSTRACT

The extended Theory of Planned Behavior (TPB) incorporates environmental concern, a critical variable in green marketing literature, intending to achieve triple bottom line (TBL). In this context, this study aims to validate TPB and its extended form (mediating role of TPB variables), as well as the Theory of Reasoned Action (TRA), to predict Indian consumers' green product purchase intention. We collected primary data from 521 respondents as input, establishing validity through confirmatory factor analysis (CFA). Our empirical results of structural equation modeling (SEM) show that extended TPB has higher predictability than TPB and TRA in green marketing settings. Consumer attitude and perceived behavioral control significantly predicts purchase intention whereas subjective norm does not. Our findings also suggest that TPB mediates the relationship between environmental concern and green products purchase intention. An additional construct in the new model considerably contributes to improving the understanding of green products purchase intention formation and could become a sustainable mainstream variable.

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1. Introduction

Over the past two decades, environmentalism has reflected consumers' embrace of sustainable consumption (Han et al., 2009; Kalafatis et al., 1999). As consumers become aware of their consumption-related environmental problems, they seek to purchase environmentally friendly products (Kilbourne et al., 2009; Jaroché et al., 2001) for future generations' benefit. While satisfying personal needs remains central to consumer behavior, environmental preservation has also become a primary concern (De Moura et al., 2012; Verbeke et al., 2007). Pertaining sustainability, balancing the ecosystem (ecological), profit-generation (economic) and people (social) is a core concern (Vermeir and Verbeke, 2008).

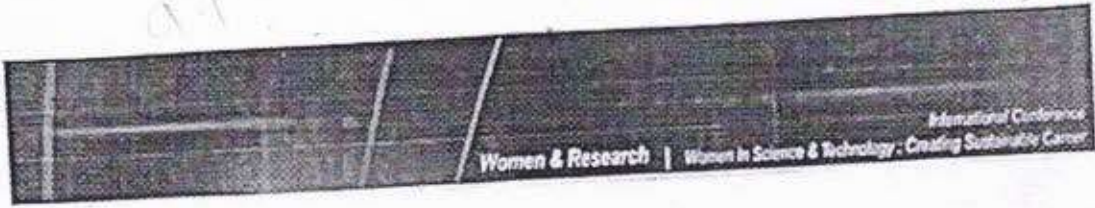
This increased awareness and interest in sustainable consumption is expected to influence consumer purchase decisions (De Moura et al., 2012). Moreover, sustainable consumption has drawn more attention from corporate decision-makers due to stricter environmental regulation and growing stakeholder pressures focused on preserving the environment (Fridt, 2011; Magnan and Ferrel, 2004; Banerjee et al., 2003; Karra et al., 2009).

Under the operational perspective, sustainable consumption may be achieved by encouraging green product consumption. The term "green products" is defined as "products that will not pollute the earth or deplete natural resources, and [that] can be recycled or conserved" ("Green Products") (Shandaxani et al., 1993). To promote Green Products, marketers must focus on consumer preferences and decision-making processes (Cherrier et al., 2011). Nevertheless, marketers have not succeeded at selling Green Products, due to environmentally concerned consumers' fluctuating preference for these products (Ho and Janda, 2012; Kilbourne and Pickett, 2008) despite remarkable growth rate in these consumers (Schlegelmich et al., 1995). To tackle this issue, Barber (2010) recommended that scholars investigate consumers' adoptability of sustainable practices, attitudes, and purchase intentions for Green Products.

Meta-analysis reveals that environmental concern is one of the important sustainability variables in green marketing literature (Wiercik et al., 2013). The term "environmental concern" was derived from political discourse and refers to values, attitudes, emotions, perceptions, knowledge and behaviors related to the environment (Ogie, 2004; Bamberg, 2003). Initially, scholars perceived environmental values, perceptions, and knowledge as critical to environmental concern (Maloney and Ward, 1973), but thereafter categorized them as precursors to environmental concern. Subsequently, researchers excluded actual behavior from the

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WOMAN AND SCIENCE RESEARCH IN INDIAN

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Abstract

Science and society are closely linked and there is need for changes within the social processes and institution of science. Gender has figured in important ways in shaping the careers of women scientists for centuries. While, in western countries, gender questions in science have been extensively raised, ranging from discussions about women in science to philosophical analyses of the gendered nature of science itself, in India the status of women in science has still not drawn adequate attention. There are only a few reports and studies on gender and science in India. There are immediate issues of working conditions of Woman scientists. There are also larger issues of "gendered" science, the need to evolve a system of knowledge that integrates a gender perspective in its approach and direction. Kerala, Karnataka and Tamil Nadu are only leading in most of the areas in terms of women engineering force. Similarly, the number of woman Ph.D. holders in science in 1950 was approximately 80 but this number swelled to 3312 in 1993 and today this number is more than 10,000. Gender stereotypes alone are unlikely to explain much of this disparity. Instead, a fundamental restructuring of the way academic science is conducted and how individual scientists are evaluated is necessary if we are to fully embrace women in all walks of science research. This paper concerns the current status of women faculty in the Science research.

Keywords

Research; Women; Funding; Equality; Decisions

INTRODUCTION

There are several dimensions to consider with regard to issues about Indian women in science research, first, they are professionals in the academy, and as such their lives and work are affected by the overall environment, ethos, and policies in the Indian higher education system. Second, by virtue of the fact that they are women, they face situations that are quite distinctive and related to their role and status in the society [1]. Again, since we are considering very male-dominated disciplines in particular, specific factors, such as the peculiar nature of the disciplines come into play.

Empirical research specifically on women scientists are scarce and their research productivity has not been particularly dealt with in detail. While the literature on women and research in western nations has been rather extensive, it is relatively a neglected area of research in India. There are, only a few studies on women and research in the

Report of Indian Giant Flying Squirrel (*Petaurista philippensis* Elliot, 1839) from Jambughoda Wildlife Sanctuary, Panchmahal district, Gujarat

Singh Nisha¹, Dharaiya Nishith² and Vora U.V.³

Abstract

In present article, we report about the presence of (*Petaurista philippensis* Elliot, 1839) in Jambughoda Wildlife Sanctuary, Central Gujarat for the first time. The presence of this species was identified through indirect evidences such as feeding signs like fallen twigs, pith eaten by flying squirrels with markings and the pellets found under the trees.

Background

The Indian giant flying squirrel (*Petaurista philippensis* Elliot, 1839) is a species of rodent belonging to family Sciuridae. As the name suggest, it is significantly larger than the common squirrels measuring about 45 cm (excluding tail) and weighing 1.25 to 1.50 kg. Although known as flying squirrel, it cannot truly fly but can glide through the air, due to the presence of translucent membrane connecting limbs, forming a parachute like structure covering wide gaps between trees. The Indian giant flying squirrel is an arboreal species. It is found to occupy tree canopies and holes or prepare large leaf nests (Molur *et al.* 2005). As Indian giant flying squirrels are solitary and nocturnal animals, they predominately show crepuscular activity patterns, with increased activity around dawn and dusk (Kuo and Lee, 2012).

Current status in Gujarat

A very few study has been carried out on the species in Gujarat state and therefore no such data are available which will provide the



Fig 1. Forest patch of Jambughoda Wildlife Sanctuary



Fig 2. Fallen twigs and branches of Mahua tree, a typical feeding sign of Flying Squirrel

specific geographical distribution in the state to locate them. Different researchers (Broach Gazetteer, 1961; Singh, 2013; Koll, *et al.*, 2011 etc.) have mentioned different regions (Sabarkantha, Vadodara, Dangs, Ratanmahal etc.) of their sighting. Presence of a good number of Mahua (*Madhuca indica*) trees in the forest with

minimum human presence is a typical habitat for this squirrel Gujarat.

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Melursus ursinus, Sloth Bear

Assessment by: Dharaiya, N., Bargali, H.S. & Sharp, T.



View on www.iucnredlist.org

Citation: Dharaiya, N., Bargali, H.S. & Sharp, T. 2016. *Melursus ursinus*. *The IUCN Red List of Threatened Species 2016*: e.T13143A45033815. <http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T13143A45033815.en>

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Conservation

Differentiating Sloth Bears from Asiatic Black Bears in Camera-Trap Photos

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Camera traps are increasingly used to assess the distribution of wildlife, including bears, throughout the Indian subcontinent and Southeast Asia. Accordingly, researchers must be able to determine with near certainty the species—and in our case the specific species of bear—that has been photographed. This can be difficult in areas occupied by sympatric, similar-looking bears, especially when some photographs are unclear, at a bad angle, or of poor quality (McLellan 2012, Ngoprasert and Steinmetz 2012). Asiatic black bears and sun bears may be similar-looking in photographs because the size of the animal is difficult to ascertain; since these 2 species overlap on a fine scale across Southeast Asia (Steinmetz 2011), this can lead to



(left) Camera-trap photo of a sloth bear, recognizable by the general dome shape, debris stuck in the fur, and whitish snout. (right) Camera-trap photo of a sloth bear, identifiable from length of its back claws.



(left) Camera-trap photo of an Asiatic black bear, recognizable by the smooth, clean-looking coat as well as a short, dark snout. Note that the ruff on the neck is common in both Asiatic black bears and sloth bears. The large ears are not visible in this photo due to the bear's posture. (right) Camera-trap photo of an Asiatic black bear, readily distinguishable by the large ears.



Research Article

Nutritional Status Assessment of Women from Different Occupations in Urban and Semi-Urban Regions of Gujarat

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Abstract

Objective: To assess the nutritional status of women in urban and semi-urban regions of Gujarat.

Methodology: A cross-sectional study on 605 women (aged 18 - 50 years) from urban and semi urban region was conducted in Gujarat, Western India. The parameters analyzed were anthropometry and body composition. Assessment of nutritional status was performed using BMI to evaluate percentage underweight, overweight and obesity. The analysis was stratified for the regions (urban or semi-urban) and type of occupation (students, housewives, working women). Chi square test was used to estimate percentage prevalence of underweight, overweight and obesity amongst different groups of women.

Results: Students from urban region had higher mean BMI ($21.4 \pm 3.7 \text{ kg/m}^2$) and PBF ($29.5 \pm 5.9\%$) as compared to students of semi urban region (BMI: $19.8 \pm 3.7 \text{ kg/m}^2$; PBF: $26.0 \pm 6.1\%$) ($p < 0.05$). Homemakers of urban region showed significantly lower BMI ($24.7 \pm 4.3 \text{ kg/m}^2$) and PBF ($34.8 \pm 6.2\%$) as compared to homemakers of semi-urban region (BMI: $26.0 \pm 4.8 \text{ kg/m}^2$; PBF: $36.6 \pm 6.2\%$) ($p < 0.05$). Working women group in both regions did not differ significantly for their BMI and PBF ($p > 0.05$). Students of semi-urban region showed high percentage of underweight (43.60%) as compared to students of urban region (19%) ($p < 0.05$). While in homemakers of semi-urban region 41% overweight and 19% obesity was observed whereas, in urban region it was 31% and 12% respectively ($p < 0.05$). Percentage of underweight, overweight and obesity was not significantly different in working women amongst two regions ($p > 0.05$).

Conclusion: The study indicated coexistence of obesity and under-nutrition in semi-urban region of Gujarat. These dual nutritional health problems are developing specially in urbanizing areas of our country.

Introduction

Nutritional status of the Indian population changes significantly with changing regions. In the 21st century, prevalence of overweight and obesity has increased by many folds in Asian countries. The prevalence of overweight and obesity is devel-

oping as a serious health problem in the urban population; at the same time the problem of under-nutrition continues to be a major issue in rural population^[1]. Body Mass Index (BMI) is most widely used practical marker to measure nutritional status and body composition and further categorize underweight, overweight, and obesity in adults^[2-4].

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A study on geospatial technology for detecting and mapping of *Solenopsis mealybug* (Hemiptera: Pseudococcidae) in cotton crop

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Abstract: Detection of crop stress is one of the major applications of remote sensing in agriculture. Many researchers have confirmed the ability of remote sensing techniques for detection of pest/disease on cotton. The objective of the present study was to evaluate the relation between the mealybug severity and remote sensing indices and development of a model for mapping of mealybug damage using remote sensing indices. The mealybug-infested cotton crop had a significantly lower reflectance (33%) in the near infrared region and higher (14%) in the visible range of the spectrum when compared with the non-infested cotton crop having near infrared and visible region reflectance of 48 % and 9% respectively. Multiple Linear regression analysis showed that there were varying relationships between mealybug severity and spectral vegetation indices, with coefficients of determination (r^2) ranging from 0.63 to 0.31. Model developed in this study for the mealybug damage assessment in cotton crop yielded significant relationship ($r^2=0.863$) and was applied on satellite data of 21st September 2009 which revealed high severity of mealybug and it was low on 24th September 2010 which confirmed the significance of the model and can be used in the identification of mealybug infested cotton zones. These results indicate that remote sensing data have the potential to distinguish damage by mealybug and quantify its abundance in cotton.

Keywords: LST, Mealybug, MPSI-2, MPSI-8, Remote sensing, Severity index, TVDI

INTRODUCTION

Plants respond to pest and disease stress in a number of ways, including leaf curling, wilting, chlorosis or necrosis of photosynthetically active parts, stunted growth, or in some cases reduction in leaf area due to severe defoliation (Aggarwal *et al.*, 2006). Many of these plant responses are difficult to visually quantify with acceptable levels of accuracy, precision, and speed. These responses also affect the amount and quality of electromagnetic radiation reflected from plant canopies. Cotton mealybug *Phenacoccus Solenopsis* spread from infested to healthy plants via the wind, irrigated water, rain, ants, and birds or by sticking/clinging to equipment, animals or people. Mealy bugs can feed on all parts of a plant, but prefer actively growing leaf tissue, petioles, and leaf veins. They damage the plants by sucking sap from leaves, twigs, stems, roots and fruiting bodies. They inject toxic saliva into the plant parts causing chlorosis, stunting, deformation and death of plants (Tanwar *et al.*, 2007).

The first incidence of the *Solenopsis mealy bug* on cotton in India was recorded in 2005 in the north-western state of Gujarat (Jhala *et al.*, 2008) and subsequent damage was reported in 2007 in the state of Haryana where it infested 4800 ha (Monga *et al.*, 2009). Mealybugs overrun the leaves, bolls, and branches,

feed upon phloem sap and discharge extensive honeydew, on which dark dirty mold growth develops, accordingly influencing the photosynthetic capacity of the plant. Manifestations of plants infested during the vegetative stage incorporate distorted and bushy shoots crinkled curved leaves and hindered plants that dry totally in extreme cases. Late season indications incorporate plants with less and disfigured bolls, reduced vigor and early crop senescence. Mealybugs can also stain cotton lint and reduce quality (Kranthi *et al.*, 2009; Charleston *et al.*, 2010).

A regular monitoring of pest/disease infestation and damage is critically necessary. One method that has been used for a number of years for monitoring of pest/disease outbreaks is to amount for the light reflected by the infested crop. The health of a crop can be determined by measuring the intensity of visible and near-infrared (NIR) light reflected from leaves and studying changes in plant growth. Optical properties of healthy crops or leaves are characterized by high absorption in the blue (400-500 nm), increased reflection in the green (500-600 nm), high absorption in the red (600-700 nm), and very high reflectance and transmittance in the NIR (700-1500 nm) (Gates, 1970). Spectral responses of the crop in the visible (400-700 nm) region are predominantly directed by the plenty of chlorophylls, carotenoids, and anthocyanins (Sims and Gam-



RESEARCH ARTICLE

Synthesis and Spectroscopic Characterization of Novel Hybrid Antibacterial Molecules of Fluorene and Triazole

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ABSTRACT

A series of fluorene and triazole hybrids were designed and effectively synthesized through reaction of triazole at fluorene ring. These compounds were thermally and morphologically stable and it shows pharmaceuticals useful as antibacterial material. This multifunctional component to fluorene makes them potential drug candidate for the treatment of various diseases. It is intended to help medicinal chemist in designing and synthesizing novel and potent hybrid compounds for the different disorders. The structural designing of the these fluorene compounds have been made on the basis of their elemental analysis, spectral analysis and other physico chemical investigations, antibacterial activities of the synthesized compounds have been determined qualitatively against different pathogenic bacteria. The structures were confirmed by MASS, ¹H NMR, IR and UV spectroscopy.

KEYWORDS

Fluorene, Triazole, Drug, Spectroscopy, Pharmaceuticals, ¹H NMR

INTRODUCTION

Heterocyclic compounds are important in the recent years for development in science and technology taking on much more advances of both theoretical and practical relevance which shows many pharmaceutical, medicinal and biological activities. Heterocyclic compounds offer many opportunities for synthetic organic chemist. From wide variety of heterocycles that have been explored developing pharmaceutically important molecule such as fluorene and triazoles have played important role in medicinal chemistry. They are reported to possess broad spectrum of biological activities as antiulcer, anticonvulsant, antihistaminic, antiviral, anti-parasitic, cardiovascular agent as well as antihelmintic¹⁻¹⁵

Experimental

Material and Methods

Melting points were determined by melting point apparatus and are uncorrected. These all compounds were routinely checked by for their homogeneity by Thin layer chromatography on silica gel G plates. ¹H NMR spectra were recorded on BRUKER spectrometer on a 400 MHz using TMS as internal standard, IR spectra were recorded by Perkin Elmer FT IR spectrophotometer and Mass spectra recorded on (FAB mass). The bacterial strains studied for activities are identified strains.

General Procedure

Preparation of 9 H-fluorene-4-carbonyl chlorides

A mixture of 9H-fluorene-4-carboxylic acid (20g, 0.12mole) in dichloromethane (100ml) and thionyl chloride (14.65g, 0.12mole) was

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Conservation

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Camera traps are increasingly used to assess the distribution of wildlife, including bears, throughout the Indian subcontinent and Southeast Asia. Accordingly, researchers must be able to determine with near certainty the species—and in our case the specific species of bear—that has been photographed. This can be difficult in areas occupied by sympatric, similar-looking bears, especially when some photographs are unclear, at a bad angle, or of poor quality (McLellan 2012, Ngoprasert and Steinmetz 2012). Asiatic black bears and sloth bears may be similar-looking in photographs because the size of the animal is difficult to ascertain; since these 2 species overlap on a fine scale across Southeast Asia (Steinmetz 2011), this can lead to



Harshwardhan Dhanwatay

Harshwardhan Dhanwatay

(left) Camera-trap photo of a sloth bear, recognizable by the general dome shape, debris stuck in the fur, and whitish snout.
 (right) Camera-trap photo of a sloth bear, identifiable from length of its back claws.



Dusit Ngoprasert

Li Sheng

(left) Camera-trap photo of an Asiatic black bear, recognizable by the smooth, clean-looking coat as well as a short, dark snout. Note that the ruff on the neck is common in both Asiatic black bears and sloth bears. The large ears are not visible in this photo due to the bear's posture. (right) Camera-trap photo of an Asiatic black bear, readily distinguishable by the large ears.



Effect of sterilizing agents on the production of callus in medicinal plant: *Chlorophytum* sps.

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Abstract

Chlorophytum borivilianum Santapau & R.R. Fern and *Chlorophytum tuberosum* (Roxb.) Baker has been considered as critically endangered plants belongs to family Anthericaceae. Different sterilants with different combinations of Dettol, antioxidant solution (ascorbic acid+ citric acid+ autoclaved distilled water), ethanol, hydrogen peroxide, and sodium hypochlorite were used. Among them leaves treated with hydrogen peroxide showed significant growth and survival rate as compared to sodium hypochlorite and antioxidant solutions and dettol treated leaves. The most effective protocol for sterilization tested was washed with distilled water followed by 3% hydrogen peroxide for 5minutes and then rinsed with ethanol. For callus production, leaves were taken as explant and grown under full strength Murashige and Skoog media+ cytokinin (Benzyl adenine-BA) either alone or with 2,4-Dichlorophenoxy acetic acid (2,4-D) at different concentrations on callus. The best results shown was BA 0.7 µm+2, 4 D 0.7µm with 100% callus production. This protocol could be used for secondary metabolite production along with micropropagation of these endangered varieties.

Keywords: Sterilants, Hydrogen peroxide, Sodium hypochlorite, Chlorophytum, Callus

1. Introduction

The inclination towards natural products is amassed progressively. The usage of conventional medicines and medicinal plants in most developing countries as a common basis for keeping good health has been usually witnessed. Further, an increasing dependence on the use of medicinal plants in the industrialized societies has been related to the improvement of several chemotherapeutics from plant species as well as from conventionally used rural herbal preparations. Herbal therapies have attained much more acceptance in the treatment of minor ailments, due to increasing alertness of personal health maintenance through natural products. Undeniably, the market and public plea have been so great that there is a massive extinction threat to many medicinal plants and apparently the loss of genetic diversity.

Chlorophytum borivilianum Santapau & R.R.Fern-CB (critically endangered ^[1]and *Chlorophytum tuberosum* (Roxb.) Baker -CT (least concern ^[2]) belongs to family Anthericaceae were important medicinal plants in India and mostly cultivated for its medicinal values. CB is basically recognized by Divya Aushad or White Gold by Indian medicinal system. The species has significant market appeal owing to its marketable use as a remedy and the level of exploitation is very high. The current scenario at national and international level trade is the root of Safed Musli. Due to overexploitation of its roots and tubers, it has been uprooted from its wild sites. This has a severe consequence on its natural restoration. Thus, the inhabitants of this species are diminishing rapidly in the natural habitat^[3,4]. Immediate attention should take from the worsening condition of the species in their natural habitat ^[5]. The improper use and collection of these population and low density of the plant specify that the species possibly will become extinct quickly if proper measures are not taken. Due to its aphrodisiac and rejuvenating properties along with ease in sexual disorders, it has been put in Ayurved as "Vajikaran

Rasayana". It is largely used as folkloric medication by indigenous communities of India ^[6]. The root is used in the traditional method of medicine.

In vivo grown plants were contaminated with microorganisms. This adversely affects the plants grown under *in vitro*. These microbes can hamper the growth of the explant by competing for nutrients, inhibits the culture leads to necrosis, reduced shoot proliferation, rooting and mortality of explant ^[6]. These contaminants might appear at a later stage of culture which are difficult to eliminate^[7]. Frequently sterilants like mercuric chloride, calcium hypochlorite, chlorine gas, ethanol, and sodium hypochlorite, were used as a surface sterilizer for plant and seed materials of various species ^[8-10]. Inappropriately these chemicals unsuccessfully remove contaminants. Mercuric chloride, one of the most unsafe sterilizing agent does require safe handling during the disinfection procedure, while the resulting harmful remains must be disposed of properly. This study tries to emphasize upon the different combinations of sterilization agents including dettol, antioxidant solution (1gm ascorbic acid+5gm citric acid+200ml sterilized distilled water), ethanol, hydrogen peroxide, and sodium hypochlorite. This provides better contaminant proof environment for the developing callus from the leaf as explant.

2. Materials and methods

2.1 Plant material

The explants of both the plants *Chlorophytum borivilianum* Santapau & R.R.Fern and *Chlorophytum tuberosum* (Roxb.) Baker (identified by Dr. M. A. Patel, Research Scientist) were obtained from Medicinal and Aromatic Research Centre, Anand Agriculture University, Anand, Gujarat, India.

2.2 Sterilizing agents treatment and inoculation of explant

For setting up of disinfected free cultures, young and fresh



COMPARATIVE PRELIMINARY PHYTOCHEMICAL STUDIES OF *IN VIVO*
AND *IN VITRO* EXTRACTS OF *GLORIOSA SUPERBA* L.

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ABSTRACT

Gloriosa superba L. (Liliaceae) is known for its valuable alkaloid content colchicine. It is highly used in traditional and modern therapies. Seeds and tubers of this plant contain medicinally potential alkaloid colchicine and have been traditionally used for treatment of ulcer, cancer, gout etc. The present study was done to screen various phytochemicals by using two different solvents viz. Water and Methanol. Methanolic and aqueous extracts of *in vivo* (seed, leaf, tuber) and *in vitro* (shoots, tuber) plant samples were used for preliminary phytochemical screening. The results revealed that both extracts contain all most all type of phytochemicals like Alkaloids, Glycosides, Steroids and Tannins, but the methanolic extracts of *in vitro* plant samples gave better results than other samples in aqueous system.

KEY-WORDS: *Gloriosa superba* L., Phytochemicals, Alkaloids.



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EFFECT OF SEED DIRECTION AND GROWTH MEDIA ON *IN VITRO* SEEDS GERMINATION AND SEEDLING ESTABLISHMENT OF *PTEROCARPUS MARSUPIUM* ROXB.

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ABSTRACT: In present study *in vitro* seed germination methods were developed for optimization of germination performance of medicinally important plant, *Pterocarpus marsupium* Roxb. *In vivo* seed germination through conventional method of this plant and seeds are facing so many problems due to its hard seed coat and poor viability. Application of PGRs is also not much affective in *in vivo* condition. Present study was conducted using *in vitro* culture technique the seeds were inoculated in different orientation in to different media type viz. M.S media, 1/2 M.S, Nitsch media. Among above results media and horizontal direction was found suitable for seed germination. So, with that selected condition different hormones were added in media for better germination. All together horizontal direction on MS media are the good for the population of the plant.

Key words: *Pterocarpus marsupium*, seed germination, seed direction, hormones.

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INTRODUCTION

Use of plants as a source of medicine has been an ancient practice and is an important component of the health care system in India. Among them *Pterocarpus marsupium* Roxb. is one of the most important medicinal tree commonly known as Indian kino or Malabar Kino found on hilly slope even in dry and fully exposed area above 750-3200m especially in Deccan Peninsula. It is also distributed in central India, certain part of Western and Northern India, especially in Gujarat, Rajasthan, Madhya Pradesh, Uttar Pradesh, Bihar, Orissa and Tamilnadu, West Bengal and Goa [1]. In Gujarat it found in Dangs and Rajpipla hills [2]. *Pterocarpus* is a medium to large sized tree reaching height up to 15- 20 meter with dark brown to grey bark having swallow cracks tall deciduous tree. The older tree bark exudes a red gum resin substance called "Gum Kino" when injured. This tree also yields gum kino, which is powerful astringent, used for treatments of diarrhea, dysentery, leucorrhoea, haemorrhages and toothache [3]. The water stored in vessels node of the wood is reputed to have antidiabetic properties due to transfer of glycosides into water [4, 5]. Two important phenolic constituents' marsupsin and pterostilbene, isolated from the heartwood of *P. marsupium* are reported to possess ant hyperglycemic activity [6, 7].

Pterocarpus marsupium Roxb. has been used as an anti-inflammatory, anti-elephantiasis, anti-leucoderma agent and often used to treat dysentery, cough and diarrhea. Traditionally the plant material has been used as a cooling external application for inflammations and headache, as antipyretic, anti-helminthic, aphrodisiac, alexetic and in biliousness, mental aberrations and ulcers [8, 9]. Parts of the Indian Kino (heart wood, leaves and flowers) have long been used as an astringent and in the treatment of inflammation. The mature tree harvested after 10-15 years has been estimated to produce approximately 500 kg of dry heart wood and the natural stands of these trees are rapidly disappearing due to illicit felling for its significant multipurpose properties and current high market price of its dry heartwood ranging from Rs. 70-80/ kg [10].

COMPARATIVE STUDY AND DESIGN OF PRESTRESSED CONCRETE SOLID AND VOIDED SLAB BRIDGES

Nipa Chauhan¹, Prof. Farhan A. Vahora²
M.TECH. STRUCTURE ENGG

ABSTRACT: While designing prestressed slab bridges the common difficulties arising are – choice of economical span and depth, type of cross-section and choice of method of construction. The superstructure of a bridge shall be designed in such a way that it satisfies load carrying requirements along with necessary geometry. Till date a very limited data are available for the comparison between types of prestressed solid slabs. In the present study a comparison of superstructures of two types of prestressed slabs, that is prestressed solid slab and prestressed voided slab is done. The study is carried out with alternative spans of bridge slab. For that purpose models with different span length but same width will be prepared and analysis is done using SAP2000. A comparison for the bending moments and shear forces for different spans in both types of slabs is done. From the results of analysis for both solid and voided slabs, a slab design for suitable span is done.

I. INTRODUCTION

Bridge construction plays a vital role in development of cities and thus, has achieved great significance these days. It facilitates a free and undisturbed movement for traffic. It also plays an important role in development of trade and industries, enhancing progress of the nation.

A prestressed concrete slab constitutes a great portion of bridges all around the world. Prestressed concrete was introduced into bridge construction since very early period of time. In past decades wide varieties of new techniques have been developed. Along with new developments in technologies spans became longer and aesthetics and appearance of bridge became more important. Prestressed concrete bridges include a wide variety of different forms like cast-in-situ or precast concrete; continuous or cable-stayed; simply supported; box-girders, slabs or beams.

Among wide variety of prestressed concrete bridges, a study on solid and voided slabs has been carried out. A comparison regarding forces and moment in both cases for different spans and sections is done; thus, analyzing both cases for a better section to be used.

II. PRESTRESS CONCRETE BRIDGES

High-strength concrete and high-tensile steel, besides being economical, make for slender sections, which are aesthetically superior. Prestressed concrete bridges can be designed as class I type structures without any tensile stresses under service loads, thus resulting in a crack-free structure. In comparison with steel bridges, prestressed concrete bridges require very little maintenance. Prestressed concrete is ideally suited for composite bridge construction in which precast prestressed girders support the cast in situ slab deck.

This type of construction is very popular since it involves minimum disruption of traffic. Post-tensioned prestressed concrete finds extensive applications in long-span continuous girder bridges of variable cross-section. Not only does it make for sleek structures, but it also effects considerable saving in the overall cost of construction. In recent years, partially prestressed concrete (type-3 structure) has been preferred for bridge construction, because it offers considerable economy in the use of costly high-tensile steel in the girder.

Slab type superstructure

These types of structures require more steel and concrete compared to that of girder bridges of same span. The overall cost of construction of these bridges is lower and is easier to construct. The limit of span of slab bridges depends on magnitude of load and relative cost of frame work, materials and labour. In slab type superstructure bridges, it is the slabs that are major load carrying elements. The loads are directly transferred to substructure through slabs. Bridges are referred as slab bridges if ratio between $W/D \geq 5$, where W = total width of slab and D = Depth of slab (if $W/D < 5$, then the bridge is referred as beam bridge). Slab bridges can be classified as per their construction: Solid slab bridges, voided slab bridges and ribbed bridges. The study here consists of solid slabs and voided slabs. A comparative analysis is done for both type of slabs.

Solid slab bridges

Solid slab decks comprises of a solid section, without beams or voids. This type of deck is commonly used in the construction of short span bridges and culverts. As the slabs are solid, the cross section from any point is a homogeneous structure. The construction of solid slab bridge decks is straight forward and easier. Also the formwork required is very simple and easy. As the structure is solid and the cross section homogeneous, the layout of reinforcement becomes very easy. There is no congestion of reinforcements created and thus, placing concrete becomes easier.

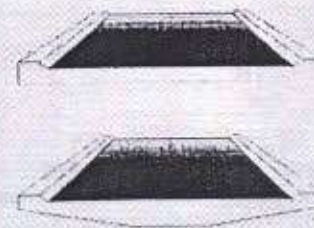


Fig 1 Typical solid slab

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Review Article

A Review: Fabrication of Biogenic Silver Nanoparticles and Applications

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Abstract: Nanotechnology refers to an emerging field of science that deals with synthesis of nanoparticles and nonmaterial which has a dimension of 1 to 100 nanometers. In the recent years, nano-scale materials have been found potential applications in catalysis, biological labeling, biosensing, drug delivery antibacterial activity, antiviral activity, gene therapy and DNA sequencing. Metallic nanoparticles that have immense applications in optics, biomedical sciences, drug delivery and electronics. Metal nanoparticles such as gold and silver have numerous applications in sensors, detectors and antibacterial agents. Metal nanoparticles can be synthesized chemically or biologically. Chemical and physical methods are used in the synthesis of nanoparticles, which has a severe hazardous and high toxicity for living organisms. Biological synthesis of metallic nanoparticles is cheap single step and eco-friendly. Metal nanoparticles such as gold and silver have several applications in sensors, detectors and antibacterial agents. Among these metal nanoparticles silver have tremendous applications in different fields. This review presents an overview of silver nanoparticles preparation by green synthesis approaches and its applications in various fields.

Keywords: Silver nanoparticles, Plant extract, Methods of synthesis, anti-bacterial activity.

INTRODUCTION

Nanotechnology is mainly deals with the synthesis of nanoparticles and nanomaterials which have a dimension of roughly 1 to 100 nanometers. Nanoparticles are considered as fundamental blocks of



(IJ-01) Antecedents of consumer store preference:**Relationship with store and product attribute**

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Abstract

Purpose- The study proposes a store preference model for fashion apparel retailers to explore the business opportunities in the developing and liberalized country like India. Hence, the purpose of the present study is to assess the role of product and store attributes on the store preference of consumers.

Design/methodology/approach- The study utilizes judgmental sample of 497 usable responses via a mall intercept at major shopping centers and cities of Madhya Pradesh. Total eight factors are regressed with store preference as a dependent variable by multiple regression analysis.

Findings- The study demonstrated significant affect of the most of the variables to store preference from the young consumer segment.

Practical implications-

The findings provide fashion apparel retailers with more definitive information on effective store and product attributes along with the communication and marketing mix strategies to increase customer base in the emerging metropolitan cities of India.

Keywords- Apparel market, multiple regressions, product attribute, Store attribute, Store preference

Introduction

Indian retail is poised to become a \$1.3 trillion opportunity by 2020 (The Economic times, 2015). To attract international giants to enter into Indian retail sector through the means of franchising, licensing and other ways of entries into Indian business (Dutta and Singh, 2013), Indian government has opened the door for International retail firms for multi-brand retail with 51 percent Foreign Direct Investment (Times of India, 2013; The Economic times, 2011). With the estimated average annual growth of 25 percent (Gupta and Tandon, 2013), India is a commercially attractive market in top 30 emerging countries of the world, as per the Global Retail Development Index by Atkearney (2015). Besides this, India is far ahead of the USA (more than 15 million stores in India as compared to 0.9 million in the USA) in terms of density of organized as well unorganized retail stores which is the



Validation of two point-of-care tests against standard lab measures of NO in saliva and in serum



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ABSTRACT

Nitric oxide (NO) is an endogenous signaling molecule, which plays important roles in cardiometabolic health. A significant source of NO is dietary nitrate (NO₃), which is initially metabolized by oral bacteria into nitrite (NO₂) and is subsequently converted into NO once digested in the acidic gastric environment. Inexpensive non-invasive tests for measuring nitrite from saliva have been developed as a means for individuals to monitor their NO bioavailability. However, few studies exist in the literature validating and comparing these products with standard lab assays. The objective of this study was to validate two commonly used commercial strips: Nitric Oxide Test Strips (Berkeley Test) and Nitric Oxide Indicator Strips (Neogenesis) against standard lab measures for saliva and serum nitrite/nitrate. A stratified random sample of 20 non-smoking, overweight or obese participants between 40 to 65 years of age, were selected for this study from the baseline data of the San Juan Overweight Adults Longitudinal Study (SOALS). There was a significant correlation between the measures from the two nitrite-detecting-strips after controlling for the stratification variables (metabolic syndrome, and mouthwash use) ($r = 0.75$). Measurements from both strips correlated significantly with salivary nitrite levels ($r = 0.76$ for Berkeley strips; $r = 0.59$ for Neogenesis). Neither of the strips had a significant correlation with the levels of saliva nitrate, serum nitrite and serum nitrate. In conclusion, commercially available Berkeley and Neogenesis strips provide a reasonable surrogate for salivary, but not for systemic nitrite levels.

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1. Introduction

The saliva circulating in the mouth comprises a mixture of secretions from the major and minor salivary glands and traces of gingival crevicular fluid. Saliva contains proteins, glycoproteins, electrolytes, small organic molecules [1], and constituents of non-salivary origin including blood cells [2–4] and desquamated epithelial cells. Saliva also contains serum-derived components resulting from passive diffusion via gingival crevices [5]. Therefore, saliva may be a good surrogate for serum/plasma samples in biochemical and immunological analysis [6].

There has been increasing interest in the use of saliva and other oral samples for the diagnosis of oral and systemic diseases. Saliva is low-cost, noninvasive, and easier to collect by individuals with minimal training [7–10]. It is a highly accessible bodily fluid for biomarker detection in clinical applications. Little attention has been given to nitrate and nitrite in human saliva until recently [11]. Saliva nitrate concentrations are about ten-fold higher than serum [12]. It is now known that approximately 25% of the circulating nitrate in blood is actively taken up, concentrated, and secreted into saliva by the salivary glands [12,13]. Salivary nitrate is reduced to nitrite by nitrate-reductase expressing bacteria residing primarily on the tongue. Nitrite is then ingested where it may be further reduced to nitric oxide (NO) to support or maintain NO-signaling especially in acidic and ischemic tissues [14]. The functionality of this entero-salivary nitrate-reduction to nitrite system has been demonstrated in humans and experimental systems and is

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**(IJ-16) Determinants for the Selection of Housing Finance Providers:
In Special Context to Affordable Housing Customers of Urban region**

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Abstract:

Purpose: The study aims to examine the key determinants for the selection of housing finance providers in the context of affordable housing customers of urban region. The study has examined the impact of cost, convenience, confidence and service quality on selection of housing finance providers.

Design/Methodology/Approach: 228 respondents from affordable segment households from urban area of one of the fastest growing economies of the world were surveyed with the help of structured questionnaire and with a response rate of 91 percent.

Research Findings: The factors extracted from this study are cost, confidence, convenience and service quality which support the research model of Kotykhov (2005). It is observed that cost is the major determinant for selecting housing finance providers by affordable housing segment customers, compared to other factors.

Research Implications/Limitations: The findings of this study are helpful to the housing finance providers, governing agencies of Indian Housing Finance System, regional government and research scholars.

Originality/Value: This research study seeks to provide insights into the affordable segment customers' preferences as well as priorities when selecting housing finance providers. More specifically, it contributes to have better understanding about the basic issues associated with the selection of housing finance providers.

Keywords: Affordable Segment, Cost, Gujarat, Housing Finance Providers, Housing Finance, Service Quality.

1. Introduction:

House, a basic requirement of human beings, is an asset which helps in creation of wealth and social status for a family. However, house involves highest amount of investment of a family as every family wants the facilities in house as per their capacity. It makes the investment in house relatively highest among all the investments. Consequently, low income households face issues of living in deprivation of housing or slum housing especially in urban areas. An affordable housing customer is specially the focused category worldwide to overcome from housing shortage in the urban areas, where the low-income group people is facing chronic issue. In India, 80.7 million persons, amounting to 26.7% of total poor people in the country live in urban areas and constitute nearly one-fourth of the



Intermolecular interactions behavior of terpinolene with some halobenzenes: A thermophysical, acoustical, spectral and DFT study

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ABSTRACT

Densities, viscosities, speed of sound were experimentally measured for binary mixtures of terpinolene with some halobenzenes such as fluorobenzene, chlorobenzene, bromobenzene at 303.15, 308.15 and 313.15 K at atmospheric pressure. Various secondary properties such as molar volume (V_m), excess molar volume (V_m^E), partial molar volume (V_m^p), excess partial molar volume (V_m^{pE}), apparent molar volume (V_m^a), deviation in viscosity ($\Delta\eta$), excess Gibbs' free energy of activation of viscous flow (ΔG^{\ddagger}), deviation in speed of sound (Δu), isentropic compressibility (κ_s), deviation in isentropic compressibility ($\Delta\kappa_s$), acoustical impedance (Z), deviation in acoustical impedances (ΔZ), intermolecular free length (l_f), partial molar isentropic compression ($K_{T,m}^p$), excess partial molar isentropic compression ($K_{T,m}^{pE}$) and apparent molar isentropic compression ($K_{T,m}^a$) were calculated from the values of primary physical properties. Infinite dilution apparent molar volume (V_m^a), infinite dilution apparent molar isentropic compression ($K_{T,m}^a$), empirical parameters S_a , B_a and S_b , B_b of the Redlich-Rosenberg-Mayer equation with the limiting apparent molar expansibility (E_a^0) were also calculated. Some theoretical viscosity of binary mixtures calculating relations like Bingham, Arrhenius, Kendall-Munroe, Grunberg-Nissan (G_{12}), Dolezalek-Schulze (D_{12}), Tamura-Kurata (T_{12}), Katti-Chaudhari (W_{12}/RT), and 3-body McAllister (M_{12}) and some theoretical speed of sound calculating relations such as Nomoto relation (u_{Nom}), Ideal mixture relation (u_{IMR}), Junji relation (u_{Junji}) and Free length theory relation (u_{FLT}) were also calculated. FT-IR analysis of binary mixtures at 4:1, 1:1 and 1:4 composition ratios were carried out. The DFT (Density Function Theory) based computational calculations such as bond length, Mulliken charges, theoretical vibrational frequencies, solvation model and NBO calculations were also studied. All the results of excess/deviation properties were fitted with the Redlich-Kister polynomial equation. The results were discussed in term of types, strength and behavior of intermolecular interaction present between components of binary mixtures.

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Introduction

The study of intermolecular interactions in terms of thermophysical properties plays a vital role to understand the behavior of intermolecular interactions between solute and solvents. The data of thermophysical properties are important for various industrial applications. The proper information of these data help us to choose proper solvent to design various processes such as separation, extraction, chromatography method etc. where nature of solvent contributes a major role in overall results.

Terpinene is one type of essential oils component which are generally extracts from the various plants. Essential oils are volatile, natural,

complex compounds characterized by a strong odour and are formed by aromatic plants as secondary metabolites. They are usually obtained by steam or hydro-distillation first developed in the middle Ages by Arabs. Known for their antiseptic, i.e. bactericidal, virucidal and fungicidal, and medicinal properties and their fragrance, they are used in embalmment, preservation of foods and as antimicrobial, analgesic, sedative, anti-inflammatory, spasmolytic and locally anesthetic remedies. Up to the present day, these characteristics have not changed much except that more is now known about some of their mechanisms of action, particularly at the antimicrobial level [1].

The combined study of thermophysical properties, FT-IR spectroscopic and computational analysis will help us to understand how specific interactions occur between components of mixtures and which are the suitable active sites of molecules involving in specific interactions. It will also give information about the strength, type and behavior of specific interactions at different concentration regions of solute and solvent molecules at different temperatures.

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Pro-environmental behavior and socio-demographic factors in an emerging market

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Abstract We examine the role of socio-demographic factors on consumers' pro-environmental behavior (PEB)—a subset of ethical behavior and analyze its implications in an emerging market, with a sample study from India. Multivariate analysis of variance (MANOVA) was performed as research method. Results show that males display higher PEB than their female counterparts. Married consumers score more on PEB than single. Mid-age consumers (36–50) also score high on PEB than young and old-age consumers. Furthermore, highly educated consumers are more pro-environmentalist than graduates and post-graduates. The novelty of this study is that centers on the use of demographic variables interactively in order to form microsegments. For instance, married men score more on PEB scale than unmarried men and women and prefer green channels even more (i.e., public transportation). On the contrary, unmarried women display no hesitation in paying more for energy-efficient goods compared to married men and unmarried men. Marketers may aim in setting such PEBs as the moral standards among consumers being an easily identifiable segment as their prime target.

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First record of *Pilumnopus convexus* (Maccagno, 1936) (Crustacea, Decapoda, Pilumnidae) from the Indian coast

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Abstract

Pilumnopus convexus (Maccagno, 1936) (Pilumnidae) is recorded for the first time across the Indian coast. The species has so far been reported from coastal waters of the Red Sea, Pakistan and Persian Gulf. *P. convexus* can be easily distinguished from closely related species in having transversely hexagonal carapace, acute anterolateral teeth and tip of the male left gonopod curved to form a hook like structure. Possible explanations to the new record are discussed.

Key words

Geographic distribution extension; rubble shore; first record; Arabian Sea.

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Introduction

Brachyuran crab species of the family Pilumnidae Samouelle, 1819 are inhabitants of rocky and muddy shores of tropical and subtropical seas (Davie 1989, Ghani & Davie 2000; Kaullysing et al. 2015; Trivedi et al. 2015). The family is currently composed of 5 subfamilies (Calmaniinae Števdčić, 1991, Eumedoninae Dana, 1852, Pilumninae Samouelle, 1819, Rhizopinae Stimpson, 1858, Xenophthalmodinae Števdčić, 2005), 69 genera and 394 species (Davie et al. 2015). DAVIE (1989) revised the taxonomy of 2 genera, *Pilumnopus* A. Milne Edwards, 1863 and *Heteropanope* Stimpson, 1858, and proposed the new genus *Benthopanope* Davie, 1989 to accommodate 5 species previously described under these genera. *Pilumnopus* differs from *Heteropanope* in having the carapace more convex and narrower and rounded in front, and with 8 sternites visible laterally on

the male abdomen (Davie 1989). Currently, *Pilumnopus* contains 10 well-recognised species (Davie 1989, Ng et al. 2008, Ghory et al. 2013), but *Pilumnopus convexus* (Maccagno, 1936) is taxonomically problematic. This species was originally described from Ethiopia based on 2 female specimens (Maccagno 1936), but later Davie (1989) redescribed *P. convexus* based on a female lectotype collected from Ethiopia and illustrated the carapace and cheliped of this specimen. More recently, Ghory et al. (2013) discussed the taxonomy of *P. convexus* and *P. salomonensis* Ward, 1942 and assigned *P. salomonensis* as junior synonym of *P. convexus*. *Pilumnopus convexus* is recorded to date from the coast of Ethiopia (Maccagno 1936), South Africa (Barnard 1955), Red Sea (Apel 2001); Iran (Naderloo and Türkay 2012, Naderloo et al. 2013); Saudi Arabia and Bahrain (Apel 2001), UAE (Cooper 1997, Apel 2001), and Pakistan (Ghani and Davie 2000, Ghory et al. 2013). The present study records *P. convexus*



Range extension of brachyuran crabs of the family Camptandriidae Stimpson, 1858 (Crustacea: Decapoda: Brachyura) in Indian waters

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Abstract. We report the presence of 3 species of brachyuran crabs, *Opusia indica* (Alcock, 1900), *Nasima dotilliformis* (Alcock, 1900) and *Leptochryseus kuwaitensis* (Jones & Clayton, 1983) (family Camptandriidae), for the first time from Indian waters. The species are so far reported from Iran, Iraq, Kuwait, UAE, Saudi Arabia and Pakistan. Records of these species in Indian waters extend their distribution range in the northern Indian Ocean.

Key words. Gujarat, India; Arabian Sea; new record.

Brachyuran crab species of the family Camptandriidae are common inhabitants of estuarine, mangrove-associated mudflat habitats and open mudflat habitats of the Indian Ocean and Western Pacific region (JONES & CLAYTON 1983). Approximately 40 species belonging to 22 genera are reported in the family Camptandriidae worldwide (NG et al. 2008, DE GRAVE et al. 2009, AHYONG 2014). Of these, only 2 species, *Camptandrium sexdentatum* Stimpson, 1858 and *Baruna socialis* Stebbing, 1904 are reported from Indian waters (KEMP 1915, HARMINTO & NG 1991, DEV ROY & DAS 2000, DEV ROY 2008, DEV ROY & NANDI 2008). The present study adds 3 more species, *Opusia indica* (Alcock, 1900), *Nasima dotilliformis* (Alcock, 1900) and *Leptochryseus kuwaitensis* (Jones & Clayton, 1983), to the list of Camptandriidae occurring in Indian waters.

This study was carried out as part of an ongoing study on the brachyuran crab fauna of Gujarat state, India. The specimens were collected from coastal areas of Lakhpat (23°50'01" N, 068°46'26" E) and Jakhau (23°13'26" N, 068°37'37" E) (Fig. 1) located on the coast of northern Arabian Sea in the Gulf of Kachchh, Gujarat, and consisting of mangrove mudflat habitats. Specimens were collected by hand during low tide. Specimens were washed properly to remove sediment and photographed in the field using a Canon 1000D with 18–55 mm lens. Specimens were preserved in 70% alcohol and deposited in the Zoology Museum of the Department of Zoology, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India. Specimen catalogue numbers are provided in the species accounts below. Maximum carapace width (CW) and length (CL) were measured for each speci-

men. The abbreviation GI is used for male first left gonopod and coll. for specimen collector.

Family Camptandriidae Stimpson, 1858
Genus *Opusia* Ng, Rahayu & Naser, 2009

Opusia indica (Alcock, 1900) (Figs. 2, 3, 8–13)

Tyloidiplax indica — ALCOCK (1900): 374; ALCOCK & ANDERSON (1895): pl. 64, fig. 2; NG et al. (2008): 234.

Opusia indica — NG et al. (2009): 6, fig. 1A, 2.

Material examined. 4 males and 2 females (ZL- AR-CR-82) (CL: 3.87–6.24; CW: 5.94–9.54); India, Gujarat, Gulf of Kachchh, Lakhpat (23°50'01" N, 068°46'26" E), open mudflat habitat, 27 March 2015, Coll. Jignesh Trivedi and Kauresh Vachhrajani.

Description. Carapace wider than long (Figs. 2, 8), dorsal surface with pits and folds with long plumose setae, 2 short transverse parallel grooves on either side of gastric region, anterolateral margin with row of granules extending halfway to posterior, pterostomial region swollen beyond anterolateral margin; posterolateral margin strongly convex, rounded. Anterior straight with thick margin. Cornea small, eyestalk long, slender with plumose setae. Third maxilliped (Fig. 9)

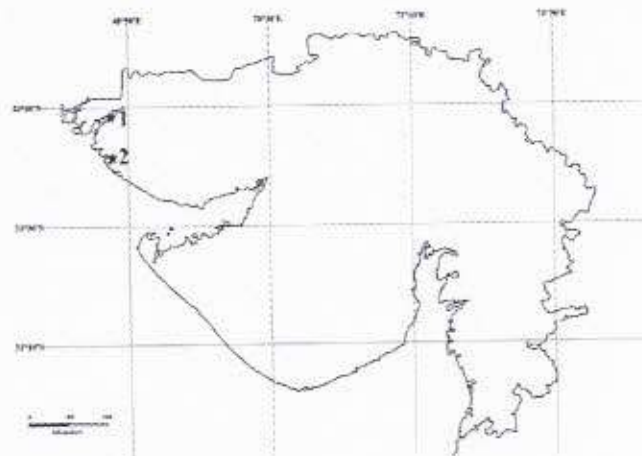


Figure 1. Map of specimen collection site. Gulf of Kachchh, Gujarat, India. 1: Lakhpat (23°50'04" N, 068°46'10" E). 2: Jakhau (23°13'26" N, 068°37'37" E).



RESEARCH ARTICLE

Microwave Assisted Synthesis of Naphthimidazoles Using Acid Catalyst & their Antimicrobial Activity

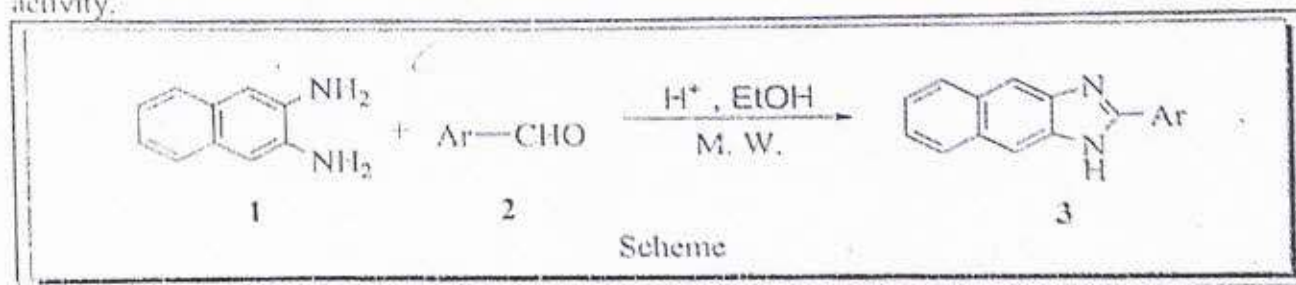
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ABSTRACT

It deals with the synthesis of naphthimidazoles **3** by the condensation reaction between 2, 3-naphthalene diamine **1** and aromatic aldehydes **2** catalyzed by the optimized quantity of HCl as a catalyst in ethanol as the solvent. A series of compounds was synthesized by conventional route and under microwave irradiation (MWI) technique. All the synthesized compounds have been characterized by using ¹HNMR, ¹³CNMR, IR and Mass spectroscopy. All the synthesized compounds were tested for their biological activity.



KEYWORDS

Naphthimidazoles, Antimicrobial Activity, Microwave, Spectroscopy

INTRODUCTION

Benzimidazole is a heterocyclic aromatic organic compound. It is very important skeletal in medicinal chemistry. Today this moiety bearing various medicinal characteristics.

The most famous benzimidazole derivative in practice is *N*-riboseyl-dimethylbenzimidazole, which act as ligand bind with Co metal in vitamin B₁₂¹. The application of Benzimidazole records many year back².

In 1990 different benzimidazole moiety were prepared with different group such as fluorine, tetrahydroquinoline, propylene & ring compound which resulted in drug with bioavailability, increased stability & significant biological potency^{3,4}. In 1991 benzimidazole derivatives were synthesized by derivatization at N-H of benzimidazole by electron donating group and substitution with long chain of propyl, acetamido, thio, thiazole-amino, tetramethyl piperidine on pyridine resulting in good antitumor activity^{5,6}. Nowadays infectious microbial diseases are causing problems worldwide, because of resistance to number of antimicrobial agents (β -lactam antibiotics, macrolides, quinolones, and vancomycin). A variety of clinically significant species of

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New Records of Anomuran Crabs from India

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Abstract

The present study reports four species of anomuran crabs of family Diogenidae, collected during the survey of crustacean fauna of Gujarat state from 2015- 2016. The four species viz. *Arcopaguris tesperspicax*, *Clibanarius virescens*, *Diogenes fasciatus* and *Diogenes lophochir* are first time reported from India. Among which, three species *A. perspicax*, *C. virescens*, *D. fasciatus* were collected from Gujarat coast, while *D. lophochir* was collected from Tamil Nadu coast. *A. perspicax* is earlier reported from the North-western Indian Ocean; *C. virescens* is widely distributed along Indo-West Pacific; *D. fasciatus* is only reported from Indonesia, Singapore and Pakistan; *D. lophochir* is reported from Eastern Indian Ocean and Pakistan. The possible justification for their range extension and distribution in India will be discussed. The details of morphological characters of the anomuran crabs are given in the report.

Keywords: Crabs, range, distribution

Human-Bear Conflicts

An Unusual Attractant Spurs Sloth Bear Break-ins in Maharashtra, India

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Sloth bears (*Melursus ursinus*) are known to feed on termites, ants, honey, and fruits. The mixture of these items varies by area and by season. However, since they specialize on ants and termites, which tend to be common across their range, sloth bears seem less prone than the other omnivorous bears to seeking out human-related sources of food. Sloth bear conflicts with people generally have more to do with bear attacks, or actions related to fear of attacks, than to property damage. Situations that lead to encounters between sloth bears and people often result in such conflicts, with bad outcomes for people and bears (Bargali et al. 2005, Akhtar 2006, Dharaiya and Ratnayeke 2009, Ratnayeke et al. 2014).

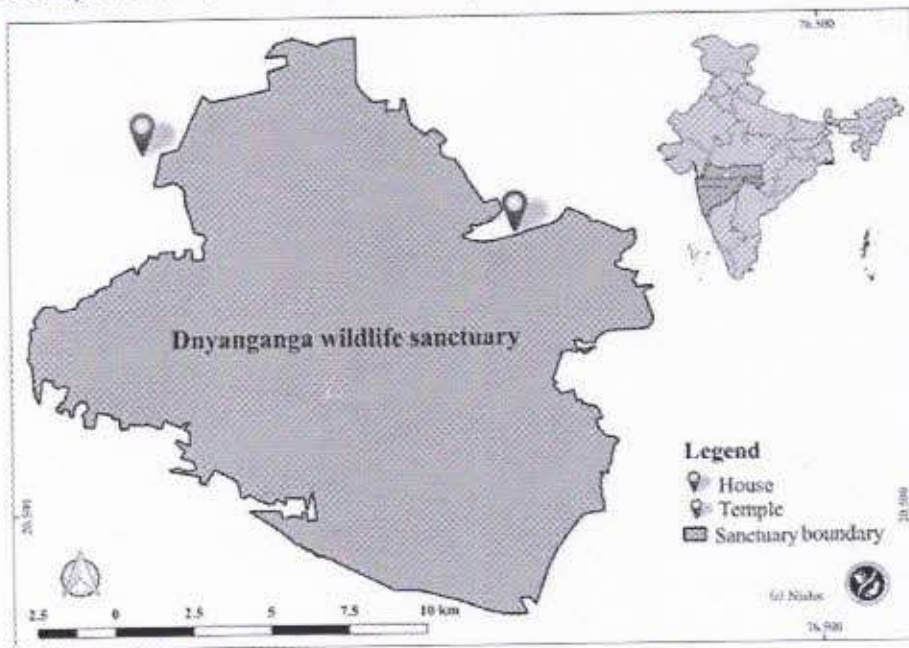
Sloth bears in Maharashtra state, India, generally fit this pattern: recently, human maulings have increased drastically. We were investigating this during this year (since April 2017) when we became aware of an atypical conflict situation, which we describe here. We were conducting research in Buldhana wildlife division, in mid-northern Maharashtra. The division comprises 840 km² of forest, with 3 wildlife sanctuaries (Amba Barwa, Dnyanganga and Lonar WLS) along with patches of unprotected forests.

Villagers reported that on 8 June 2017, a bear had visited the village of Nandri and entered a house by breaking the wooden door. We looked around the house and found that before breaking the door, the bear had searched for other possible ways of entering the house, as evident by many claw marks on the earthen outer walls. Inside, nearly every household

article was damaged by the bear. We found an empty, bitten cooking-oil container, and the walls and floor of the house were wet with the splattered oil. We found a fresh bear scat just outside the house, containing seeds of *Aegle marmelos*.

The house (20°36'48.2" N, 76°17'31.6" E) was well separated from the rest of the houses in the village. A *Ficus benghalensis* tree close to the house had several bear claw marks from about 6 months before, suggesting bears had visited this site previously, although villagers noted that this was the first incidence of such a break-in. The house owner had been away to attend a wedding ceremony in a nearby village when the incident occurred.

A second similar incident occurred in a temple (20°35'18.4"



Dnyanganga wildlife sanctuary in Maharashtra, India, and the location of the house and temple that were broken into by a sloth bear in June 2017. Credit: Nisha Singh

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Section A: Green Chemistry



CODEN (USA): IJGHAY

Green Synthesis of Silver Nanoparticles using *Elytraria acaulis* Plant Root Extract and its Antimicrobial activity

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Abstract: nanoparticles of silver has been synthesized by using *Elytraria acaulis* plant root extract through a green chemistry approach with a number of advantages like eco-friendly process, economical efficient, non-toxic, energy efficient, less time consuming, environmentally safe and protecting human health. Silver nanoparticles were successfully synthesized by using *Elytraria acaulis* plant extract colour change of the solution from light yellow to dark brown confirmed the formation of silver nanoparticles and the nature of synthesized nanoparticles were characterized by UV-Vis spectroscopy, FT-IR, X-ray diffraction, SEM, and TEM. The green synthesis of silver nanoparticles exhibited a good antimicrobial activity against gram-negative and gram-positive bacteria.

Keywords: Green synthesis, silver nanoparticles, antimicrobial activity

1. INTRODUCTION

In search, novel sources of medicinal plants have been widely studied for their antioxidant activity. Many natural fibres, herbs have been used in various areas, including nutrition, medicine, flavoring, beverages, cosmetics, etc. The plants species are used as a different doses antispasmodic, emetic, anti-nausea, antidiarrhoeal and the plants are claimed to possess the antibiotic properties in the traditional method and are also used by the tribal people worldwide. Now, it is believed that nature



Synthesis, Characterization and Biological Screening of Oxadiazole Incorporated Acetamide Derivatives as Potent Antibacterial Agents

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ABSTRACT: A series of ten derivatives of 2-[(5-aryl-1,3,4-oxadiazol-2-yl)sulfanyl]-N-(2,4,6-tribromophenyl)acetamide was synthesized and the structure of synthesized compounds were determined by obtained IR, ¹H NMR and Mass spectroscopy data. To evaluate biological potential of synthesized compounds they were subjected for *in vitro* antibacterial study against gram positive bacterial strains *Staphylococcus aureus*, *Bacillus subtilis* and gram negative bacterial strains *Pseudomonas aeruginosa*, *Escherichia coli* where antibacterial potential was shown by some compounds.

Keywo. Js: 2,4,6-tribromo aniline; oxadiazole; acetamide and antibacterial study.

INTRODUCTION: The attraction of researchers in heterocyclic chemistry has expanded the boundaries of literature in the field with novel molecules having broad spectrum of biological activeness. Oxadiazole is one of the important class of heterocyclic chemistry with four possible isomers. Amongst these isomers an important isomer which have attracted researchers due to its biological activeness is 1,3,4-oxadiazole. The various biological potential of this 1,3,4-oxadiazole nucleus has gave numbers of compounds having potential as antimicrobial¹⁴, anticancer¹⁵, anti-HIV¹⁶, anti-inflammatory^{11,12}, analgesic¹³, antitubercular^{13,16}, antioxidant^{17,19}, antitumor¹⁸, anticonvulsant²¹, antidiabetic²², antiviral²³ etc. The presence of 1,3,4-oxadiazole nucleus is found in many therapeutic agents like Furamizole, Raltegravir, Nesapidil etc.²⁴

MATERIAL AND METHODS: All the synthesized compounds were prepared using analytical and laboratory grade chemicals. To monitor the reaction progress and purity of compounds a TLC technique was selected in which silica gel coated aluminium plates (E-Merk) and suitable eluents were used. The melting points of synthesized compounds were observed through open capillary method and they are uncorrected. The structure determination was achieved by various spectroscopy analyses where IR spectra was obtained with KBr and recorded on Perkin-Elmer 237 spectrophotometer. Mass spectra was recorded on MS

route JMS 600-II and PMR analysis was carried out on Bruker AM -400 instrument using DMSO as solvent and TMS as internal standards.

General Reaction Scheme for Preparation of 2-[(5-aryl-1,3,4-oxadiazol-2-yl)sulfanyl]-N-(2,4,6-tribromophenyl)acetamide:

Step I: Synthesis of aryl enoate (2): In this step various substituted aromatic acid (0.1 mol) and concentrated H₂SO₄ (6.0 ml) were taken in methanol and refluxed for 12 to 14 hour. The resulting reaction mass was then poured into crushed ice, stirred well and products were separated from reaction mass. The purification of products were carried out in ethyl alcohol. A mixture of toluene: acetone (8:2) was used as eluent to check the progress of reaction by TLC method.

Step II: Synthesis of aryl hydrazide (3): In the synthesis of various substituted benzohydrazide, the mixture of aryl enoate (0.1 mol) and hydrazine hydrate (0.2 mol) were taken in (180 ml) methyl alcohol and refluxed for 12 to 15 hour, the reaction mass was then cooled, poured into crushed ice, stirred well and products were isolated from reaction mass. The products were recrystallized by ethyl alcohol. The progress of reaction was monitored by TLC method with toluene: acetone (8:2) as eluent.

Step III: Synthesis of 5-aryl-1,3,4-oxadiazole-2-thiol (4): To synthesize 5-aryl-1,3,4-oxadiazole-2-thiol, the



Synthesis, Structure Elucidation and Biological Studies of 2-[[5-(4-fluorophenyl)-4-phenyl-4*H*-1,2,4-triazol-3-yl]sulfonyl]-*N*-arylacetamide derivatives

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ABSTRACT: A series of ten derivatives of titled compounds was designed and synthesized using appropriate route and structures of compounds were determined by FT-IR, ¹H NMR and Mass spectroscopy analysis. The synthesized compounds were evaluated for their *in vitro* antibacterial potential using bacterial strain *Staphylococcus aureus*, *Bacillus subtilis*, *Pseudomonas aeruginosa* and *Escherichia coli* where some of the compounds showed their activeness against the strain.

Keywords: Triazole; acetamide and biological evaluation.

INTRODUCTION: Heterocyclic chemistry has vast literature in the subject of organic chemistry with millions of novel molecules. In these molecules 1,2,4-triazole nucleus have generated a different class among other triazole isomers due to its biological potential like antimicrobial,^{1,4} anti-inflammatory,^{5,7} anti HIV,⁸ antioxidant,^{9,12} anticonvulsant,¹³ anti-tumor,¹⁵⁻¹⁷ antiviral,¹⁸ antitubercular^{19,20} etc. In this work we have developed series of compounds clubbed with this 1,2,4-triazole nucleus having antibacterial strength.

MATERIAL AND METHODS: In this work all the compounds were derived using laboratory and analytical grade chemicals. An open capillary method was adopted for measurement of melting points of all synthesized compounds and is uncorrected. The progress of reaction and purity of compounds were observed by using TLC plates coated by 0.25 mm silica gel (E-Merk) and spots were visualized under UV light. The IR spectral analysis was carried by using KBr and recorded on Shimadzu FT-IR spectrophotometer. Mass spectra was recorded on Apilant 100 series instrument and ¹H NMR analysis was carried out on Bruker AM -400 MHz instrument using DMSO as solvent and TMS as internal standard.

General Procedure for Preparation of 2-[[5-(4-fluorophenyl)-4-phenyl-4*H*-1,2,4-triazol-3-yl]sulfonyl]-*N*-arylacetamide

Step I: Synthesis of methyl 4-flouro benzoate (2) - In this step, 4-flouro benzoic acid (0.1 mole) in methanol (180 ml) and concentrated H₂SO₄ (6.0 ml) were refluxed for 12 to 14 hour. The resulting reaction mass was then poured into crushed ice, stirred well and separated from the reaction mass. The product was recrystallized by ethyl alcohol. The progress of reaction was monitored by TLC using toluene : acetone (8:2) as eluent.

Step II: Synthesis of 4-fluorobenzohydrazide (3) - To synthesized the product 4-fluorobenzohydrazide, methyl 4-flouro benzoate (0.1 mole) and hydrazine hydrate (0.2 mole) were taken in (180 ml) methyl alcohol and refluxed for 12 to 15 hour then reaction mass was poured into crushed ice, stirred well, separated and washed by cold water. The product was recrystallized by ethyl alcohol. The progress of reaction was monitored by TLC using toluene : acetone (8:2) as eluent.

Step III: Synthesis of 2-(4-fluorobenzoyl)-*N*-phenylhydrazinecarbothioamide (4) - The mixture of 4-fluorobenzohydrazide (0.1 mole) and phenyl isothiocyanate (0.1 mole) were refluxed in (120 ml)



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Green Synthesis of Copper Nanoparticles using *Mitragyna parvifolia* Plant Bark Extract and Its Antimicrobial Study

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ABSTRACT

In this study, *Mitragyna parvifolia* plant bark used to prepare aqueous extract which provides cost-effective, eco-friendly process, less time consuming, an environmentally benign, easy and proficient way for the synthesis of copper nanoparticles. *Mitragyna parvifolia* plant bark was collected from Virpur hills forest area. The *Mitragyna parvifolia* plant bark extract was prepared with deionised water and used for the green synthesis of copper nanoparticles. The colour change of the solution dark brown from pale yellow colour confirms the formation of copper nanoparticles. The green synthesised copper nanoparticles were characterised by UV-visible spectroscopy, FT-IR, XRD, SEM, TEM and their antimicrobial activity was also investigated. UV-visible spectral result confirmed the reduction of copper sulphate to copper nanoparticles. FTIR analysis also supported for the formation of copper nanoparticles. Crystallinity of Cu NPs was found out by XRD study and the morphology of the particles was analysed with the help of scanning electron microscopy and found spherical in nature. The antibacterial activity experiment done against *Escherichia coli*, gram-negative and *Bacillus subtilis*, gram-positive bacteria by agar well method and the maximum zone of inhibition was higher in gram-positive bacteria compared to gram-negative bacteria. The green synthesised copper nanoparticles proved to be potential candidates for medical application where the antimicrobial activity is highly essential.

1. Introduction

Nanotechnology has involved many researchers from different field like chemistry, physics, biotechnology, material science, engineering, medicine, pharmaceutical etc. Copper nanoparticles synthesised by many ways such as biological method, chemical method, physical method, sol-gel method, solid-state reaction, co-precipitation, vapour deposition [1], electrochemical reduction [2], radiolysis reduction [3], chemical decomposition [4] and chemical reduction of copper metal salt [5]. Green synthesis method has so many advantages compared to other methods and one of the best methods because of its cost-effective, simple, use of low energy, use of less toxic materials and eco friendly [6, 7]. The copper nanoparticles are mostly found their applications in the field of medical, electronic devices, biosensors, and reagents in various reactions, lubricants, antibiotic, antimicrobial agents and many more.

The *Mitragyna parvifolia* is a tree belongs to Rubiaceae family. This species are used medicinally and their height of 50 feet with a branch spread over 15 feet and a stem is erect and branching, flowers are yellow and grow in ball-shaped clusters, dark green in colour leaves smooth and round in shape [8]. The medicinal plant which contains a variety of phytopharmaceuticals found very important applications in the area of agriculture, human and veterinary medicine and novel drug for the treatment and prevention of disease [9]. The plant bark and roots are used in the treatment of fever, cold, muscular pain, burning sensation, poisoning, rheumatological disorders, cough, oedema and oral pain, augmenting the breast milk in lactating mothers [10].

Banoor et al. [11] have prepared green synthesis copper nanoparticles using *Solanum lycopersicum* (tomato aqueous extract). In preparation of CuNPs used the chemical reduction method on different temperature, and found average nanoparticle size 40-70 nm. Subhankari and Nayak [12] have synthesised copper nanoparticles by Ginger (*Zingiber officinale*) leaf extract. They studied various microbiological testes with various concentrations of CuNPs with a size of 10 nm. Jayaram et al. [13] have synthesised copper nanoparticles from *Aerium aleander* leaf aqueous

extract and its antibacterial activity. They reported nanoparticles derivatives used for medical purposes like ulcer, infection and anti-bacterial pathogens. Khan et al. [14] have synthesised copper nanoparticles for a chemical reduction approach. The shape of the nanoparticle was cubic with their size of 28.73 nm and have great advantages of these NPs applied in catalysis and photo activated energy conversion. Kulkarni et al. [15] have synthesised copper nanoparticles using *Leucosolenia* leaf extract. Leaf extract was prepared in deionised water and these extracts added with 1 mM copper sulphate solution, the colour was changed which indicates the formation of CuNPs.

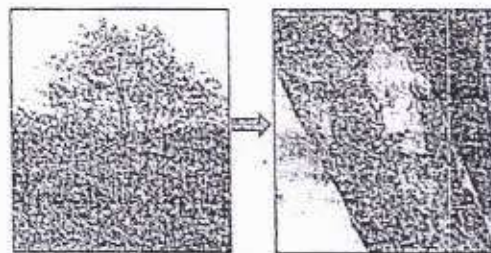


Fig. 1. Bark of *Mitragyna parvifolia* plant

Lee et al. [16] have a biological synthesis of copper nanoparticles using plant extract. In a high resolution of TEM analysis indicate a size of NPs 40-100 nm for the prepared particles by chemical and physical methods. It was given an application in various human body areas. Subhankari et al. [17] have synthesised of copper nanoparticles using *Syzygium aromaticum* (Cloves) aqueous extract by using green chemical reduction method and TEM reports revealed particle shape and size in the range 5-40 nm. These NPs had good stability. Angerson and Subhanya [18] studied bio-synthesis of copper nanoparticles by *Vitis vinifera* leaf an aqueous extract and its antibacterial activity. By the reduction of copper sulphate into copper nanoparticles confirmed by UV spectra and IR which is obtained with strong band peak at 4431 cm^{-1} and also shows good antimicrobial activity. *Staphylococcus aureus* exhibited the highest mean zone of inhibition.

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4502

An annotated checklist of the marine brachyuran crabs (Crustacea: Decapoda: Brachyura) of India

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A new pea crab species of the genus *Arcotheres* Manning, 1993 (Crustacea: Decapoda: Brachyura: Pinnotheridae) from India

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Abstract

A new species of pinnotherid crab, *Arcotheres shahi* n. sp., is described on the basis of specimens collected during a crustacean survey along the coastal areas of Pamban fishing harbor in the Gulf of Mannar, Tamil Nadu state, east coast of India. The new species resembles *A. pernicola* (Bürger, 1895), *A. winckworthi* (Gordon, 1936) and *A. rayi* Ah Yong & Ng, 2007, in having the dactyli of the longer fourth pereopod longer than that of fifth pereopod. *Arcotheres shahi* n. sp. differs from these three known species in the shape of female carapace, frontal region and chela, setal pattern on the dactyli of the fourth and fifth pereopods and relative length of the ambulatory pereopods.

Key words: Pinnotheridae, new species, dactylus length, Gulf of Mannar, India

Introduction

The genus *Arcotheres* Manning, 1993, contains 26 species, all characterized by a subquadrate to subhexagonal carapace, and pereopods 2–5 (P2–P5, ambulatory legs) which are asymmetrical in length, with the dactyli of P4 and P5 longer than those of P2 and P3 (Bürger 1895; Gordon 1936; Manning 1993; Campos 2001; Campos & Manning 2001; Ah Yong & Ng 2007; Ng *et al.* 2008, 2017; Ng & Kumar 2015). On the basis of relative lengths of the dactyli of the longer P4 and P5, it is possible to recognize two subgroups within *Arcotheres* (Bürger 1895; Hornell & Southwell 1909; Gordon 1936; Ah Yong & Ng 2007; Ng *et al.* 2017). Species of the larger subgroup have the dactyl of the longer P5 longer than that of the P4 while the species of smaller subgroup have the dactyl of the longer P4 longer than that of the P5. A total of five species of *Arcotheres* are known from India (Ng & Kumar 2015, Ng *et al.* 2017). According to Ng & Kumar (2015) records of two more species, *Arcotheres modiolicola* (Bürger, 1895) and *Arcotheres sinensis* (Shen, 1932) (as *Pinnotheres*) by George & Nobel (1970) and Kannappan *et al.* (2012), respectively, are questionable and need reexamination of specimens in the view of study carried out by Ah Yong & Ng (2007). The record of *Arcotheres placunae* (Hornell & Southwell, 1909) (as *Pinnotheres*) by Jose & Deepthi (2005) from the mytilid *Perna viridis* (Linnaeus, 1758) collected from the coastal areas of Kerala State also needs reexamination as the figure available in their paper is too small to record the diagnostic characters of the species (Ng & Kumar 2015).

In this paper, we describe a new species of *Arcotheres* on the basis of specimens collected from the coastal areas of Tamil Nadu state located on east coast of India. The specimens are preserved in 70% alcohol and deposited in the Zoology Museum (ZL-AR-CR), Department of Zoology, The Maharaja Sayajirao University of Baroda, in Vadodara, Gujarat. The morphological terminology used in the description follows Manning (1993) and Ah Yong & Ng (2007). The following abbreviations are used: CL = carapace length, measured along the vertical median line of the carapace; CW = carapace width, measured at the widest point; MXP3 = third maxilliped; G1 = male first

Human-Bear Conflicts

Use of Geospatial Techniques to Target Water Sources for Sloth Bears, Aimed at Alleviating Conflicts with People

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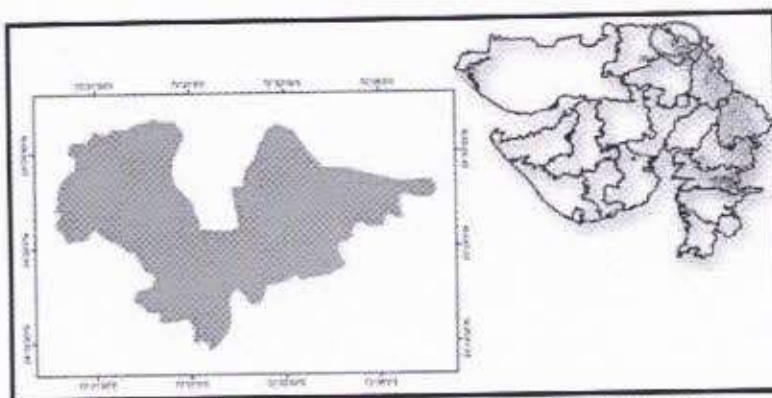
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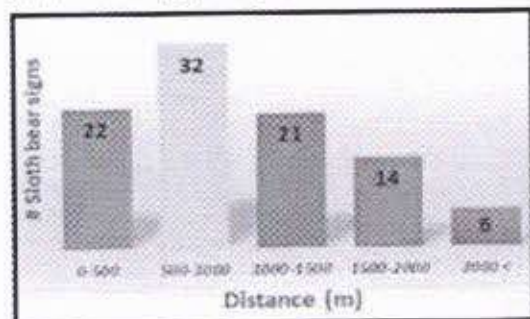
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In Gujarat, India, sloth bears are mainly found in five protected areas with highly fragmented tropical dry deciduous forests. Habitat degradation is one of the major threats to sloth bears in the region; the other important threats are human-bear conflict, change in land use and lack of community participation in bear conservation (Dharaiya et al. 2016). Loss of habitat results in bears moving into areas inhabited by humans leading to increased encounters, conflicts, human injury, and sometimes retaliatory killing (Garcia et al. 2015). Previous studies revealed two main reasons for increasing conflicts: sharing forest resources, including movement of sloth bears into villages and humans entering forested bear habitat (Dharaiya and Ratnayake 2009). Sloth bear movements into human areas are driven primarily by their need to access food and water. Sloth bears are generalists, therefore food may be less of an issue, however, in summer, water becomes a limiting resource which pushes bears outside of their typical habitat in search of it. Studies have revealed regular sightings of sloth bears near water sources and villages after dark in summer (Sultana et al. 2015), but also, within 500 m of water sources irrespective of the season (Bargali et al. 2012). Also, the number of attacks in Gujarat has increased over the past decade when more than 300 were reported, primarily in the hot dry summer. These patterns support the fact that water is a major factor in driving the sloth bears into human settled areas where conflicts and attacks occur.



Study area showing Jessore Sloth Bear Sanctuary in Gujarat, India.

To address the importance of water resources within typical sloth bear habitat, we carried out an experiment in Jessore wildlife sanctuary, an important sloth bear sanctuary in Gujarat which contains the highest sloth bear density in the state (<https://forests.gujarat.gov.in/writereaddata/images/pdf/Wildlife-Population-Estimation1.pdf>).



Number of sloth bear signs recorded within the distance of 1000m.

In GIS, human-bear conflict locations were overlaid on to land use layers to assess patterns of conflicts and attacks relative to settlements and water bodies in the sanctuary. We found that 71 % (5 out of 7) conflicts during 2016 were within 1000 m of water sources. Also, water close to settlements increased the probability of an encounter with a sloth bear.

Our main objective was to target water resources within sloth bear habitat in Jessore sanctuary using GIS to help identify areas where water could accumulate naturally if a containment structure was built. By identifying such areas, water could be provided throughout the year for bears and other wildlife, removing the need for bears to leave the sanctuary for water and ultimately reduce human-bear conflicts, human injury, and retaliatory killing.

To reach our objective, we created a drainage map of Jessore sanctu-

**Universal Impact Factor**

2012:0.9285;

2013:1.2210

Index Copernicus Value

2011:5.09, 2012:6.42,

2013:15.8, 2014:89.16,

2015:78.30, 2016:91

NAAS Rating

2012:1.3; 2013-16: 2.69

2017-18: 3.98

SJIF

2012: 3.947, 2013:4.802

InfoBase Index

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Cosmos Impact Factor

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MONITORING OF MUNDRA COASTAL ZONE, GULF OF KACHCHH WITH REFERENCE TO LAND USE LAND COVER CHANGES USING REMOTE SENSING AND GIS

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ABSTRACT:

Urban expansion has increased the utilization of natural resources and has altered land use and land cover patterns. Coastal zones are most susceptible for land use changes in this rapid era of industrialization and urbanization. Land cover change is a major distress of global environment change. To conserve the present natural resources and to be aware of the causes and consequences of over exploitation of soil and water resources a land use and land cover mapping and monitoring was done in the coastal zone of Mundra, one of the most rapidly growing industrial hub in India. Remote Sensing and Geographical Information System (GIS) techniques were used as a tool to monitor the land use and land cover change in the study area. The main objective of this study is to monitor and evaluate land use land cover (LULC) changes during the year 2000, 2006 and 2013. LISS-III satellite data and digital change detection techniques were used. The images were classified through supervised classification method coupled with expert visual interpretation techniques. Eight LULC classes were decided for the classification purposes. Error matrix and KAPPA analysis have been done for accuracy assessment classification. Change detection between the images for all the land use and land cover classes was computed. The overall accuracy of classification methodology is 89.2%, 91.3% and 90.1% and KAPPA statistics is 0.86, 0.88 and 0.87 for the 2000, 2006 and 2013 images respectively. The study exposes that the important coastal land use type of Mundra coast i.e. coastal wetlands and mangrove vegetation have

Original Research Article

Spectrophotometric method development and validation for estimation of rutin in some herbal formulation

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Abstract

Three simple, rapid, accurate precise and economic spectrophotometric methods (A, B and C) have been developed for estimation of rutin in several herbal formulations. Method A and B are based on the complexation of rutin with cobalt (II) nitrate and nickel (II) chloride to give colored complexes. The absorption maxima, λ_{max} , are at 359.70 nm for method A, 347.85 nm for method B and 340.90 nm for method C respectively. Beer's law was obeyed in the concentration range of 0.004-0.04 mg mL⁻¹ for all methods. Developed methods are validated as per ICH guidelines and could be successfully adopted for the routine estimation of rutin.

Key Words: Herbal formulations, ICH guidelines, rutin, spectrophotometric.

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INTRODUCTION

Rutin (3,3',4',5,7-pentahydroxy flavones-3-rutinoside) (Fig. 1), which was also named vitamin P, eldrin, melin, sophorin, and violaquercitrin, is a typical glycoside of the natural flavonoids widely distributed in plants¹. Rutin is slightly soluble in water and has a higher solubility in organic solvent such as methanol². Rutin, a flavonoid glycoside, found in vegetables, fruits, tea and herbs¹. Moreover, rutin possess different protective effects including antioxidant, anti-cancer and anti-inflammatory properties². Also, rutin has a protective effect against doxorubicin-induced memory deficits and has neuroprotective effects^{4,5}. In addition, it has a protective function in ischemic organs including the heart and brain⁶. Several methods have been developed for the determination of rutin in different plant extracts; these

include HPLC^{7,8}, capillary electrophoresis⁹⁻¹¹ and spectrophotometry¹²⁻¹⁴. Recently, HPTLC has been applied for the determination of flavonoids¹⁵⁻¹⁸. The present work deals with the development of three simple and sensitive spectrophotometric methods for the quantitative estimation of rutin in herbal formulations. To our knowledge, there is no pharmacopeial method or any validated method that quantifies rutin in its herbal formulation. The objective of this study is to develop simple spectrophotometric method for quantification of rutin in its formulations and compare its quality with what is available in the local and international market. These methods are validated according to the international standards^{19,20}. The developed analytical method will be applied in quantification of rutin in its final herbal dosage form.

Solar Light Induced and TiO₂ Assisted Heterogeneous Degradation of Textile Dye Janus Green

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Abstract

The photocatalytic degradation of textile dye Janus Green has been investigated in presence of H₂O₂. The influence of various reaction parameters such as concentration of dye, amount of photocatalyst, change of pH, Hydrogen peroxide, light intensity, etc. It was found that the dye degradation followed pseudo first order kinetics. Process of degradation was followed spectrophotometrically at maximum wavelength 615 nm. Rate of photodegradation of Janus Green dye and optimal conditions are explained. Participation of OH radical is confirmed by the use of scavengers. A tentative mechanism of photodegradation of Janus Green is reported.

Keywords: Titanium dioxide, Hydrogen peroxide, Janus Green

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Introduction

The methods used for the removal of organic dyes and pigments from wastewaters are classified into three main categories: physical, chemical and biological methods, such as coagulation, adsorption, membrane process and advanced oxidation process (AOP) [1-7]. Titanium dioxide (TiO₂) has emerged as an excellent photocatalyst material for removal of environmental contaminants [8]. Synthetic dyes have been used in the textile, leather, paper, printing inks, plastics, cosmetics, paints, pharmaceutical, and food industries. It is estimated that 15% of these dyes is lost in the synthesis, processing of colorants, dyeing, printing and finishing [9-11]. Many processes have been proposed over the years and are currently employed to destroy toxic chemicals discharged along with textile wastewater. Photocatalytic detoxification (AOPs) has been focussed as an alternative method to clean up polluted water. This technique adopts the possibility of combining the heterogeneous catalysis with solar light to achieve mineralisation of toxic pollutants present in textile wastewater [12]. Photocatalytic degradation of Direct Blue 1 dye in the presence of an aqueous heterogeneous suspension of ZnO irradiated with visible light has been investigated [13]. TiO₂ has been reported as a good semiconductor for removal of many organic compounds, may be due to high oxidation efficiency, complete decomposition process, cheap and nontoxic material [14-15]. A photocatalysts could be heterogeneous if it is present in a different phase than the reaction mixture. The advantages of heterogeneous catalysts are cheap, non-toxic can be easily separated from the reaction mixture, and can be reused [16-17]. Many commercially available dyes are known and approximately one million tons of these dyes are produced annually worldwide. Also, the synthetic dyes represent a relatively large group of organic chemicals that are met in practically all spheres of our daily life. The cationic dye such as Janus Green is an important group of organic compounds which have a variety of scientific and industrial applications [18-19]. Here solar induced and TiO₂ assisted Heterogeneous degradation of studied.

Experimental

Chemical Used

Janus Green was obtained from ACS chemicals India Ltd. and its characterised are given in Table 1. Hydrogen peroxide with 30% volume was brought from FINAR India Ltd. and was used as received. A commercial product of Titanium dioxide was supplied by CHITI CHEM Vadodara, India Ltd. and it is used as a photocatalyst. All chemicals were of analytical grade and used without further purification.

Instrumentation

The concentration of the dye solution was monitored using absorbance recorded on UV-visible double beam spectrophotometer (Thermo scientific-evolution 201) and pH was checked with pH meter (Systronics model n EQ - 361). The stock solution of dye was prepared in double distilled and deionized water with conductance 1.5×10^{-6} and

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Colchicine (a high-priced alkaloid) accumulation and HPTLC quantification in different stages of in vitro developed tuber of *Gloriosa superba* L.

[Dipika Rathod](#) , [Jitendriya Panigrahi](#) & [Illa Patel](#)*Future Journal of Pharmaceutical Sciences* **7**,

Article number: 177 (2021)

1188 Accesses | **1** Citations | [Metrics](#)

Abstract

Background


Gloriosa superba L. belongs to Colchicaceae, which is an important medicinal plant containing high-priced alkaloid colchicines and other potent phytochemicals. Due to its extensive importance at the industrial level, this plant is overexploited. Moreover, indiscriminate harvesting for raw material leads to a decline in the

SPECTROSCOPIC AND ANTIMICROBIAL STUDIES OF SOME NOVEL COMPLEXES OF
 d^{10} METAL IONS.Jabali J. Vora*, Jwalant J.Vora[†], Hardikkumar D. Chaudhary[‡],*Department of Chemistry, Hemchandracharya North Gujarat University, Patan - 384 265.Gujarat, India
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ABSTRACT: Complexes of kynurenic acid (KYNA) with d^{10} metals have been synthesized and their physicochemical properties were investigated using elemental analysis, IR, molar conductance, uv- visible and mass spectroscopy. Kynurenic acid acts as a chelating agent coordinating through the oxygen and nitrogen atoms of >O-H >C=N groups, respectively. Thermal stability and mechanism of decomposition of complexes were determined by TGA - DSC techniques. The ligands and its complexes were screened for their antibacterial activities towards Bacillus, Salmonellatyhi A, Escherichia coli and Staphylococcus aureus.

Key words: Kynurenic acid, d^{10} metal complexes, Antibacterial activity.

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INTRODUCTION

The inter disciplinary area of coordination chemistry is very important. There are a number of applications of chelate compounds in laboratory, medicinal chemistry, electronics, catalysis etc. Kynurenic acid (KYNA) (IUPAC name 4-oxo-1H-quinoline-2-carboxylic acid), a major tryptophan metabolite, is a glutamate receptor antagonist, which is also reported to inhibit nicotinic acetylcholine receptors. The co administration of endomorphin-1 (EM1) with KYNA causes an enhanced antinociceptive effect.

KYNA levels are elevated in the brain and cerebrospinal fluid of persons with schizophrenia and Alzheimer's disease, both of which are characterized by deficits in contextual learning and memory. That elevated concentration of endogenous KYNA interferes with contextual learning and memory and support the notion that increased concentration of KYNA may contribute to cognitive dysfunction. In addition, data provides new insight into how novel 'gliotransmitters' may modulate neuronal function and behaviour (Chess, et.al., 2009).

EXPERIMENTAL

The complexes were made between the ligand and d^{10} metals, according to the standard procedure (Haresh, et.al., 2015). 0.2M solution of perchloric acid was prepared. The exact strength was determined by pH metric-titration. Metal perchlorate solution was prepared from metal carbonate and perchloric acid. 25ml 0.2M metal perchlorate solution and 25ml 0.2M KYNA solution which is made in DMSO were mixed and refluxed for 2.5 to 3 hours at 90°C temperature and then cooled. This resulted in the solid product. The complex thus obtained was washed well with warm water and alcohol for the removal of unreacted metal salt and ligand. All the complexes were dried in oven at 40°C to 45°C temperature. In this way, the complexes of Zn(II), Cd(II), and Hg(II) were prepared and isolated as solid. An antibacterial study was carried using Agar Diffusion Method.



KINETIC ACTIVITY AND CATALYTIC STUDY OF NOVEL COMPLEXES OF SELECTED TRANSITION AND D¹⁰ METAL IONS.

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ABSTRACT

Heterocyclic compounds and their derivatives represent an interesting class of compounds having a wide spectrum of biological activities such as antiinflammatory, anticancer, antitubercular, antiviral and antimicrobial properties. The present investigation involved the synthesized novel complexes's (Kynurenic acid-KYNA + Metal carbonates) chemical kinetic study with (i)K₂S₂O₈ + KI (ii) HBrO₃ + HI and (iii) H₂O₂ + HI . The product of all these three reactions is iodine, and it was titrated with standard aqueous sodium thiosulphate by starch solution as indicator. The rates of all these reactions were measured by simple kinetic methods therefore one of the chief applications of coordination compounds, as catalysts was investigated. These complexes were used to investigate whether they own catalytic activity in homogeneous or heterogeneous phase. One organic reaction, formation of benzpinacol from benzophenone was studied. Catalytic effects of the complexes were studied and useful outcome was obtained.

Keywords: Kynurenic Acid(KYNA), Kinetic Study, Catalytic Activity.



SPECTROSCOPIC AND ANTIMICROBIAL STUDIES OF SOME NOVEL COMPLEXES OF MN (II) AND CU (II)

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ABSTRACT

In this study, complexes were synthesized in marginal yields via the coordination of metal perchlorates with the ligand. Kynurenic acid (KYNA) ligand reacts with solution of Mn(II) and Cu(II) perchlorates and solid kynurenic acid – metal complexes are synthesized. The ligand and its complexes have been investigated with IR, UV-VIS, mass spectrometry, elemental analysis, TGA – DSC technique etc. These compounds were subjected to their biocidal efficacy against Escherichia coli, Bacillus, Staphylococcus aureus and Salmonellatyphii A and also results have been compared with standard drugs streptomycin and ampicilin.

Key words: Kynurenic acid, metal complexes, Antibacterial activity.

INTRODUCTION

KYNA is regarded as “privileged ligand” due to its capability to form complexes with a wide range of transition metal ions yielding stable and colored metal complexes with interesting physical and chemical properties and potential biological activities. KYNA acts as a better ligand because

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ISSUES IN GERIATRIC CARE IN INDIA

Dr. Bhupinder Chaudhary *

Dr. Rachna Kumar **

Abstract

As the second most populous country in the world (next only to China), population of India is 1.21 billion (2011). In the age group of 60 years and above, the population has increased by about 55% in the last 15 years. Contrary to this, the working population (15-59 years) has grown by 42.34% in the last 15 years. The old age dependency ratio, which measures the number of elderly people as a portion of those of working age, stands at 0.132 (01 March 2012), which is expected to be over 0.20 (by 2050). With the increase in life expectancy and decline in death rate, there is an increased demand for care-givers to provide care to the elderly. According to prediction by demographers, globally, in about another 25 years, the population aged 65 years and above will be double the population under age of 5 years. So, we would need more geriatricians than pediatricians in the next few years. In the Indian context, the situation is acquiring a critical status, as the healthcare system is still not geared for geriatric care as a separate specialization. Eventually, the number of geriatricians in public and private sector is minimal and grossly inadequate to ensure a reasonable level of healthcare to the ageing nation. This article is an attempt to enlist and analyse the salient features of Geriatric care system in the Indian context, the problem associated with it and probable solutions to these issues.

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Management of Geriatric Care in the US

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ABSTRACT

The federal administration on ageing anticipates that by 2030, 72 million (20% of total population) Americans will be above the age of 65 years. This number is almost 13% at present. Interestingly, every day nearly 10000 baby boomers enter the age group of 65 years. Also, almost 90% of the elderly have single or multiple chronic illness which needs continuous medical care. The problem is not the ageing population or increased prevalence to disease, but the acute shortage of trained clinicians to take care of the ageing population. According to the American Geriatrics Society, in the next fifteen years, America will have only one geriatrician for a population of 4000 elders. This prediction is strengthened by the fact that in 2014, there were almost 7500 practicing geriatricians in the US and in 2013, only 75 physicians opted for geriatric fellowship. Increasing life expectancy, increased burden of disease and decrease in the number of care providers is gradually leading to an inevitable situation, where the elders are left alone in the later years of their life. Few of these situations have been compiled on this article and probable solutions have also been discussed.

Keywords— Geriatrics, OECD, Older Adults

I. GERIATRIC CARE IN THE USA

As compared to most of the countries, the United States has a very huge healthcare spending. Per capita, the United States spends more on healthcare than any other country in the Organization for Economic Co-operation and Development (OECD) – 22 percent more than second-ranked Luxembourg, 49 percent more than third-ranked Switzerland, and 2.4 times higher than the OECD average. While India, is spending 10% of OECD average. Elderly population in America also experiences problems, but in a different way. First and foremost is the difference in access to healthcare services. And the main reason being the lack of health insurance of any type. In the year 2000, more than 15% of Americans below 65 years were uninsured. A significant number of working Americans (sans insurance) have histories of serious ailments like diabetes, cardiac

problem, and depression. High cost of care was responsible for delay or non-availability of healthcare. Apart from this, social and demographic factors (including age, gender, race and education) have also been responsible for lack of access to care. It is also becoming evident that satisfaction with provider services may impact perceptions of access to health care and clinical outcomes.

From the available literature, it can be visualized that geriatrics or elderly care is an area, preferable neglected in most healthcare settings. Though, it is significantly mentioned in the healthcare policies, but implementation phase witness great deal of ignorance or neglect. According to an article published by the American Geriatric Society:

In response to the needs and demands of an aging population, geriatric medicine has grown rapidly during the past 3 decades. The discipline has defined its core values as well as the knowledge base and clinical skills needed to improve the health, functioning, and well-being of older persons and to provide appropriate palliative care. Geriatric medicine has developed new models of care, advanced the treatment of common geriatric conditions, and advocated for the health and health care of older persons. Nevertheless, at the beginning of the 21st century, the health care of older persons is at a crossroads. Despite the substantial progress that geriatric medicine has made, much more remains to be done to meet the healthcare needs of our aging population. The clinical, educational, and research approaches of the 20th century are unable to keep pace and require major revisions. Maintaining the status quo will mean falling further and further behind. The healthcare delivery and financing systems need fundamental redesign to improve quality and eliminate waste. As aptly mentioned in the public policy and aging report, this issue is not only related to financing problems, it also relates with the quantum of resources, which are consumed by the elderly population. The report reads: As the nation's older population grows, the U.S. will require a well-trained workforce of health care providers with expert knowledge in geriatric medicine. Compared with younger

A STUDY ON IMPACT OF GST AFTER ITS IMPLEMENTATION

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Abstract: In today's scenario we pay various taxes i.e. Direct and Indirect taxes, which are felt as burden on us and due to these taxes the corruption is increasing. So, to overcome from all these taxation system the Central Government has decided to make one tax system i.e. Goods and Services Tax (GST). GST is one of the most critical tax reforms in India which has been long awaiting decision. It is a comprehensive tax system that will subsume all indirect taxes of State and central Governments and whole economy into seamless nation in national market. It is expected to remove the burden of existing indirect tax system and play an important role in growth of India. GST includes all Indirect Taxes which will help in growth of economy and proves to be more beneficial than the existing tax system. GST will also help to accelerate the overall Gross Domestic Product (GDP) of the country. GST is now accepted all over the world and countries are using it for sales tax system. This paper will help to show that, what will be the impact of GST after its implementation, difference between present Indirect Taxes and GST and what will be the benefits and challenges of GST after implementation.

Keywords: Central, State, Dual, GST, Indirect Tax, Direct Tax, GDP, Implementation.

1. INTRODUCTION

India is the hub of taxes where people pay many taxes which create confusion for them. Presently we pay two types of taxes i.e. Direct and Indirect in various sectors. Direct Tax paid directly to the government by the taxpayer i.e. Income Tax, Wealth Tax, and Corporation Tax. Indirect Tax is a tax levied on goods and services rather than on income or profits. It is not directly paid to government but collected from intermediaries (such as retail stores) from the person who bears the ultimate economic burden of the tax (such as consumers). The intermediary later files a tax return and forwards the tax proceeds to government with the return for example Sales Tax, VAT, Excise Duty, and Custom Duty and so on.

GST is a blanket of Indirect Tax that will subsume several indirect state and federal taxes such as Value

Added Tax (VAT) and Excise Duty and different State Taxes, Central Surcharges, Entertainment Tax, Luxury Tax and many more. GST was firstly introduced in France in 1954, with introduction of GST France became the first country ever to introduce GST. Its introduction was requiring because very high sales taxes and tariffs encourage cheating and smuggling. After France it was adopted by 165 nations. Now, India is also going to adopt it. After its implementation in India, India will become 166th nation to adopt it. In India before 16 years, in 2000 Shri Atal Bihari Vajpy brought this system but no one paid attention on it and due to some reasons it was not passed. On 28th February 2006, the finance minister P. Chidambaram, had announced the target date for implementation of GST on 1 April, 2010. The Constitution (122nd Amendment) Bill was introduced in the Lok Sabha by Finance Minister Arun Jaitely, on 19th December 2014, and passed by the house on 6th May 2015. The bill was passed by Lok Sabha on August 2016. The bill, after ratification by the States, received assent from President Pranab Mukherjee on 8th September 2016. GST bill is brought for the reason that the different taxes paid by us on different rates would be brought under one roof so that all the taxes may get cancelled and only one tax is paid which is GST. Goods and Services Tax (GST) will include one tax one nation; this statement was given by the honorable Prime Minister Mr. Narandra Modi of India. In today's scenario we pay 30% to 35% tax on different things but with GST it will be only 18%, which shows it will be beneficial and one main thing that GST will remain similar in all nation.

The GST is expected to change the whole scenario of current Indirect Tax. GST will merge all Indirect Taxes under an umbrella and will help in creation of smooth market. Experts say that GST will help in economic growth of the country. It is estimated that GST will help in creation of single, uniform market that will benefit both corporate sector and the Indian economy. Both the State and the Central Government will levy GST on almost all goods and services produced in India or






Impact of Occupation on Stress and Anxiety Amongst Indian Women



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REFURBISHMENT OF LIBRARIES: AN INNOVATIVE APPLICATION OF SERVICES IN LIBRARIES

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MUKUNDKUMAR CHHAGANLAL PATEL
and Dr. KANAKBALA ARVINDBHAI JANI

Keywords:

Creative, Innovative, Libraries, Refurbishment, Services

Introduction :

The progress of any nation relies on the success of its education system today. The contribution of libraries is of prime importance in the base of progressive education system. Dr. A. P. J. Abdul Kalam, the former President of India also cited his golden dreams in his book 'India 2020'. In this book, Dr. Kalam had quoted that India will acquire a very significant position among the other developing countries in 2020 and for achieving this reference is taken into consideration, along with better education, the students should be provided with such atmosphere wherein they can be endowed with latest curriculum as well as information connected with universal community and such knowledge should be available in the library of institution itself.

Meaning of refurbishment :

Change is the law of nature. Everything has been changing in the world for the primitive period. Change is necessary in the world and the change brings creation. Creation brings new hopes. What is there in present is conversed and acquires new form or is placed forward to the world by getting regeneration.

'Refurbishment' is the process of bringing change and transformation in the situation prevailing at the moment and to present it in a novel form. Refurbishment in the context of library is to implement innovative changes and to open new directions in front of its readers by providing new services and specific information.

'Re' means 'again' and 'furbish' means to renew the things existing at present and regenerate it. In short, the state of being restored to its former good condition is identified as refurbishment.



The Impact of Digital Technology in Tribal Area: An Online Research

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• Abstract :

The present research article gives a comprehensive view about the Digital Services of College Library wherein a research work has been conducted by obtaining data from the college students by the means of a questionnaire regarding various services provided by college library and their effects on the library users. On the basis of data analysis, interpretation and research findings, inter - structural changes will be made in various services in college library specifically for digital services.

• **Keywords :** Digital Technology, Digital Library, Tribal Area, Library Users

• Introduction :

21st century is identified as the 'Century of Knowledge'. In the world updating and upgrading every day, we acquire maximum knowledge and information through the field of Information and Technology. The present era is the era of information. Wherever we glance. Information and Technology is found to be talked about. Digital Technology has entered in every area of the world. There is no area wherein technology is not used. The use of technology in education has also increased to a great extent. If we talk about use of technology in education, the use of technology in education had begun with projector. Today most of the schools, colleges and universities have started teaching with smart classrooms. In developed countries of the



Digital Library User's Satisfaction - A Study

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Abstract:

In the present era of technology, a rapid progress is being observed along with changing scenario. Even a digital change has been noticed in the field of library too. Considering this aspect, the present research article gives a comprehensive view about digital library user's satisfaction regarding digital services of library. The present research has been conducted considering the students using digital library and that will enable the students to get required information easily at home or at anywhere by the means of mobile, personal computer or laptop from the various sites of digital library. The students will also be acquainted with the information available from traditional library as well as digital library and will feel self-satisfaction by getting the required information swiftly.

Key words: Digital Library, Users' Satisfaction

Introduction:

Due to the impact of Information and Communication Technology, our routine tasks have greatly changed. That's why the present era is identified as the 'Era of Information' and the society is identified as the 'Society of Knowledge'. In the present time, digital gadgets have entered in each one's life whether they are young or aged, poor or rich, literate or illiterate. Knowingly or unknowingly, we are getting dependent on Information and Communication Technology. As the expected changes have occurred in various areas due to Information and Communication Technology, changes have taken place in the area of digital library in the context of making the information available for its users. Due to print media, the information is available in digital form. The digital mediums are accepted as internal parts of Information and Communication Technology today. Every country of the world is using Information and Communication Technology for extending information and communication as well as in the area of education and training. As a result, anybody can learn at any place and at any time. In addition



Biogenesis and characterization of proficient silver nanoparticles employing marine procured fungi *Hamigera pallida* and assessment of their antioxidative, antimicrobial and anticancer potency

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Himanshu Bariya[✉]

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Abstract

Objective To assess the anticancer potential of biosynthesized silver nanoparticles using marine derived fungi *Hamigera pallida* with their antibacterial and antioxidant activities.

Results The biosynthesis of silver nanoparticles (AgNPs) was assessed by the change in color from bright yellow to dark brown. UV-Visible spectroscopy revealed its stability at 429 nm; ATR-FTIR spectroscopy revealed the functional group responsible for its production; X-Ray Diffraction revealed its crystalline FCC structure resembling the peaks in the XRD pattern, corresponding to (110), (111), (200), and (311) planes; TEM imaging revealed its spherical morphology with an average particle size of 5.85 ± 0.84 nm ranging from 3.69 to 16.11 nm and Tauc's plot analysis revealed a band gap energy

of 2.22 eV, revealing aptitude of AgNPs as a semi-conductors. The subsequent characterization results revealed the effective synthesis of silver nanoparticles. The biosynthesized AgNPs were found to have significant antimicrobial effect against three Gram-positive and three Gram-negative bacteria. They also demonstrated higher antioxidative potential by demonstrating strong radical scavenging activity against DPPH (2, 2-diphenyl-1-picrylhydrazyl). AgNPs showed highest anticancer activity ($62.69 \pm 1.73\%$) against human breast cancer (MCF-7) cell line at 100 $\mu\text{g}/\text{mL}$ with the IC_{50} value of 66.07 ± 2.17 $\mu\text{g}/\text{mL}$.

Conclusions This study revealed the prospect for further utilization of AgNPs by Cell free filtrate of *Hamigera pallida* as an antibacterial, antioxidative and anticancer agents.

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Efficient biodegradation of Congo red dye using fungal consortium incorporated with *Penicillium oxalicum* and *Aspergillus tubingensis*

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Abstract

A novel approach had been carried out to develop fungal consortium, namely, RH-2, containing two marine procured fungal isolates in order to evaluate biodegradation of recalcitrant diazo dye Congo red. The fungi were isolated from the seacoast of Diu, India. According to the ITS sequencing, the strains were identified as *Penicillium oxalicum* (DS-2) and *Aspergillus tubingensis* (DS-4). Discs of 12 mm were cut out from the edge of both the fungal isolates (DS-2 and DS-4) and inoculated in flasks consisting of potato dextrose broth with 100 mg/L Congo red for the development of fungal consortium RH-2. The degradation by the fungal consortium RH-2 was more effective than the fungal monocultures DS-2 and DS-4 with the respective degradation reaching $97.15 \pm 0.15\%$, $68.96 \pm 0.09\%$, and $29.96 \pm 0.21\%$ in addition of yeast extract (1% w/v) within 12 h. The influence of dextrose (1% w/v), yeast extract (1% w/v), pH 5, and salt concentration (1% w/v) enhanced the degradation potential of fungal consortium RH-2. The maximal degradation was correlated with the production of laccase (12.498 ± 0.21 U/mL) and manganese peroxidase (10.314 ± 0.25 U/mL). The catabolism of Congo red was confirmed by UV-Visible spectroscopic analysis (Congo red λ -max = 499 nm) and ATR-FTIR spectroscopic analysis. The filtrates obtained after Congo red degradation were also evaluated for microbial toxicity against bacteria (*Bacillus haynesii*) and phytotoxicity analysis on plant seed (*Trigonella foenum*) which revealed that the filtrate acquired after the treatment of Congo red by fungal consortium RH-2 was less toxic than the original dye in nature. A novel aspect is determined by the evidence of mutualistic interaction between two different fungi for the rapid decolorization and degradation of dye providing a prospective of utilizing the developed consortium RH-2 as a cost-effective approach in textile wastewater treatment for cleaner environment.

Keywords Azo dyes · *Penicillium oxalicum* · *Aspergillus tubingensis* · Phytotoxicity · Microbial toxicity · Laccase

Introduction

Azo dyes are considered a recalcitrant xenobiotic. They are extensively utilized in printing, paper, textile, leather, cosmetic, and food industries owing to their rapid kinetics, but textile industries mostly utilize these compounds for dyeing yarns and fabrics (65%–80% of all dyes used industrially) (Sarkar et al. 2017; Benkhaya et al. 2020). Studies have indicated an industrial use of dyes from 10 to 20 million tons, of which about 15–20% goes to wastewater (Sarkar et al. 2017). These dyes consist of one or more azo bond ($-N=N-$) with aromatic rings in their structure that provide dyes stability and recalcitrance towards degradation

(Allen 1971). Prevalent applications of azo dyes have led to an inevitable issue, posing threat to the environment (Lade et al. 2012). These dyes could biologically alter to form carcinogenic compounds. These azo dye residues are directly exuded into natural water streams, causing a hazardous effect on the aquatic environment by averting light penetration into the water in turn inhibiting photosynthesis. Congo red is a benzidine-based anionic dye frequently used in textile, paper, as well as wood industries (Das and Mishra 2017). Congo red is reduced to form benzidine. Benzidine is an aromatic amine that is carcinogenic and mutagenic in nature (Asses et al. 2018). Hence, the degradation of azo dyes enduring in effluents of industries is of great significance.

Substantial attempts have been dedicated for the degradation of azo dyes in effluents, and as an outcome of these, different physicochemical methods such as membrane filtration, adsorption, and ion exchange have been developed. In spite of this, they possess drawbacks such as less adaptability for

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Divisor cordial labeling for some cycle and wheel related graphs

C. M. Barasara^{1*} and Y. B. Thakkar²

Abstract

Divisor cordial labeling is a variant of cordial labeling. We investigate divisor cordial labeling for Armed Crown, Closed Helm, Web graph and one point union of Cycles.

Keywords

Graph labeling, Cordial labeling, Divisor cordial labeling.

AMS Subject Classification

05C78.

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1. Introduction

We begin with simple, finite, connected and undirected graph $G = (V(G), E(G))$. For all standard terminology and notation we follow Clark and Holton [9]. We will give brief summary of definitions which are useful for the present investigations.

Definition 1.1. A graph labeling is an assignment of integers to the vertices or edges or both subject to certain condition(s). If the domain of the mapping is the set of vertices (or edges) then the labeling is called a vertex labeling (or edge labeling).

Labeled graph have applications in many diversified field such as X-Ray crystallography, network design, missile guidance codes etc. A detailed study on verity of applications of graph labeling is reported in Bloom and Golomb [4].

For an extensive survey on graph labeling and bibliographic references we refer to Gallian [8].

In 1987, Cahit [7] introduced cordial labeling as a weaker version of graceful labeling and harmonious labeling. Many variants of cordial labeling are also introduced with variation

in cordial condition. These labeling are known as equitable labeling.

Definition 1.2. For a graph $G = (V(G), E(G))$, the vertex labeling function is defined as $f : V(G) \rightarrow \{0, 1\}$ and induced edge labeling function $f^* : E(G) \rightarrow \{0, 1\}$ such that for each edge uv , $f^*(uv) = |f(u) - f(v)|$. f is called cordial labeling of graph G if the number of vertices labeled with 0 and the number of vertices labeled with 1 differ by at most 1, and the number of edges labeled with 0 and the number of edges labeled with 1 differ by at most 1. The graph that admits a Cordial Labeling is called a Cordial Graph.

In 2011, R. Varatharajan *et al.* [18] have introduced divisor cordial labeling as follows.

Definition 1.3. For a graph $G = (V(G), E(G))$, the vertex labeling function is defined as a bijection $f : V(G) \rightarrow \{1, 2, \dots, |V(G)|\}$ such that an edge uv is assigned the label 1 if one $f(u)$ or $f(v)$ divides the other and 0 otherwise. f is called Divisor cordial labeling of graph G if the number of edges labeled with 0 and the number of edges labeled with 1 differ by at most 1. The graph that admits a Divisor cordial labeling is called a Divisor cordial graph. Denote the number of edges labeled with 0 and 1 by $E_f(0)$ and $E_f(1)$ respectively.

Varatharajan *et al.* [18, 19] have derived many results related to divisor cordial graphs for standard graph families. Vaidya and Shah [20, 21] have investigated divisor cordial labeling for some star related graphs.

RESEARCH

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Impact of silver nanoparticles as antibacterial agent derived from leaf and callus of *Celastrus paniculatus* Willd

Anita Solanki¹, Dipika Rathod², Illa C. Patel¹ and Jitendriya Panigrahi^{3*}

Abstract

Background: *Celastrus paniculatus* Willd. is a rich source of numerous active constituents such as celapanigin, celapagin, malkangunin, celapanin, zeylasteral, pristimerin, and zeylasterone which render medicinal properties to its various parts. Therefore, the present work provides a protocol for the synthesis of AgNPs from in vivo leaf and in vitro developed callus extract of *C. paniculatus* and both the extracts have great antibacterial potential, which may give immense support for the drug preparation using AgNPs prepared from this valuable medicinal plant.

Results: High frequencies of calli induced from leaves and its counterpart, i.e., the natural part leaf were selected as the experimental materials for the green synthesis. The collected data exhibited gradual color variations started with whitish color, creamish, and after 8 weeks it ultimately turns into a solid mass of brownish callus. The silver nanoparticles (AgNPs) were synthesized using in vivo fresh leaves and in vitro developed callus extracts with an indication of brown colored complex. Further confirmation of AgNPs synthesis in both the samples was done using UV-visible spectral analysis followed by X-ray diffraction (XRD) analysis, Fourier transformation infrared spectroscopy (FTIR), and scanning electron microscopic (SEM) analysis.

Conclusion: The antibacterial activity of both extracts reflected the presence of the zone of inhibition in both gram-positive and gram-negative bacteria. AgNPs derived from callus extract showed better results with 24.00 ± 1.00 mm zones of inhibition. This protocol deserves the recognition of the antibacterial potential of AgNPs synthesized from CP plant extracts.

Keywords: Antibacterial activity, *Celastrus paniculatus*, SEM, Silver nanoparticles, Silver nitrate

Background

In the current situation, nanotechnology is an advanced field that deals with the green synthesis of nanoparticles at nano levels using smaller scales below 1 μm /normally from 1 to 100 nm [1]. The detailing of nanoparticles is a significant component of nanotechnology since its particular characters are characterized at the degree of nanoparticles, nanocrystals, or nanolayers and are valuable in different fields of science, for example, physical, synthetic, and natural just as drug applications [2].

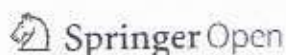
These particles are of great scientific interest for research due to their different characteristics and large surface area/volume ratio [3].

Silver nanoparticles are one of the noble metal-based nanoparticles. Besides, silver nanoparticles have attracted particular attention because of their unique properties, including antimicrobial activities, catalytic, chemical stability, and electrical conductivity [4, 5]. Also, silver ion behaves completely different properties in the nano-scale as compared to bulk particles prepared from similar material [6]. Silver is used in several medical products such as skin ointments, creams used to cure burns and open wounds [7]. But, chemically synthesized AgNPs reported toxic in their chemical form so that

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Morphological and Biochemical Facets of Arsenic Toxicity on *Vigna mungo* L

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ABSTRACT

A nutritive fodder black gram has great importance for overall health as it has anti-inflammatory properties, liver stimulant increases sperm count, and sperm motility. To study the tolerance mechanism of black gram under a simulated level of heavy, non-essential, and highly toxic arsenic metal (10 mg/L, 20 mg/L, and 30 mg/L), various biochemical parameters such as total amino acid, proline, phenol, reducing sugar, and catalase activity were measured and the changes were compared with control. The result showed more toxicity towards the root system as compared to the shoot system. Experimentally, a higher concentration of arsenic more than 10 mg/L reduced the protein content of the seed and affected all the parameters. Peroxidase activity was found to be slightly increased in experimental plants compare to the control plants. Statistical analysis like one-way and two-way ANOVA also showed the negative impact of heavy metal arsenic subjected to the black gram. Atomic absorption analysis (AAS), which also confirmed the deposition rate of arsenic metals in treated plants of AV88 and T9 cultivar, was more compared to the control plants under a high concentration of toxic arsenic metal.

Keywords: Arsenic, *Vigna mungo*; toxicity, Atomic absorption spectroscopy; Heavy metals; toxicity

INTRODUCTION

Heavy metals are important contaminants in the soil, metal pollution is continuously increasing and the root cause is the anthropogenic behavior that interferes with environmental activities. Metal ions are gaining increased attention due to their importance in mineral nutrition and toxicity studies. In recent years due to environmental pollution from industry, heavy metal toxicity was in great attention. Arsenic is a Vth group element in the periodic table along with



RESEARCH

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Colchicine (a high-priced alkaloid) accumulation and HPTLC quantification in different stages of in vitro developed tuber of *Gloriosa superba* L.

Dipika Rathod^{1*}, Jitendriya Panigrahi² and Illa Patel³

Abstract

Background: *Gloriosa superba* L. belongs to Colchicaceae, which is an important medicinal plant containing high-priced alkaloid colchicines and other potent phytochemicals. Due to its extensive importance at the industrial level, this plant is overexploited. Moreover, indiscriminate harvesting for raw material leads to a decline in the population of this plant in the natural environment. Thus, the present study deals with the optimization of colchicine accumulation from the different intervals of in vitro and in vivo tubers of *Gloriosa*.

Result: To obtain in vitro tuberization, shoot tip explants were inoculated on Murashige and Skoog medium prepared with 3 mg/l BA and 0.5 mg/l Kn + 1 mg/l 2, 4-D followed by 2 mg/l BA + 0.2 mg/l NAA. In the high-performance thin-layer chromatography study (HPTLC), the linearity range of colchicine was set at a concentration range of 100–1000 ng/spot with a regression value (r) of 0.99. Its R_f value (0.25) was recorded at 254 nm. The colchicine amount in the in vivo tuber was $7.75 \pm 0.25\%$ dry weight, while the nearby amount of $7.7 \pm 0.40\%$ dry weight of colchicine was produced from 2 weeks in vitro old tuber. This value was followed by the 4th-week old tuber with $6.35 \pm 0.17\%$ dry weight and then a gradual decrease in its accumulation.

Conclusion: The significant results for the accumulation of colchicine at different stages were observed. Hence, this strategy of colchicine production creates a new possibility for improved production of colchicine under in vitro conditions which will be helpful to various pharmaceutical industries without damaging the plants from the natural environment.

Keywords: Alkaloid, Colchicine, *Gloriosa* tubers, HPTLC

Background

Gloriosa superba L. is a seasonal climber, and it belongs to the family Colchicaceae. It is commonly known as vachhnag, kalahari, flame lily, and glory lily. Individual parts of this plant contain important phytochemicals including colchicine and are used for the treatment of various diseases like cancer, swelling,

leprosy, piles, gout, chronic ulcers. Moreover, this plant considers to have antipyretic, anti-anthelmintic, purgative, and anti-abortion properties and is used as an antidote in snake bites [1, 2]. Seeds and tubers of this plant are a rich source of high-priced alkaloid colchicine. Owing to this, both parts are highly exploited for the extraction of colchicine. Further, the seed germination rate is found inefficient in this plant, and it is conventionally multiplied only by these two parts. So, the natural population of this plant is drastically declining. Furthermore, its unsustainable harvesting from the wild population for its colchicine content has

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Research Article

Effect of calcium chloride and gallic acid combination on the extension of postharvest life of *Lagenaria siceraria*, a vegetable with medicinal importance

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ABSTRACT

Lagenaria siceraria (Mol.) Standl. consists of all essential elements that are required for good and normal human health. Post harvest losses occur due to lack of proper packaging material, microbial spoilage, and improper handling during transport. Thus, this study deals with viability, sensory evaluation, antioxidant enzymatic activities of *L. siceraria* fruits by the treatment of a combination of calcium chloride and gallic acid (abbreviated as CG) for 21 days storage at room temperature. The solutions were prepared by the addition of CG in equal amount with different concentrations: 1:1 μM , 2:2 μM , 3:3 μM , and 4:4 μM . The untreated *L. siceraria* fruits survived for 14 days. However, all the coated *L. siceraria* fruits could sustain for 21 days, and the combination of 2:2 μM CG was superior in all aspects. The combination of calcium chloride and gallic acid showed beneficial effects by delaying the ripening process.

Keywords: *L. siceraria*, CaCl_2 , gallic acid, postharvest

Abbreviations: CAT- Catalase activity; CG- CaCl_2 plus Gallic acid; POD- Peroxidase activity; TTA- Titratable acidity; FCR- Folin and Ciocalteu's phenol reagent.

INTRODUCTION

Vegetables can be consumed either raw or in cooked form and considered an imperative part of the human diet. They are low in fats and starch, whereas high in vitamins, minerals, and dietary fiber. Numerous nutritionists urge individuals to devour a lot of foods grown from the ground, at least five plants a day regularly being suggested. *Lagenaria siceraria* (Mol.) Standl. i.e. bottle gourd is a popular culinary vegetables in many tropical regions around the world (India, Japan, Thailand, etc.) and grown year-round in tropical climates. It is used in the field of

pharmaceutical and dietary formulation (Decker-Walter *et al.*, 2001). It belongs to the Cucurbitaceae family, which is probably one of the earliest vegetables cultivated by man. *L. siceraria* plant is fast-growing, annual yellowish-green in colour containing white pulp with white seeds embedded in spongy flesh. The plant is a climber with various synonyms, like calabash gourd, lauki, long-squash, etc. (Pradhan *et al.*, 2013).

L. siceraria fruits generally has all the essential elements that are needed for good and normal human health (Kubde *et al.*, 2010). The juice of the fruit is used to regulate the blood pressure of hypertensive patients, due to its high

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"STUDY ON MICROFINANCE AND WOMEN EMPOWERMENT: AN INDIAN PERSPECTIVE"

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ABSTRACT

In India, the emergence of liberalization and globalization in early 1990's aggravated the problem of women workers in unorganized sectors from bad to worse as most of the women who were engaged in various self-employment activities have lost their livelihood. Despite its substantial contribution of women to both household and national economy, their work is considered just an extension of household domain and remains non-monetized. In India, Microfinance scene is dominated by Self Help Group (SHGs) as an effective mechanism for providing financial services to the "Unreached Poor", and in strengthening their collective self-help capacities leading to their empowerment. Rapid progress in SHG formation has now turned into an empowerment movement among women across the country. Micro finance is necessary to overcome exploitation, create confidence for economic self-reliance of the rural poor, particularly among rural women. Although no 'magic bullet', they are potentially a very significant contribution to gender equality and women's empowerment. Through their contribution to women's ability to earn an income, these programmes have potential to initiate a series of virtuous spirals of economic empowerment, and wider social and political empowerment.

KEYWORDS : Microfinance, SHGs, Women Empowerment

INTRODUCTION

Micro finance through Self Help Group (SHG) has been recognized internationally as the modern tool to combat poverty and for rural development. Micro finance and SHGs are effective in reducing poverty, empowering women, and creating awareness which finally results in sustainable development of the nation. Women have been the most underprivileged and discriminated strata of the society not only in India but the world over. Despite all Government and Non-Governments' efforts, they have been highly ignorant clients of the financial sector. In the recent times, microfinance has been emerging as a powerful instrument for empowering women particularly, the rural women. Apart from the informal sector of finance the formal and semi formal sectors like commercial banks, NGOs etc. are taking much interest in providing microfinance to women considering it to be a profitable commercial activity. Women are also participating in the microfinance movement by availing the microfinance services being provided by the various financial channels.

The main aim of microfinance is to empower women. Microfinance is the provision of financial services to low-income clients, including consumers and the self-employed, who traditionally lack access to banking and related services. Microcredit, or microfinance, is banking the unbankable, bringing credit, savings, and other essential financial services within the reach of millions of people who are too poor to be served by regular banks, in most cases because they are unable to offer sufficient collateral. Women make up a large proportion of microfinance beneficiaries. Traditionally, women (especially those in underdeveloped countries) have been unable to readily participate in economic activity. Microfinance provides women with the financial backing they need to start business ventures and actively participate in the economy. It gives them confidence, improves their status, and makes them more active in decision making, thus encouraging gender equality. According to CGAP long-standing MFIs even report a decline in violence towards women since the inception of microfinance.

MICROFINANCE AND WOMEN EMPOWERMENT

Micro finance services and groups involving men also have potential to question and significantly change men's attitudes

women with a view to empower them. These are varying underlying motivations for pursuing women empowerment. Some argue that women are amongst the poorest and the most vulnerable of the underprivileged and thus helping them should be a priority. A more feminist point of view stresses that an increased access to financial services represent an opening/opportunity for greater empowerment. Such organizations explicitly perceive microfinance as a tool in the fight for the women's rights and independence. Finally, keeping up with the objective of financial viability, an increasing number of microfinance institutions prefer women members as they believe that they are better and more reliable borrowers.

REVIEW OF LITERATURE

Ranjula Bali Swaina and Fan Yang Wallentin (2009) in their article 'Does microfinance empower women? Evidence from self-help groups in India' concluded that their study strongly indicates that SHG members are empowered by participating in microfinance program in the sense that they have a greater propensity to resist existing gender norms and culture that restrict their ability to develop and make choices.

Baliwala (1994) identified three approaches to women's empowerment: the integrated development approach which focused on women's survival and livelihood needs; the economic development approach which aimed to strengthen women's economic position and the consciousness approach which organized women into collectives that address the source of oppression.

Mayoux (1997) argues that the impact of microfinance programmes on women is not always positive. Women that have set up enterprises benefit not only from small increases in income at the cost of heavier workloads and repayment pressures. Sometimes their loans are used by men in the family to set up enterprises, or sometimes women end up being employed as unpaid family workers with little benefit. She further points that in some cases women's increased autonomy has been temporary and has led to the withdrawal of male support.

RESEARCH OBJECTIVES

To study the role of microfinance in women empowerment

To analyze in SHGs. To offer empower

RESEARCH M

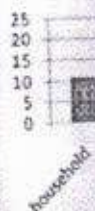
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ORIGINAL RESEARCH PAPER

Management

"MICROFINANCE SERVICES AND RURAL EMPOWERMENT: AN IN-DEPTH STUDY"

KEY WORDS: Financial Freedom, Microfinance, NGOs, Women Empowerment

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ABSTRACT

This study basically attempts to analyze the impact of microfinance services in empowering the rural women. The study is also meant to obtain insights regarding factors empowering rural women through microfinance services and which factors influences. The research works carried into rural Patan with structured questionnaire by following a non-probabilistic convenience sampling technique. The limitation of the study relates to the population of rural women only used for the study, which limits the generalizability of the findings. The findings of the study are likely to be important to microfinance institutions, govt., and NGOs in designing policy to empower rural women socially and economically. This study makes the valuable contribution by providing a base to the microfinance institutions for strengthening and expanding their support to rural poor women.

INTRODUCTION

Woman has been suppressed under custom and law for which man was responsible and in the shaping of which she had no hand. Woman has as much right to shape her own destiny as man has to shape his. It is up to men to see that they enable them to realize their full status and play their part as equal of men. - Mahatma Gandhi

In India, a developing country, women are still dominated by male in household matter which shows their very weak position in the society. The discrimination of women by the society results into more poverty, lower standard of livings as well as economic growth. To eliminate such evils from the society, empowering women through microfinance is deemed to be one of the rays of hope. Microfinance is the provision of financial services to low-income clients who traditionally lack access to banking and related services. It focuses on alleviating poverty by providing financial services to poor women to take up income generating activities. Microfinance, a development tool to alleviate poverty in Asian, African, and South American countries, gives quick and tangible results to the poor people, especially women. Micro-credit to the poor often works on the assumption that availability of finance will enable them to come out of the vicious circle of poverty.

Today various peoples faced various levels of problem in day-to-day life, like nutrition related diseases, low lifestyle; they are unable to start any small level business. Therefore, financial help for the poor through government and NGO is essential. Women constitute around half of the total world population. So is in India also. Therefore, they are regarded as the better half of the society. In traditional societies, they were confined to the four walls of houses performing household activities. Now -a- day in modern societies, they have come out of the four walls to participate in all sorts of activities. The global evidence buttress that women have been performing exceedingly well in different spheres of activities like academics, politics, administration, social work and so on. In this process not only urban educated women but also rural women participate. Therefore, women development and entrepreneurship are must for rural women.

REVIEW OF LITERATURE

Gaiha & Nandini (2007) analyzed that whether access to microfinance has given women greater autonomy in household decisions relating to allocation of resources, savings and investments and found that neither participation nor duration of membership of a Self-help Groups (SHGs) has a significant effect on female autonomy.

Page and Czuba (1989) defines empowerment as a multi-dimensional social process that helps people gain control over their own lives, a process that fosters power in people for use in their own lives, their communities and in their society, by acting on issues they define as important.

Puhazhendhu and Sarya Sai (2001), in their research study, found that SHGs have been instrumental in economic and social empowerment of the rural poor. This provided the incentive to take successive loans. Microfinance to rural women has given a great opportunity to the rural poor in India to attain reasonable economic, social, and cultural empowerment, leading to better living standard and quality of life for participating households.

According to the UN 1994 International Conference on Population and Development, women empowerment has five components that include women's sense of self-worth; their right to have and to determine choices; their right to have access to opportunities and resources; their right to have the power to control their own lives, both and within outside the home; and their ability to influence the direction of social change to create a more just social and economic order, nationally and internationally.

WHAT IS WOMEN EMPOWERMENT?

Women's empowerment is the process of empowering women. Empowerment can be defined in many ways, however, when talking about women's empowerment, empowerment means accepting and including people who are on the outside of the decision-making process into it. It's so important for women self-esteem and for societies. Empowering women is to give women the right. Women can have equal right to participate in education, society, economy and politically. Women can involve in society as they are glad to choose their religious, language, work, and other activities. Women's empowerment can be defined to promoting women's sense of self-worth, their ability to determine their own choices, and their right to influence social change for themselves and others. ... In Western countries, female empowerment is often associated with specific phases of the women's rights movement in history. Based on the assumptions that women differ from men in their social positions and that those differences consist of asymmetric, unequal power relations between the genders. "women's empowerment" refers to the process of increasing women's access to control over the strategic life choices that affect them and access to equal their position up to certain level.



Longitudinal association between adiposity measures and regression of prediabetes/diabetes

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KEYWORDS

Weight loss;
Body mass index;
Pre-diabetes;
Diabetes;
Regression;
Neck circumference;
Obesity;
Waist circumference

Abstract Background and aims: The recent COVID-19 pandemic has further increased the importance of reducing obesity and prediabetes/diabetes. We aimed to evaluate the association between adiposity and regression of prediabetes/diabetes.

Methods and results: The San Juan Overweight Adults Longitudinal Study (SOALS) included 1351 individuals with overweight/obesity, aged 40–65, free of major cardiovascular diseases and physician diagnosed diabetes. From the 1012 participants with baseline prediabetes/diabetes, 598 who completed the follow-up were included. Over the follow-up, 25% regressed from prediabetes to normoglycemia or from diabetes to prediabetes or normoglycemia. Poisson regression with robust standard error was used to estimate the relative risk (RR) adjusting for major confounders. Higher neck circumference (NC) was associated with regression of prediabetes/diabetes (RR = 0.45 comparing extreme tertiles; 95% CI: 0.30–0.66); RR was 0.49 (95% CI: 0.34–0.73) for waist circumference (WC) and 0.64 (95% CI: 0.44–0.92) for BMI. Significant associations were found using median cut-offs or continuous measures for weight and BMI. Greater reduction in BMI (comparing extreme tertiles) was significantly associated with regression of prediabetes/diabetes (RR = 1.44; 95% CI: 1.02–2.02). Continuous measures of change in adiposity (except for NC) were also associated with regression of prediabetes/diabetes for BMI and weight. Participants who reduced BMI (>5%) increased prediabetes/diabetes regression (RR = 1.61; 95% CI: 1.15–2.25) compared to those who did not; similarly for weight (RR = 1.55; 95% CI: 1.10–2.19). Additional analysis for body fat percentage showing slightly weaker results than BMI/weight further supported our findings.

Conclusion: Lower baseline adiposity and higher reduction in adiposity were associated with regression of prediabetes/diabetes among individuals with overweight/obesity.

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Acronyms: SOALS, San Juan Overweight Adults Longitudinal Study; RRs, Relative risks/risk ratios; NC, Neck circumference; WC, Waist circumference; BMI, Body mass index; COVID-19, Coronavirus disease 2019; CVD, Cardiovascular disease; METs, Metabolic equivalent of tasks; HPFS, Health Professionals Follow-Up Study; SBP, Systolic blood pressure; DBP, Diastolic blood pressure; HDL-C, High-density lipoprotein cholesterol; LDL-C, Low-density lipoprotein cholesterol; HOMA-IR, Homeostatic model assessment of insulin resistance; ELISA, Enzyme-linked immunosorbent assay; CVs, Coefficients of variation; CIs, Confidence intervals; HbA1c, Hemoglobin A1c; Fat%, Body fat percentage.

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वेदभाष्यकार सायणाचार्य का भाष्यकार दयानन्दजी
द्वारा किया गया खण्डन

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Sanskrit & Bhartiya Vidhya Bhavan, Hem. North Gujarat University, Patan

अ. वेदभाष्यकार सायणाचार्य :

भारतीय साहित्य का आरम्भ अपौरुषेय वेदमन्त्रों से हुआ है। वैदिक भाषा प्राचीन एवं क्लिष्ट होने के कारण वेदमन्त्रों का अर्थघटन करना आरम्भ से ही कठिन माना गया है। परिणामस्वरूप वेदमन्त्रों का अर्थघटन करने के लिए वेदभाष्यों की परंपरा प्रवर्तित हुई। अनेक भाष्यकारों ने चारों वेदों पर एवं ब्राह्मण, आरण्यक आदि ग्रन्थों पर भाष्यों की रचना की। वेदभाष्यकारों में प्रमुख एवं प्राचीन भाष्यकार हैं - स्कन्दस्वामी, माधव, महीधर, मायण, दयानन्द मरुन्वती इत्यादि। इन्हीं भाष्यकारों में मायणाचार्य का वेदभाष्य अति प्रसिद्ध हुआ। इतना ही नहीं मायणाचार्य का वेदमन्त्रों का अर्थघटन अधिक रूप में मान्य भी हुआ। मायणाचार्य की एक प्रशस्ति-उक्ति प्रसिद्ध है 'वेदानां पुण्यप्रकर्ष एव मूर्तो भूत्वा मायणात्मना प्रकटीभूतः।'

मायणाचार्य तैत्तिरीयशास्त्र के स्वाध्यायी आन्ध्रप्रदेश के ब्राह्मण थे। वे विजयनगर साम्राज्य के संस्थापक बुद्धमहीपति (1364-1378 ई.स.) एवं उनके पुत्र हरिहर द्वितीय (1379-1387 ई.स.) के प्रधान अमात्य थे। कहा गया है -

तत्कटाक्षेण तद्रूपं दधतो बुद्धभूपतेः।

बभूव हरिहरो राजा श्रीराव्धेरिव चन्द्रमा॥¹

मायणाचार्य ने प्रायः 24 वर्ष पर्यन्त वैदिक साहित्य का अध्ययन करके वेदों पर प्रामाणिक भाष्यों की रचना की। महाराज बुद्धराय संस्कृत साहित्य के एवं आर्यधर्म के स्वाध्यायी एवं संवर्धक थे। उन्होंने राजनीति-निपुण माधवाचार्य के द्वारा उनके छोटे भाई सायणाचार्य को आदेश दिया -

तत्कटाक्षेण तद्रूपं दद्यात् बुद्धमहीपतिः।

आदिशन्माधवाचार्य वेदार्थस्य प्रकाशने॥²

मायण के वेदभाष्य वेदार्थज्ञान के लिए कूचिका स्वरूप है। वेदज्ञान प्राप्ति के लिए ये भाष्य सिंहद्वार स्वरूप हैं। मायणाचार्य जानते थे कि इतिहास-पुराणादि ग्रन्थों के ज्ञान के बिना वेद समझ में नहीं आ सकते। कहा गया है - इतिहासपुराणादिग्रन्थज्ञानहीनाज्जनाद् विभेति वेदः।³ इसी कारण से मायणाचार्य अपने भाष्य लेखनकार्य में पुराणइतिहासादि - ग्रन्थों की पर्याप्त मात्रा में सहाय लेते हैं। इतिहासपुराण के आधार से वेदज्ञान

On the diversity of some Brachyuran Crabs (Crustacea: Decapoda) from bycatch at the Gulf of Mannar, Tamil Nadu, India

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Abstract: The present study provides taxonomical information on a collection of some marine brachyuran crabs from the Gulf of Mannar of Tamil Nadu. The specimens were collected from fisheries bycatch at Mandapam fishing harbor located in the Gulf of Mannar during July 2019 to March 2020. A total of 18 species (15 genera, 8 families) of brachyuran crabs were identified. Maximum species were recorded from the family Leucosiidae (8 species), followed by Parthenopidae (4 species). Families like Epiplatidae, Scalopidiidae, Corystidae, Euryplacidae, Ipliculidae, and Xanthidae were represented by single species each. Out of these 18 species, *Lyphira heterograna* is reported first time from the East coast of India.

Keywords: New records; Marine; Brachyuran crabs; Gulf of Mannar; India.

1 Introduction

Brachyuran crabs are the most diverse and species-rich group of decapod crustaceans alive today with 73 families and over 7000 species reported worldwide (Ng et al., 2008; Davie et al., 2015).

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Diversity of Indian Barnacles in Marine Provinces and Ecoregions of the Indian Ocean

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The present study is the first completed and taxonomically validated literature review of the biodiversity of barnacles (Cirripedia) in India. A total of 144 species in 75 genera and 19 families have been recorded in India. The highest number of species has been recorded from the Bay of Bengal province, located on the eastern side of the Indian Peninsula, comprising the Eastern India ecoregion (76 species) and Northern Bay of Bengal ecoregion (34 species). The West and South India Shelf province has fewer species (Western India ecoregion: 29 species; South India and Sri Lanka ecoregion: 40 species; and Maldives ecoregion: 10 species) compared to the Bay of Bengal province. The Andaman province is composed of the Andaman and Nicobar Islands, and contains 65 species. Most of the coral-associated barnacles (family Pyrgomatidae) have been recorded in the corals reefs of the Andaman and Nicobar Islands (7 species), Eastern India (6 species), and Northern Bay of Bengal ecoregions (5 species). Sponge-associated barnacles (mostly in the subfamily Acastinae) were recorded in the Eastern India ecoregion, Southern India and Sri Lanka, and Andaman and Nicobar Islands ecoregions. Deepwater species were recorded the most extensively in the Andaman and Nicobar Islands ecoregion (21 species), followed by the South India and Sri Lanka ecoregion (9 species) and Eastern India ecoregion (7 species). Six Atlantic/boreal cold water species previously reported in India were removed due to incorrect identification, and some incorrectly identified species were validated and corrected.


Keywords: India, checklist, cirripedia, barnacles, biodiversity

INTRODUCTION

India is one of the 12 mega-biodiversity countries and has 25 biodiversity hotspots, containing a considerable number of endangered species (Myers et al., 2000; Venkataraman and Wafar, 2005; Venkataraman and Raghunathan, 2015). India supports a rich diversity of marine habitats and invertebrate fauna (Aneesh et al., 2018; Trivedi et al., 2018; Kottarathil et al., 2019; Shih et al., 2019; Aneesh and Kappali, 2020). India contains 7516.6 km of coastline—5422.6 km in the Indian Peninsula and 2094 km in islands (Andaman and Nicobar Islands: 1962 km; Lakshadweep Islands: 132 km) (Ahmad, 1972; Kumar et al., 2006; Trivedi et al., 2018).

First record of *Manningis arabicum* (Jones and Clayton, 1983) (Decapoda, Brachyura, Camptandriidae) from India

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ZOOBANK: <http://zoobank.org/urn:lsid:zoobank.org:pub:97D09367-0113-46AC-82E1-3AD0E6309F9D>

ABSTRACT

The present paper confirms the occurrence of the brachyuran crab *Manningis arabicum* (Jones and Clayton, 1983) in India. The species has thus far been recorded from Kuwait, Iran, Iraq, Saudi Arabia, Qatar, and Pakistan and now also from the northwestern coast of India.

KEYWORDS

Gulf of Kachchh, mangrove, new record, west coast of India

INTRODUCTION

Brachyuran crab species of the family Camptandriidae Stimpson, 1858 are commonly found in the estuarine, mangrove mudflat and open mudflat habitats in the Indo-West Pacific regions (Jones and Clayton, 1983). Camptandriidae is represented by around 40 species belonging to 22 genera worldwide (Ng *et al.*, 2008; 2009; De Grave *et al.*, 2009; Ah Yong, 2014), out of which five species, viz., *Baruna socialis* Stebbing, 1904, *Camptandrium sexdentatum* Stimpson, 1858, *Leptochryseus kuwaitense* (Jones and Clayton, 1983), *Nasima dotilliformis* (Alcock, 1900), and *Opusia indica* (Alcock, 1900) have been reported from India (Trivedi *et al.*, 2017; 2018). In the present study, we report the sixth species *Manningis arabicum* (Jones and Clayton, 1983) for the first time from the northwestern coast of India.

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Diversity of intertidal, epibiotic, and fouling barnacles (Cirripedia, Thoracica) from Gujarat, northwest India

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Abstract

The present work studied the diversity of intertidal, epibiotic, and fouling barnacles in the state of Gujarat, northwest India. In total, eleven species belonging to eight genera and five families were recorded in the present study. The Arabian intertidal species *Tetraclita obscuri* Shahdadi, Chan & Sari, 2011 and *Chthamalus barnesi* Achiruv & Safriel, 1980 are common in the high- and mid-intertidal rocky shores of Gujarat suggesting that the Gujarat barnacle assemblages are similar to the assemblages in the Gulf of Oman Ecoregion. The biogeographical boundary between the Gulf of Oman and Western Indian ecoregions for barnacles should probably extend southward towards the waters adjacent to Mumbai, where Indo-Pacific species of intertidal barnacles dominate. This study provides the first reports of the common widely distributed balanomorph barnacles *Striatobalanus tenuis* (Hoek, 1883), *Tetraclinella karandei* Ross, 1971, *Amphibalanus reticulatus* (Utinomi, 1967), and lepadid barnacle *Lepas anatifera* Linnaeus, 1758 in Gujarat, as well as of the chthamalid barnacle *Chthamalus barnesi* in India.

Keywords

Arabian Sea, biogeography, ecoregions, new records, provinces



STUDY OF VARIATION IN BIOCHEMICAL COMPOSITION OF MUSCLE TISSUE OF MUD CRAB *Scylla serrata* COLLECTED FROM GUJARAT AND MAHARASHTRA STATE, INDIA

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. Authors JS, MP and TJ designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors JS and NM managed the analyses of the study. Author JS managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

In present study, biochemical composition of mud crab, *Scylla serrata* collected from seven local fish market of Gujarat and Maharashtra states was analysed to check the variation in their nutritive value. Total 10 individuals were collected from each fish market of study sites like Sartanpar, Bhavnagar, Bilimora, Amalsad, Versova, Gorai and Pen. Major biochemical components like moisture, protein, carbohydrate and total lipid content were estimated in body and claw muscles of the male and female specimens using standard protocols. Biochemical composition of studied species was variable amongst different study site. Moisture (83.81 ± 7.87%), protein (47.7 ± 21.74%) and lipid (4.03 ± 2.83%) were recorded maximum in body muscle of female collected from Bhavnagar whereas maximum carbohydrate (11.72 ± 2.35%) was recorded in body muscle of female collected from Amalsad. Present data shows that nutritive value of body muscle was higher compared to claw muscle tissue. The study also suggests that females were more nutritious as compared to male. Variation occurring in biochemical composition of *S. serrata* collected from various may be due to the effect of geographical area, the environmental factors and available food resources.

Keywords: Biological value of meat; protein; lipid; carbohydrate; *Scylla serrata*.

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GASTROPOD SHELL OCCUPATION PATTERN OF HERMIT CRAB *Clibanarius rhabdodactylus* FOREST, 1953 IN THE INFRA-LITTORAL ZONE OF GULF OF KACHCHH, GUJARAT, INDIA

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This work was carried out in collaboration among all authors. Authors DRT, KJP, PRP and JNT designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors DRT, KJP and PRP managed the analyses of the study. Authors DRT and KJP managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

The gastropod shell occupation pattern by *Clibanarius rhabdodactylus* Forest, 1953 was studied in the infralittoral zone of the Jakhau fishing harbor, Gujarat, India. Specimens of *C. rhabdodactylus* were collected from muddy bottom at the depth of 10 meters using a fishing boat equipped with trawl net. Hermit crabs were categorized into male, non-ovigerous female and ovigerous female and their shield length and wet weight were recorded. Gastropod shells species were identified and morphological variables such as shell length, shell aperture length and width, shell dry weight and shell volume were recorded. Total 2000 individuals of *C. rhabdodactylus* were collected (976 males, 957 non-ovigerous females and 67 ovigerous females) occupying 36 different species of gastropod shells. Shells of *Indothais lacera* (51.35%), *Babylonia spirata* (16.60%), *Cerithideopsisilla cingulata* (8.25%), *Tibia insulaechorab* (4.15%), and *Cantharus spiralis* (4.0%) were highly occupied. Ovigerous females were significantly larger in shield length than non-ovigerous females and males. Regression analysis showed relationship between the shield length and wet weight of *C. rhabdodactylus* and morphological variables such as shell length (SHL), shell aperture length (SAL), shell aperture length (SAW), shell dry weight (DW) and shell volume (SHV) of gastropod shells. Highest values of relationship were obtained between morphological parameters of *C. rhabdodactylus* and SAL, SAW and SHV. The results showed that shell morphology has pronounced impact on the shell occupation pattern of *C. rhabdodactylus*.

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Shell utilization pattern of the Hermit crab *Clibanarius rhabdodactylus* Forest, 1953 on rocky shores of the Saurashtra coast, Gujarat State, India

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Abstract

The present study deals with gastropod shell utilization of the hermit crab, *Clibanarius rhabdodactylus* Forest on the rocky intertidal zone of the Saurashtra coast, Gujarat State, India. Collection of the specimens was carried out using a hand-picking method in June and December 2018 during low tide. The hermit crab weight (HW) and shield length (SL) were measured and sorted in different class intervals of 1 mm each. Gastropod shells were identified and morphological variables such as shell dry weight (DW), shell length (SHL), shell volume (SHV), shell aperture length (SAL), and shell aperture width (SAW) were recorded. A total of 2000 individuals of *C. rhabdodactylus* were collected, occupying 29 different species of gastropod shells. Males and non-ovigerous females occupied a greater number of gastropod shell species (25 and 27 respectively) as compared to ovigerous females (23 species). Males and ovigerous females preferred larger shells as compared to non-ovigerous females. *Cerithium caeruleum* (Sowerby II) (67.1%) was the highest occupied gastropod shell species followed by *Lunella coronata* (Gmelin), *Tenguella granulata* (Duclos) and *Turbo brumeus* (Roding). Regression analysis showed a moderate relationship between the different morphological variables of hermit crabs and gastropod shells; the highest values of coefficient of determination were obtained between hermit wet weight and gastropod shell dry weight. The values of relationship between different morphological variables of hermit crabs and gastropod shells suggest that shell architecture has a significant impact on shell utilization patterns of *C. rhabdodactylus*.

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Key words: Gastropods diversity, Hermit crab morphology, shell architecture, shell selection

Introduction

Hermit crabs belong to the superfamily Paguroidea of order Decapoda. They are abundantly found in intertidal and subtidal areas (Reese, 1969) and occupy empty gastropod shells to protect their non-calcified abdomen (Vance, 1972). Hermit crabs occupy either empty shells (Reese, 1969) or by removing the gastropod from the shell (Elwood and Neil, 1992). The selection of shell is primarily

dependent upon shell availability (Kellogg, 1977) while shell species, shell internal volume, weight, aperture width and length, and shell condition are also important factors for shell selection (Abrams, 1978; Angel, 2000; Dominciano and Mantelatto, 2004; Biagi et al., 2006; Bach and Hazlett, 2009). Occupying empty shells provides shelter from various physical factors (Hazlett, 1966) and biological stress (Bertness, 1982). Shell morphology has various advantages and disadvantages to hermit

New record of the Sesarmid crab *Episesarma versicolor* (Tweedie, 1940) (Crustacea: Decapoda: Sesarmidae) from the West Coast of India

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Abstract

Episesarma versicolor (Tweedie, 1940) also known as violet vinegar crab is widely distributed species in the south-east Asian countries. However, its presence in India is restricted, with just one record from Pichavaram and Vellar mangroves of Tamil Nadu state located on the east coast of India. The present paper reports the occurrence of *E. versicolor* for the first time from Gujarat and Goa states located on the west coast of India.

Keywords: Brachyura, Sesarmidae, New record, West coast of India.

1 Introduction

The sesarmid genus *Episesarma* (De Man, 1895) contains some of the largest sesarmid crabs. The species of the genus are characterised by the number of tubercles on dorsal margin of the dactylus and the colouration of the chelae (Lee et al., 2015; Serène and Soh, 1967b). Currently *Episesarma* is represented by seven species: *E. chentongense* (Serène and Soh, 1967), *E. crebrestriatum* (Tesch, 1917), *E. lafondii* (Hombron and Jacquinet, 1846), *E. mederi* (Milne Edwards, 1853), *E. palawanense* (Rathbun, 1914), *E. singaporense* (Tweedie, 1936) and *E. versicolor* (Tweedie, 1940), out of which three species: *E. chentongense*, *E. mederi* and *E. versicolor* are reported from India (Manikantan et al., 2016; Trivedi et al., 2018). In India, the distribution of *E. versicolor* is restricted to mangroves of Tamil Nadu state located on the east coast (Manikantan et al., 2016). Present study records occurrence of *E. versicolor* for the first time from West coast of India.

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Tritodynamia bengalensis n. sp., a new species of brachyuran crab from West Bengal state, India (Decapoda: Brachyura: Macrophthalmidae)

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Abstract

Tritodynamia bengalensis n. sp. is described on the basis of a male specimen dredged from the shallow coastal waters of West Bengal state, India. The new species is morphologically similar to *T. bidentata* Yang & Tang, 2005 and *T. serratipes* Anker & Ng, 2014, but can be distinguished by the carapace shape, dentition of the pollex, relative length of the dactylus of the third maxilliped, proportions of the propodus of the third pereopod, and structure of the male left gonopod. This is the first record of the genus *Tritodynamia* from India.

Key words: *Tritodynamia*, new species, by-catch, West Bengal, India

Introduction

Macrophthalmid crabs belonging to genus *Tritodynamia* Ortmann, 1894 sensu stricto are relatively small in size (< 20 mm carapace width) inhabiting muddy or sandy bottoms of the infralittoral zone. The habits of most species are not known (many were collected by trawls or dredges), but better studied ones live symbiotically with burrows of polychaetes and enteropneusts (Sakai 1976; Barnes 2010; Marin 2013; Schmitt *et al.* 1973). The genus was previously classified in the Pinnotheridae De Haan, 1833, but is now in the Macrophthalmidae Dana, 1851 (Ng *et al.* 2008; Naruse & Ng 2010; Tsang *et al.* 2018). *Tritodynamia* is currently represented by 11 species, all from the West Pacific and Southeast Asia: *T. japonica* Ortmann, 1894, *T. horvathi* Nobili, 1905, *T. rathbuni* Shen, 1932, *T. intermedia* Shen, 1935, *T. fujianensis* Chen, 1979, *T. longipropodum* Dai, Feng, Song & Cheng, 1980, *T. hainanensis* Dai, Feng, Song & Cheng, 1980, *T. dilatatum* Yang & Sun, 1996, *T. bidentata* Yang & Tang, 2005, *T. yeoi* Naruse & Ng, 2010, and *T. serratipes* Anker & Ng, 2014 (Ng *et al.* 2008; Naruse & Ng 2010; Anker & Ng 2014).

In the present study, we described a new species, *Tritodynamia bengalensis* n. sp. on the basis of a male specimen dredged by commercial fisherman from West Bengal state in India.

Material and methods

The specimen examined has been deposited in Zoological Survey of India (ZSI), in Kolkata, India. The terminology used in the description follows Anker & Ng (2014). The following abbreviations are used: CL = carapace length; CW = carapace width; P2–P5 = second to fifth pereopods (first to fourth ambulatory legs), respectively; G1 = male first gonopod; G2 = male second gonopod; coll. = collector. All the measurements are in millimeters (mm).

Nauplius

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On the Indian species of *Eurycarcinus* A. Milne-Edwards, 1867, *Heteropanope* Stimpson, 1858, and *Pilumnopus* A. Milne-Edwards, 1867 (Decapoda: Brachyura: Pilumnidae)

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ABSTRACT

Five species of pilumnid crabs assigned to *Eurycarcinus* A. Milne-Edwards, 1867, *Heteropanope* Stimpson, 1858, and *Pilumnopus* A. Milne-Edwards, 1867, have been reported from India: *E. orientalis* A. Milne-Edwards, 1867, *E. bengalensis* Deb, 1999, *H. glabra* Stimpson, 1858, *H. neolaevis* Deb, 1995, and *P. convexus* (Maccagno, 1936). The identity of *E. bengalensis* is confused and the species had been provisionally transferred to *Heteropanope*. Examination of the types however, confirms the affinities of the species with *Eurycarcinus* and consequently extends the range of the genus to the eastern Indian

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Intertidal, epibiotic, and fouling barnacles (Thoracica) from Gujarat, northwest India

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The diversity of intertidal, epibiotic, and fouling barnacles in the state of Gujarat, eleven species belonging to eight genera and five families were recorded. Arabian intertidal species *Tetraclita ehani* Shahdadi, Chan & Sari, 2011 and *Tetraclita* sp. (Garniel, 1980) are common in the high- and mid-intertidal rocky shores of the Gujarat. Barnacle assemblages are similar to the assemblages in the Gulf of Oman and the geographical boundary between the Gulf of Oman and Western Indian ecoregions probably extend southward towards the waters adjacent to Mumbai, where intertidal barnacles dominate. This study provides the first reports of the common epibiotic barnacle *Striatobalanus tenuis* (Hoek, 1883), *Tetraclitella karandei* Ross, 1967 (Urinomi, 1967), and lepadid barnacle *Lepas anatifera* Linnaeus, 1758 in the intertidal barnacle *Chthamalus barnesi* in India.

Keywords: Gujarat, intertidal, epibiotic, fouling, barnacles, new records, provinces



GASTROPOD SHELL OCCUPATION PATTERN OF HERMIT CRAB *Clibanarius rhabdodactylus* FOREST, 1953 IN THE INFRA-LITTORAL ZONE OF GULF OF KACHCHH, GUJARAT, INDIA

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ABSTRACT

The gastropod shell occupation pattern by *Clibanarius rhabdodactylus* Forest, 1953 was studied in the infralittoral zone of the Jakhau fishing harbor, Gujarat, India. Specimens of *C. rhabdodactylus* were collected from muddy bottom at the depth of 10 meters using a fishing boat equipped with trawl net. Hermit crabs were categorized into male, non-ovigerous female and ovigerous female and their shield length and wet weight were recorded. Gastropod shells species were identified and morphological variables such as shell length, shell aperture length and width, shell dry weight and shell volume were recorded. Total 2000 individuals of *C. rhabdodactylus* were collected (976 males, 957 non-ovigerous females and 67 ovigerous females) occupying 36 different species of gastropod shells. Shells of *Indothais lacera* (51.35%), *Babylonia spirata* (16.60%), *Cerithiopsis cingulata* (8.25%), *Tibia insulaechorab* (4.15%), and *Cantharus spiralis* (4.0%) were highly occupied. Ovigerous females were significantly larger in shield length than non-ovigerous females and males. Regression analysis showed relationship between the shield length and wet weight of *C. rhabdodactylus* and morphological variables such as shell length (SHL), shell aperture length (SAL), shell aperture length (SAW), shell dry weight (DW) and shell volume (SHV) of gastropod shells. Highest values of relationship were obtained between morphological parameters of *C. rhabdodactylus* and SAL, SAW and SHV. The results showed that shell morphology has pronounced impact on the shell occupation pattern of *C. rhabdodactylus*.

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Molecular Docking Study of Alzheimer Disease Responsible Protein Inhibition Activity by Bioactive Ginkgolides

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Structured Abstract: Terpenoids are major components present in herbal formulations of Ginkgo biloba which are considered to slow down progression of Alzheimer disease. Ginkgolide A, Ginkgolide B, Ginkgolide C, Ginkgolide M, Ginkgolide J, Ginkgolide K and Bilobalide are some of the terpenoids selected for computational theoretical calculations using DFT theory at B3LYP/6-311+G(d,p) basic set level using Gaussian 16W. To study the interaction between selected terpenoids and selected proteins, molecular docking analysis is carried out using Argus Lab (4.0.1) and Auto Dock (4.2). Calculations are carried out on efficient shape-based search algorithm principle and a score base function to calculate the binding energies between them. ADMET analysis provide properties insight of terpenoids compounds. Results from calculated data reveal that there are possible interactions. This data can help in development of potent protein kinase inhibitor for the treatment of Alzheimer.*

Keywords: Alzheimer Disease; Terpenoid; DFT; Molecular Docking; Binding Energies; Inhibition; Drug Likeness

I. INTRODUCTION

Ginkgo biloba is a living fossil, it is the only survivor of one of the species originated 150 million years ago. Its components in modern science has been identified for the reasons of immutability.[1] Ginkgo biloba have been used as herbal medicine or dietary supplements for treatment of heart disease, eye ailments, tinnitus, cerebral and peripheral vascular insufficiency, injuries involving brain trauma, dementia, short-term memory improvement, cognitive disorders secondary to depression, vertigo, and various cognitive disorders.[2]

Leaves and root bark contain terpenoids, including the monomethyl-mononor diterpenes: Ginkgolide A, Ginkgolide B, Ginkgolide C but Ginkgolide M are found in the root bark; Ginkgolide J, pene Bilobalide in the leaves. Ginkgolides are reported to be antidepressant and antistress effects in different animal models, these appear to be mediated by antagonism of the GABA receptor and show elevating brain catechol amines and plasma corticosterone levels.[3],[4]

Alzheimer Disease marked by a gradual loss of cognitive functioning which can also incorporate losses of motor, emotional, and social functioning as well. It is a permanent and progressive disease that eventually renders people unable to care for themselves [5]. Till time, there is no particular cure method available for AD, but the pathogenesis of the disease could be delayed by the use of natural antioxidants drugs [6]

In most high-income country settings, where only around 50% of people living with Alzheimer's receive a diagnosis. In low and middle-income countries, less than 10% of cases are diagnosed. As populations age, due to increasing life expectancy, the number of people with AD is increasing [7] It is estimate that there will be 50 million people worldwide living with Alzheimer's in 2015. Every year, nearly 10 million new cases are added, implying that 1 new case every 3 seconds and expected to rise to 82 million by 2030.[8-10]

In many articles, research papers and reports suggest that there is a direct physical interaction happen between proteins and antioxidant drug compound. Antioxidant drug compound binds to the protein which reduced neurological disorder activity and free radical generation.[11]

The structures of Ginkgolides A, B, C, J, and M only differ by the number and the position of hydroxyl groups on C1, C3, or C7 of the spiroonane framework. In figure I and Table I show Ginkgolides how do defer its name on the basis of the position of hydroxyl groups position on R1, R2, and R3. Figure II is Bilobalide compound.[12-17]

Shell utilization pattern of the Hermit crab *Clibanarius rhabdodactylus* Forest, 1953 on rocky shores of the Saurashtra coast, Gujarat State, India

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Abstract

The present study deals with gastropod shell utilization of the hermit crab, *Clibanarius rhabdodactylus* Forest on the rocky intertidal zone of the Saurashtra coast, Gujarat State, India. Collection of the specimens was carried out using a hand-picking method in June and December 2018 during low tide. The hermit crab weight (HW) and shield length (SL) were measured and sorted in different class intervals of 1 mm each. Gastropod shells were identified and morphological variables such as shell dry weight (DW), shell length (SHL), shell volume (SHV), shell aperture length (SAL), and shell aperture width (SAW) were recorded. A total of 2000 individuals of *C. rhabdodactylus* were collected, occupying 29 different species of gastropod shells. Males and non-ovigerous females occupied a greater number of gastropod shell species (25 and 27 respectively) as compared to ovigerous females (23 species). Males and ovigerous females preferred larger shells as compared to non-ovigerous females. *Cerithium caeruleum* (Sowerby II) (67.1%) was the highest occupied gastropod shell species followed by *Lunella coronata* (Gmelin), *Tenguella granulata* (Duclos) and *Turbo bruneus* (Roding). Regression analysis showed a moderate relationship between the different morphological variables of hermit crabs and gastropod shells; the highest values of coefficient of determination were obtained between hermit wet weight and gastropod shell dry weight. The values of relationship between different morphological variables of hermit crabs and gastropod shells suggest that shell architecture has a significant impact on shell utilization patterns of *C. rhabdodactylus*.

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Key words: Gastropods diversity, Hermit crab morphology, shell architecture, shell selection

Introduction

Hermit crabs belong to the superfamily Paguroidea of order Decapoda. They are abundantly found in intertidal and subtidal areas (Reese, 1969) and occupy empty gastropod shells to protect their non-calcified abdomen (Vance, 1972). Hermit crabs occupy either empty shells (Reese, 1969) or by removing the gastropod from the shell (Elwood and Neil, 1992). The selection of shell is primarily

dependent upon shell availability (Kellogg, 1977) while shell species, shell internal volume, weight, aperture width and length, and shell condition are also important factors for shell selection (Abrams, 1978; Angel, 2000; Dominciano and Mantelatto, 2004; Biagi et al., 2006; Bach and Hazlett, 2009). Occupying empty shells provides shelter from various physical factors (Hazlett, 1966) and biological stress (Bertness, 1982). Shell morphology has various advantages and disadvantages to hermit

New record of the Sesarmid crab *Episesarma versicolor* (Tweedie, 1940) (Crustacea: Decapoda: Sesarmidae) from the West Coast of India

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Abstract

Episesarma versicolor (Tweedie, 1940) also known as violet vinegar crab is widely distributed species in the south-east Asian countries. However, its presence in India is restricted, with just one record from Pichavaram and Vellar mangroves of Tamil Nadu state located on the east coast of India. The present paper reports the occurrence of *E. versicolor* for the first time from Gujarat and Goa states located on the west coast of India.

Keywords: Brachyura, Sesarmidae, New record, West coast of India.

1 Introduction

The sesarmid genus *Episesarma* (De Man, 1895) contains some of the largest sesarmid crabs. The species of the genus are characterised by the number of tubercles on dorsal margin of the dactylus and the colouration of the chelae (Lee et al., 2015; Serène and Soh, 1967b). Currently *Episesarma* is represented by seven species: *E. chentongense* (Serène and Soh, 1967), *E. crebrestriatum* (Tesch, 1917), *E. lafondii* (Hombron and Jacquinet, 1846), *E. mederi* (Milne Edwards, 1853), *E. palawanense* (Rathbun, 1914), *E. singaporense* (Tweedie, 1936) and *E. versicolor* (Tweedie, 1940), out of which three species: *E. chentongense*, *E. mederi* and *E. versicolor* are reported from India (Manikantan et al., 2016; Trivedi et al., 2018). In India, the distribution of *E. versicolor* is restricted to mangroves of Tamil Nadu state located on the east coast (Manikantan et al., 2016). Present study records occurrence of *E. versicolor* for the first time from West coast of India.

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Tritodynamia bengalensis n. sp., a new species of brachyuran crab from West Bengal state, India (Decapoda: Brachyura: Macrophthalmidae)

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Abstract

Tritodynamia bengalensis n. sp. is described on the basis of a male specimen dredged from the shallow coastal waters of West Bengal state, India. The new species is morphologically similar to *T. bidentata* Yang & Tang, 2005 and *T. serratipes* Anker & Ng, 2014, but can be distinguished by the carapace shape, dentition of the pollex, relative length of the dactylus of the third maxilliped, proportions of the propodus of the third pereopod, and structure of the male left gonopod. This is the first record of the genus *Tritodynamia* from India.

Key words: *Tritodynamia*, new species, by-catch, West Bengal, India

Introduction

Macrophthalmid crabs belonging to genus *Tritodynamia* Ortmann, 1894 sensu stricto are relatively small in size (< 20 mm carapace width) inhabiting muddy or sandy bottoms of the infralittoral zone. The habits of most species are not known (many were collected by trawls or dredges), but better studied ones live symbiotically with burrows of polychaetes and enteropneusts (Sakai 1976; Barnes 2010; Marin 2013; Schmitt *et al.* 1973). The genus was previously classified in the Pinnotheridae De Haan, 1833, but is now in the Macrophthalmidae Dana, 1851 (Ng *et al.* 2008; Naruse & Ng 2010; Tsang *et al.* 2018). *Tritodynamia* is currently represented by 11 species, all from the West Pacific and Southeast Asia: *T. japonica* Ortmann, 1894, *T. horvathi* Nobili, 1905, *T. rathbuni* Shen, 1932, *T. intermedia* Shen, 1935, *T. fujianensis* Chen, 1979, *T. longipropodum* Dai, Feng, Song & Cheng, 1980, *T. hainanensis* Dai, Feng, Song & Cheng, 1980, *T. dilatatum* Yang & Sun, 1996, *T. bidentata* Yang & Tang, 2005, *T. yeoi* Naruse & Ng, 2010, and *T. serratipes* Anker & Ng, 2014 (Ng *et al.* 2008; Naruse & Ng 2010; Anker & Ng 2014).

In the present study, we described a new species, *Tritodynamia bengalensis* n. sp. on the basis of a male specimen dredged by commercial fisherman from West Bengal state in India.

Material and methods







The specimen examined has been deposited in Zoological Survey of India (ZSI), in Kolkata, India. The terminology used in the description follows Anker & Ng (2014). The following abbreviations are used: CL = carapace length; CW = carapace width; P2–P5 = second to fifth pereopods (first to fourth ambulatory legs), respectively; G1 = male first gonopod; G2 = male second gonopod; coll. = collector. All the measurements are in millimeters (mm).

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On the Indian species of *Eurycarcinus* A. Milne-Edwards, 1867, *Heteropanope* Stimpson, 1858, and *Pilumnopus* A. Milne-Edwards, 1867 (Decapoda: Brachyura: Pilumnidae)

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ZOOBANK: <http://zoobank.org/urn:lsid:zoobank.org:pub:51870B2A-C089-4A53-9EA2-584160AADEEE>

ABSTRACT

Five species of pilumnid crabs assigned to *Eurycarcinus* A. Milne-Edwards, 1867, *Heteropanope* Stimpson, 1858, and *Pilumnopus* A. Milne-Edwards, 1867, have been reported from India: *E. orientalis* A. Milne-Edwards, 1867, *E. bengalensis* Deb, 1999, *H. glabra* Stimpson, 1858, *H. neolaevis* Deb, 1995, and *P. convexus* (Maccagno, 1936). The identity of *E. bengalensis* is confused and the species had been provisionally transferred to *Heteropanope*. Examination of the types however, confirms the affinities of the species with *Eurycarcinus* and consequently extends the range of the genus to the eastern Indian

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An Annotated Checklist of Bird Diversity of Kevdi Eco-campsite, Chhota Udepur, Gujarat

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Abstract

Birds are considered an indicator of the changing environment. Slight change in the climate and the habitat can disturb the ecosystem and the food web. The present study done in the kevdi Eco-campsite, has 64 species of birds belonging to the 41 families Kevdi-eco campsite is the tourist destination in the Kevdi, Chhota-Udepur district. The checklist delineates the birds present in the area along with their feeding guild. The importance of studying the feeding guilds will guide us in the use of the habitat and niche of the species.

Keywords: Indicator, Ecosystem, Kevdi-eco campsite, Feeding guild, Niche.

Introduction

Birds are an important part of the food chain in every ecosystem (Singh et al., 2018) and provide ecosystem services such as seed dispersers, decomposition, pollination, and pest management (Koskimies, 1989). Globally, 10,787 bird species are recorded where India is home to more than 1300 bird species, which is about 12.5% of total avifaunal diversity of the world. (Grimmett et al. 2011; Praveen et al., 2020c). Among them, a total of 605 bird species have been recently updated from

Gujarat state (Ganpule, 2020). Birds are associated with changes in the environment and have been used as an indicator of the changing environment, so their reproduction rate and alteration in population are frequently analyzed to understand the health of a given ecosystem (Orimaye et al., 2018). Despite their numerous services towards the environment, 14% of bird varieties are probably approaching global extinction (IUCN, 2021). The major threats to bird population are habitat fragmentation and degradation, excessive farming, drainage, wetland destruction and human set-

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Assessment of wildlife habitat and natural resources with special reference to water management in dry deciduous forest ecosystem of Gujarat state, India

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Abstract: Remote Sensing and GIS has a tremendous impact in the research and on the natural resource management and conservation. It has a wide range of applications in various fields of research and it has proved to be useful as a decision-making tool. In conservation science also the geospatial techniques have proved its applicability. The present study has been carried out to address the issue of human-wildlife conflict due to water scarcity especially during the dry season. To prepare the NDVI and hydrology maps of the Ratanmahal Wildlife Sanctuary the high-resolution Sentinel 2B satellite and Cartosat 1 DEM are used. The field data are superimposed on the drainage map and some critical locations are identified as the recommendations to build water containment structures like wildlife guzzlers, dams, reservoirs, etc. for longer period of time as well as to improve the habitat. We suggested seven such locations of land use sites in order to restrict the human-wildlife interaction. The study will help in advancing the habitat management, water conservation and formulate effective wildlife management strategies in the dry deciduous ecosystem.

Keywords: Ratanmahal wildlife sanctuary, Sloth bear, hydrological analysis, NDVI, GIS

1. Introduction

Food and water are the major resources which drives the movement of wildlife especially the large mammals such as lion (*Panthera leo*), tiger (*P. tigris*), leopard (*P. pardus*), sloth bear (*Melursus ursinus*) and many others towards the human dominated area (Athreya & Belsare, 2007; Bhattacharjee & Parthasarathy, 2013; du Toit, 2002; Gore et al., 2008; Manral et al., 2016). Water is considered to be one of the most essential and significant resource for all the living organisms for their survival. Mostly, in the dry season or during the drought conditions it becomes difficult for the wildlife to find water in the natural habitats; though food can be easily available for many of the large mammals (Epaphras et al., 2008). Movement of the large mammals outside their natural habitats often creates the conflict situations due to which either the animal or the human is at risk. Such movements were often reported in fragmented landscapes with large mammals like, tiger, elephant and sloth bear (Banerjee et al., 2020; Kinnaird et al., 2003; Linkie et al., 2006; Wikramanayake et al., 2004). Deforestation and urbanisation (say, road development) are the primary causes of habitat and forest fragmentation, which causes a tremendous loss to the forests ecosystems and also a major threat to the viability of wildlife populations (Ferrerias, 2001). Ecological corridors have proven as a better solution in such areas, where the corridor was designed using multitemporal fragmentation and corridor analysis through GIS (Banerjee et al., 2010; Sethy et al., 2021; Yadav et al., 2012). It is very important to conquer this situation in order to mitigate the human-wildlife conflicts and to enhance the opportunity of coexistence (Bhattacharjee & Parthasarathy, 2013; Maheshwari et al., 2014). This study focuses on wildlife habitat management through hydrological aspects and may help in water conservation for the longer period of time in the dry season.

Cattle and domestic dogs are easily available prey for the large cats such as tiger, lion and leopard. Lakes and water

reservoirs near settlements often used for the irrigation which also acts as a source of water for wild animals in dry seasons. In the forests of Central Gujarat-India, the sloth bear is the flagship species and one of the wild animals that is accountable for attacks on humans (Garcia et al., 2016; Pérez et al., 2017; Singh et al., 2018). Sloth bear is often reported wandering in human dominated areas for water as its primary food i.e., fruits and insects are available in the forest. However, during summer, the paucity of natural water within the forest push other wild animals like sloth bear and leopards towards the human settlements in search of water that is available at ease (Malik et al., 2018). The sharing of resources may increase the interactions and conflicts between human and wildlife.

According to the forest record, in the past five years, more than 500 cases of conflicts of leopard and sloth bear with humans have been recorded in the Central Gujarat of which most of were recorded during summer (Personal communication with Deputy Conservator of Forest). The increase of conflicts not only disturbs the well-being of locals but also raises a feeling of retribution towards the animals. To overcome this situation use of remote sensing and geospatial technology plays an important role (Dharaiya & Ratnayeke, 2009). Moreover, the ground survey technique has limitations for difficulty of sampling in limited time. Remote sensing and Geographical Information System (GIS) have proven extremely useful in this study, especially for analysing the hydrology and understanding the natural drainage pattern and location of water retaining areas. The results of RS and GIS analysis provide a synoptic view and the real-time information of a large area. Satellite imageries, Digital Elevation Model (DEM) are used to establish the Forest Cover classification of the study area using optical Multispectral Remote sensing, along with some vector datasets.

The study aims to support the forest management in establishing and maintaining areas for water management

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Gliding behaviour of Indian giant flying squirrel (*Petaurista philippensis*)

The Indian giant flying squirrel or large brown flying squirrel, *Petaurista philippensis* (Elliot, 1839) is one of 13 gliding squirrel species found in India (Koli 2016, Walston *et al.* 2016). Nocturnal by nature, they have ability to glide up to 150 m (McLean 2017). We studied its gliding habit in the human-modified landscape of the Kevdi ecotourism site (22.5198°N, 73.9356°E; Fig. 1), Panchmahal District, between two protected areas in Gujarat: Ratanmahal Sloth Bear Sanctuary and Jambughoda Wildlife Sanctuary. The Kevdi ecotourism site is a known locality of this species (Singh *et al.* 2016). Here, we present basic information on the gliding ecology of the species in the dry deciduous forests of central Gujarat.

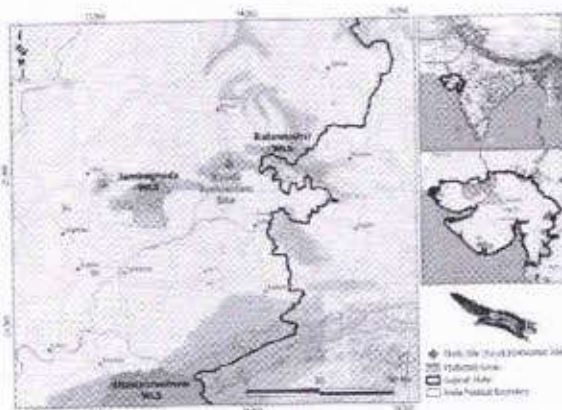


Figure 1. Study Area Kevdi Ecotourism Site, located between Ratanmahal and Jambughoda Wildlife Sanctuaries in Gujarat State, India

We located two flying squirrel nests on a Mahua (*Madhuca latifolia*, Family Sapotaceae) tree, surrounded by many other dense canopy Mahua trees. The methods used for observations followed Koli *et al.* (2011). The squirrels typically came out of the tree cavity (nest) at dusk and climbed up further before gliding. Before taking a glide, they moved from one

branch to another as if trying to find a perfect place to take off from. The squirrels were detected by eye shine and observed for half an hour using a spotlight between 1900 and 1930 h. The sexes of the two individuals could not be differentiated. For each glide ($n=8$), we recorded seven variables related to the gliding activity (Koli *et al.* 2011; Fig. 2): height of launch on the launch tree (H1), height of landing on the destination tree (H2), vertical drop (H3), horizontal distance (L), glide angle (θ), GBH of launch tree (G1), and GBH of destination tree (G2). We also calculated the glide ratio using the horizontal distance (L) and vertical drop (H3) (Koli *et al.* 2011).

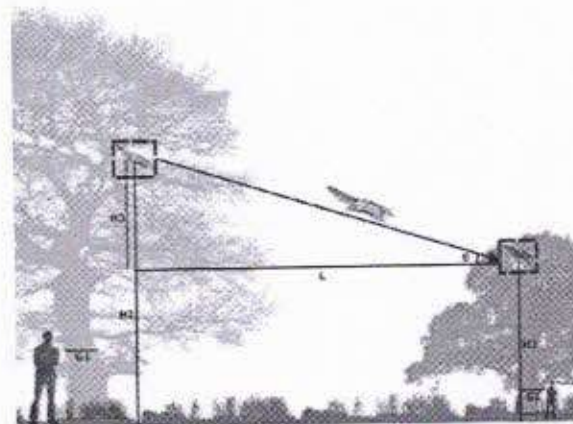


Figure 2. Observed tree variables related to gliding activities of Indian giant flying squirrel

We found an average glide ratio of 3.92, which is higher than that recorded in Sitamata Wildlife Sanctuary, Rajasthan (2.32). Further, it is also higher than other species of flying squirrels: *Petaurista leucogenys* (1.87 in Japan—Andō & Shiraiishi 1993, Stafford *et al.* 2002), *Glaucomys sabrinus* (1.98 in Canada—Vernes 2001), *Pteromys volans orii* (1.70 in Japan—Asari *et al.* 2007), *Petaurus gracilis* (1.91 in Australia—Jackson 2002), *Petaurus breviceps* (1.82 in Australia—Jackson 2002), *Glaucomys volans* (2.8 in North America—



AN ASSESSMENT OF FARMERS' ATTITUDES TOWARDS CROP DAMAGE BY WILDLIFE AND ITS PREVENTION METHODS IN THE ARID LANDSCAPE OF GUJARAT

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AUTHORS' CONTRIBUTIONS: Please write this section

This work was carried out in collaboration among all authors. Authors SD, HT and ND designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors SD and ND managed the analyses of the study. Author SD managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Human-Wildlife Conflict (HWC) is one of the most unavoidable challenges to be faced in the era of rapid development. The reason for the human and wildlife interaction is mainly the sharing of resources and the intervention of humans in the wildlife habitats which has resulted in habitat degradation. The present study was carried out in the arid landscape of Gujarat in order to understand the impact of crop damage by wildlife and to know the perception of locals towards the wildlife. One hundred and fifty (150) successful interviews were conducted from ten villages located on the fringe of the Greater Rann of Kachchh, in Banaskantha district using a structured questionnaire. The results shows that the mean area of land available per household is 10.5 ± 7.8 acre with the mean annual income of \$ 460 ± 197 . It was calculated that the respondents were at loss of \$ 318.5, due to crop damage annually. Besides wildlife, water scarcity and natural calamities are other major constraints to the farmers of this area. Wild boar (*Sus scrofa*) is reported as the major wild animal responsible for crop damage, followed by blue bull (*Boselaphus tragocamelus*) and wildass (*Equus hemionus khur*). As a result, 70% of the respondents reported unwillingness towards coexistence. Farmers here are implementing both traditional and modern preventive measures to control the crop damage. The study revealed that those who have more land are more likely to lean towards modern preventive techniques which have no significant influence by the income of the farmers. The study suggests that fencing of farm and removal of pest species may be act as important measures to mitigate the conflicts in this region. However, provision of adequate and timely

Assessment of Wildlife Habitats Using Geo-Spatial Techniques; Implications for Long-Term Habitat Management of Girnar Wildlife Sanctuary, Gujarat, India

Keywords: GIS; Greater Gir ecosystem; Hydrology; LST-NDVI relation; Habitat management.

Abstract

Wildlife habitats are under significant threat due to rapid development activities. At present, remote sensing and GIS has been used widely for modelling, evaluating and monitoring wildlife habitats. These techniques have proven to be efficient tools for integrating the spatial and non-spatial data required for monitoring wildlife habitats. This study focuses on modelling the forest cover, assessing the hydrology and land surface features of the Girnar wildlife sanctuary using such geo-spatial techniques. The forest of Girnar is known for Asiatic lions, birds and its rich floral diversity, in which habitat characteristics and land surface features are poorly known. The spatial data from various Earth observation satellites were acquired, interpreted and analysed using different tools on the GIS platform to derive the hydrology, land use-land cover and land surface parameters of the sanctuary. Geo-spatial maps were prepared showing suitable forest cover, drainage pattern with respect to elevations, and the land surface temperature with respect to NDVI. The LST-NDVI plot shows the inverse correlation between the surface temperature and vegetation indicating the importance of dense vegetation in the dry deciduous forest. These deliverables will help policy makers in evaluating suitable habitats for Asiatic lion and its prey base in Girnar and formulating effective habitat enhancement and conservation strategies.

Introduction

Although renowned for its rich bio-resources in the present era, wildlife is vanishing rapidly in India due to growing influence of humans. The pressure of developmental activities and over exploitation of resources have been the prime causes for the decline of wildlife in almost all the countries [1,2]. Declaring National Parks and reserves are a dominant method for protection and conservation of remaining wildlife habitats and safeguarding resources like food, water, forest cover and corridors [3] however, these areas are not entirely ecological units or functional ecosystems in themselves, thus have experienced several management problems, like, general decline in plant and animal diversity leading to poor habitat conditions [4,5].

Wildlife management requires reliable and consistent information on the abundance, distribution of species and their habitats as well as threats. Management strategies have focused mainly on single species and protected areas. The need of developing integrated and advanced habitat evaluation and management techniques which can help in formulating long term conservation strategies have been previously identified [6,7]. These techniques also focuses on the maintenance of some desired state of the resource base within the reserve, while



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controlling the factors that negatively impacts habitat quality [8]. The quantification and analysis of current impacts on wildlife habitat such as logging, agriculture and road development are vital phases in the process of formulating sound wildlife management policies. Several ground-based studies and survey techniques such as counting animals, trapping, scat collection investigation of feeding sites as well as ground mapping of habitats [9-11] are fruitful.

Traditionally, large carnivore species have served as flagship and umbrella species for biodiversity conservation, worldwide. In Asia, lions have been driven almost to extinction, apart the only surviving free-ranging population of Asiatic lion (*Panthera leo persica*) is in and around the Gir forests of Gujarat, India [12]. From 1920 to present date, the current population has increased from 20 to 674 [13]. However their conservation is bristling with difficulties due to inhabitation at low densities, requirement of large areas, and often conflict with human through predation on livestock and sometimes on people [14,15].

The Girnar hills in Junagadh district of Gujarat, are famous since ancient times as a place of pilgrimage for both Hindus and Jains. The town of Junagadh is situated practically at the foothills of Mount Girnar, the highest peak in Gujarat state of India with the apex elevation of 1,069m. These hills lie between the parallels of latitude North 21° 25' and 21° 35' and meridians of longitude East 70° 30' and 70° 40' [16]. The aerial view of the Girnar resembles a circular disc of the diameter of 16km (Figure 1). Mount Girnar is a major igneous plutonic complex which intruded into the basalts towards the close of the Deccan Trap period [17,18]. The climate of Girnar is semi-arid with a mean temperature and mean annual precipitation of 25.7 °C and 827mm, respectively along with more than 800 species of plants and more than 200 faunal species. The Girnar forests is approximately 50km far from the Gir National Park and Wildlife Sanctuary. The area of 180km² of Girnar wildlife sanctuary (WLS) is now known as a part of greater Gir ecosystem constituted for the conservation of Asiatic lion. Once, the forests of Girnar were contiguous with the Gir forest, but gradually the urbanization and agricultural expansion have

Hair Structure as a Key for Species Identification of Some Mammals Found in Gujarat State, India

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Abstract The anatomic study of guard hairs found on epidermis of the mammals have proven to be an effective way in identifying the species. Many researchers have been employing this methodology as an aid in wildlife forensics also creating the dataset of hair structures enabling them to explore different aspect of wildlife ecology. The goal of the present study is to develop a key of hair structures that can be helpful to researchers, wildlife managers and forensics for rapid identification of mammal species. In this study, 16 different mammals found commonly in North Gujarat were selected to develop the identification keys. The morphology and anatomical structure of hair samples were studied by cross-sectioning, analyzing cuticular structure and hair imprinting. A photographic reference was developed using the identification characteristics. This would be helpful in drawing comparisons with the unidentified hair samples collected as it is difficult to have direct sightings of mammals in the field every time. Photographic references have been given in the paper for efficient and timely interpretation of results.

Keywords Hair identification · Medullary pattern · Wildlife forensic · Mammals

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Introduction

Over the years, wildlife biologists have been developing and employing different techniques for species identification. It is not necessary to get the direct sighting of animals in wild every time, therefore several methodologies are available for identification of species based on indirect evidences. Hair identification is one of the important study known to have practical application in studying prey predator relationship, forensics, paleontology, anthropology (Choudhary et al. 2014). It is interesting for researcher to study hair morphology of mammals due to its unique anatomic structure enabling them to distinguish between different species (Oyer 1946). Also, hair samples can be easily collected through scats as they do not lose their characteristics after going through the digestion process (Oli 1993). It also helps in understanding the adaptability of animal towards its environment and in wildlife surveys (Koppikar and Sabnis 1976; Dharaiya and Soni 2012). Typically a hair of mammal is subdivided into core region known as medulla, cortex and outer scales named as cuticle, composed of dead non nucleated, overlapping and pigmented scales (Rajaram and Menon 1985; Bhat et al 2014). Microscopic study of mammal's hair including multiple physiognomies helps in determining the species (Sahajpal et al. 2008). However, analyzing the cross section pattern and scale patterns formed by cortex and medulla were used widely for species identification (Moyo 2005). The purpose of this study to prepare an identification keys and set of exposition of structure of hair of some mammalian species occurring in north Gujarat region, that can be used in comparison with unknown hair samples for various purposes. A microscopic and macroscopic character of hair was recorded by microphotographs, can provide keys of hair which can be used in rapid identification of

Long-term observation and modelling on the distribution and patterns of alpine treeline ecotone in Indian Himalaya

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Abstract: High elevation ecosystems of the Himalaya have warmed more rapidly in recent decades than other areas of the globe. Alpine life zones are areas lying between the elevational climatic treeline and the snow line. The limit of alpine treeline elevational position in Himalaya is temperature dependent. Satellite remote sensing of delineating Himalayan alpine treeline position and its dynamics can give insight regarding climatic variability. Resourcesat-1/2 Linear Imaging Self Scanning Sensor (LISS-III) and Landsat-1/2/3 Multispectral Scanner (MSS) were used to evaluate the long-term (1970s to 2014) treeline dynamics in high elevations (>3500 m) of Himalaya. The mean elevation of treeline position has shifted vertically 381 ± 73 m in over four decades at a rate of $c. 95$ m decade⁻¹ in the entire Indian Himalaya. The highest shift (452 ± 74) in the treeline position was observed in Arunachal Pradesh Himalaya. We have also predicted through future climate model simulations, that there will be overall vertical shift in the niche area of treeline tree species (*Betula utilis*) in general and more towards eastern Indian Himalaya, in particular. The highest rate of upward shift in niche was observed in Sikkim Himalaya ($c. 109.9$ m decade⁻¹) and the lowest magnitude of shift ($c. 20.8$ m decade⁻¹) in Jammu and Kashmir Himalaya. The significant elevational shifts of the treeline ecotone is a fingerprint of climate change impact in Indian Himalayan alpine ecosystem.

Keywords: alpine ecosystem; mountain; climate change; elevation; NDVI

1. Introduction

High elevation ecosystem of the Himalayan mountain ranges are the pristine environment that enables climate change studies. In the recent decades, Himalaya have warmed up more rapidly than other areas of the globe (Field and Barros, 2014). The warming effect is seen in the treeline ecotone where trees struggle to survive under cold stress in mountain summits (Butler et al., 2009). The alpine ecosystem is the zone where along the elevational gradient woody vegetation changes from lowland to dwarf shrubs, grasses, sedges, mosses, and finally to the snow line. An imaginary line connecting the uppermost patches of short stature trees (*krummholz*) and the lower most limit alpine vegetation is called the treeline (Körner, 2012). This imaginary line can be well visualized and delineated at landscape level with the help of biophysical and environmental thresholds (e.g. temperature). Temperature reduction with increasing elevation is a primary driver of species biodiversity and the formation of treelines (Mayor et al., 2017) in alpine ecosystems. The treeline is shifting upward to higher elevation primarily because of the

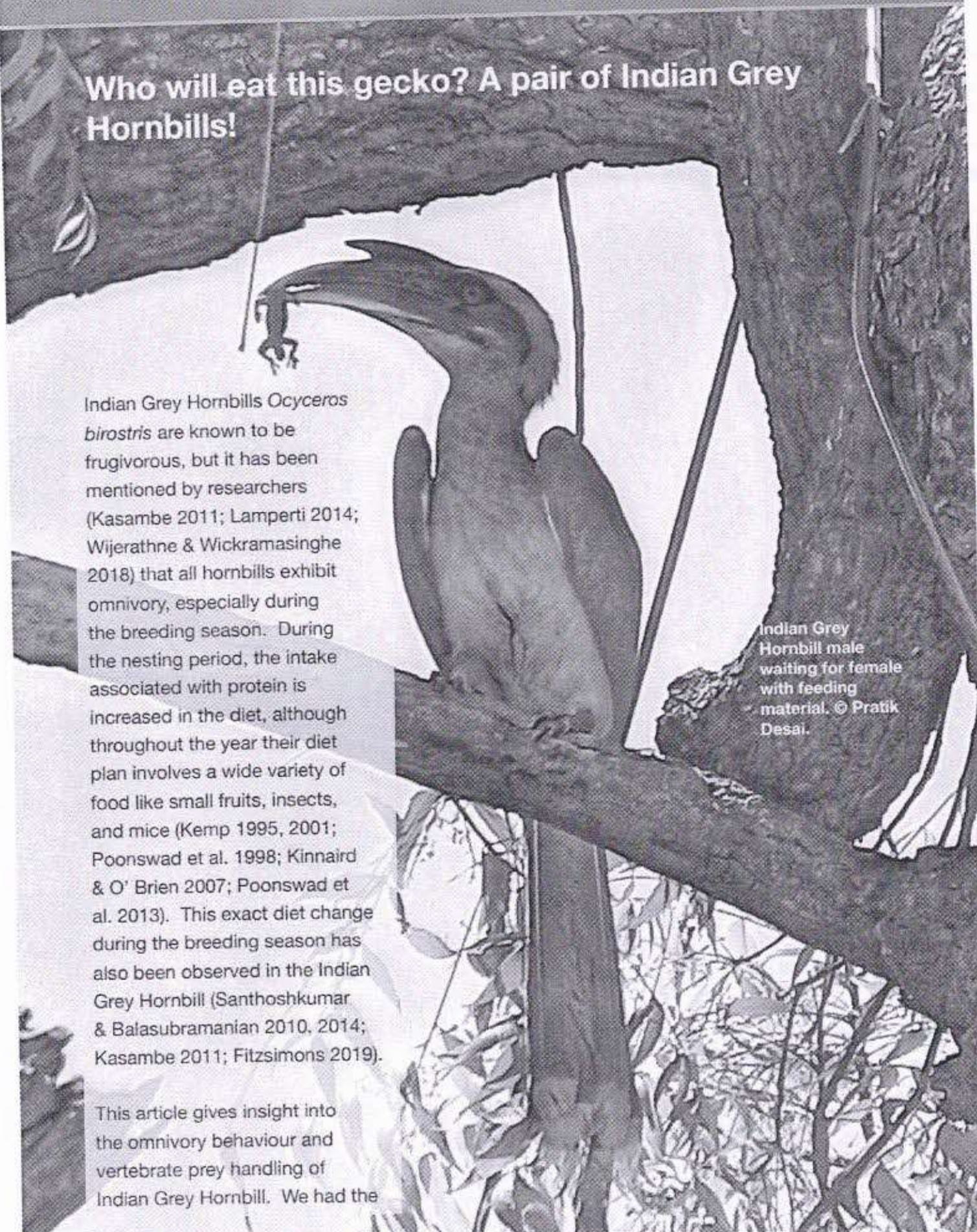
warming (Grabherr et al., 1994; Walther et al., 2005; Schickhoff et al., 2015). Along the elevation gradients, the number of vascular plant species decreases as harsher cold environment prevails towards the nival zone (Mohapatra, 2015). Temperature and precipitation are essential environmental parameters that govern the treeline dynamics.

Investigating the long-term dynamics of treeline only through field study is difficult. Remoteness, ruggedness of the terrain and extreme weather conditions in the high elevation region of Himalaya, is a challenge for field-based research. Remote sensing and Geographic Information System (GIS) with high-resolution data is useful in delineating treeline ecotone at the landscape scale. Resourcesat and Landsat imageries provide medium resolution multispectral data with the synoptic view of the earth surface at a regular interval of time. The Resourcesat-1/2 Linear Imaging Self Scanning Sensor (LISS-III) with a spatial resolution of 23.5 m is appropriate for studying vegetation dynamics at a landscape level. Landsat-1/2/3 Multispectral Scanner (MSS) with a spatial resolution of

Who will eat this gecko? A pair of Indian Grey Hornbills!

Indian Grey Hornbills *Ocyrceros birostris* are known to be frugivorous, but it has been mentioned by researchers (Kasambe 2011; Lamperti 2014; Wijerathne & Wickramasinghe 2018) that all hornbills exhibit omnivory, especially during the breeding season. During the nesting period, the intake associated with protein is increased in the diet, although throughout the year their diet plan involves a wide variety of food like small fruits, insects, and mice (Kemp 1995, 2001; Poonswad et al. 1998; Kinnaird & O' Brien 2007; Poonswad et al. 2013). This exact diet change during the breeding season has also been observed in the Indian Grey Hornbill (Santhoshkumar & Balasubramanian 2010, 2014; Kasambe 2011; Fitzsimons 2019).

This article gives insight into the omnivory behaviour and vertebrate prey handling of Indian Grey Hornbill. We had the



Indian Grey Hornbill male waiting for female with feeding material. © Pratik Desai.



Assessment of wildlife habitat in Taranga hill forest with reference to change in land use and land cover

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Abstract

Taranga hill forest is a part of Aravali mountain system and experienced by heavy biotic pressure. The forest, once had a diverse vegetation and faunal diversity now facing several issues like overgrazing, deforestation and human encroachment. In order to work the change in forest cover and wildlife habitat of Taranga hill forest, Remote sensing and Geographical information system (GIS) techniques were employed. Resourcesat-2LISSIII (2008) and Sentinel 2A (2018) remote sensing data were used in the study for change detection. The supervised classification technique was used, which is based on Maximum Likelihood Algorithm (MLA) and the habitat was studied through field observations. The results show significant change in land use in the major classes like wetlands, dense forest and open forest areas are decreased whereas; agriculture, settlement and barren land have increased in the last ten years. Proximity analysis and Normalized differencing vegetation index (NDVI) classification reveals that the remaining forest areas of Taranga may have a serious threat from urbanization, agricultural expansion and transport which can be the threat to the wildlife and biodiversity of the forest. The work also recommends for a long term exploration of habitat use by wildlife, threat analysis and biotic pressure on the forest on a seasonal basis so that long term management and conservation strategies can be devised for this small but very important wildlife habitat of north Gujarat.

Keywords: Aravallis, North Gujarat, Change detection, biotic pressure, LULC Assessment.

Introduction

Land is the most important natural resource that incorporates soil, water and associated flora and fauna that comprise the total ecosystem. Land use is referred to "how the human activities are carried on land" and land cover is referred to "natural vegetation, rock/soil artificial cover and other noticed on the land" (Ryngnga and Rntathiang, 2013). Land Use Land Cover (LULC) change is mainly induced by urbanization and development. Rapid change in land use and land cover has been a worldwide issue in most of the countries (Tahir *et al.*, 2013), also this study is important to understand environmental change of local areas (Vivekananda *et al.*, 2021). LULC studies are valuable in several environmental uses such as natural resources management, urban planning, or policy making and conservation and management of natural resources. Forest is the most versatile, renewable natural resource that provide the natural habitat for most of the living creatures on the earth. It serves as a sink for greenhouse gases to sustain the ecological balance. It also provides "five Fs" i.e., Fuel, Fodder, Food, Fruits and Fertilizers for the advantage of mankind. Several ecological functions like stabilizing the soil, nutrient conservation, global cycling of carbon dioxide and water supplies moderation are done by forest (Sunecla and Mamatha, 2013). Remote sensing data have been one of the utmost significant data sources for studies on spatial and

temporal changes in land cover and land use. In fact, multi-temporal remote sensing datasets allows mapping and identifying landscape changes, giving an effective effort to sustainable landscape planning and management (Dewan *et al.*, 2009). Remote Sensing provides some useful factors such as vegetation type and density, biome, region maps while the Geographic Information System (GIS) is an ideal tool for geospatial database formation, data addition and modelling (Yang *et al.*, 2013). The remote sensing technology and GIS tools cooperatively have made it easier to monitor the changes in land use land cover from past to present (Chughtai *et al.*, 2021).

The forest of Taranga hills is a small non-protected forest, yet very important patch as it harbours many wildlife, provides a corridor to the large mammals like leopard (*Panthera pardus*) and sloth bear (*Melursus ursinus*) and contribute to the green cover of Mehsana district (Patel and Patel, 2010). Rapid development of agriculture, urbanization and mining are responsible reasons for land use pattern and change the land cover of such an important forest (Vyas 2019, Unpublished data). Hence, it is very important to understand the change in the LULC in this area in last decade. The present research work is the first attempt for this region through which change in forest habitat in last ten years is studied using the techniques of RS and GIS. Further, the assessment of forest habitat carried out in this study

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Human-Bear Conflicts

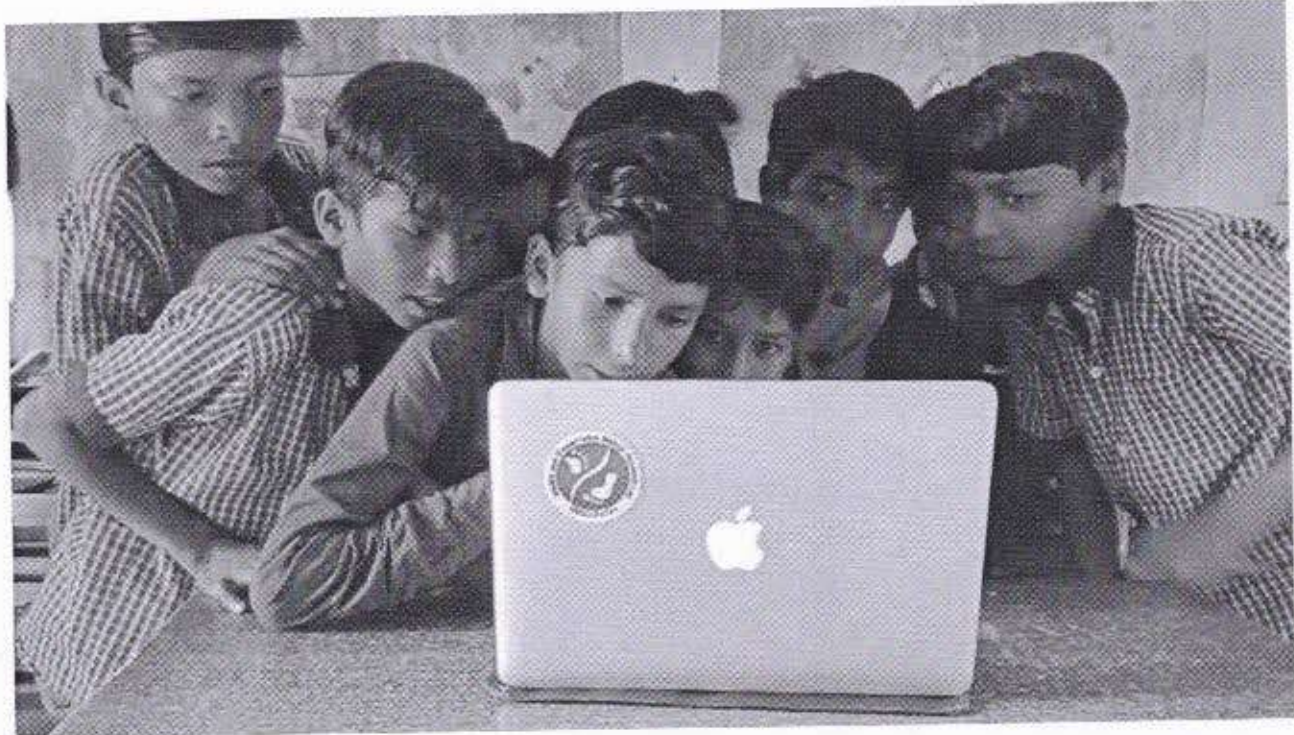
Promoting Coexistence Between People and Sloth Bears in Gujarat, India Through a Community Outreach Programme *AatmavatSarvabhuteshu*

The noisily grunting, shaggy and reclusive sloth bear (*Melursus ursinus*) is native to the Indian subcontinent, subsisting in many habitat types, including wet and dry tropical forests, savannah, scrubland and grassland, generally below 1500 m elevation (Dharaiya et al. 2020). It is the only bear species found in the state of Gujarat, which marks the westernmost edge of its range. It is patchily distributed in the eastern part of the state in both protected and unprotected forests. Sloth bear habitat in Gujarat is undergoing degradation and fragmentation due to a high and increasing level of anthropogenic pressure from the burgeoning human population. Additionally, overgrazing, tree-felling, fire, change in land use, and over-extraction of resources all threaten the remaining sloth bear habitat. Dry forests in Gujarat and throughout the

sloth bear range appear to be particularly susceptible to degradation (Yoganand et al. 1999).

The degraded habitat in the form of reduced forest cover and food resources, especially outside protected areas (Akhtar et al. 2004), has prompted sloth bears to venture into villages, agricultural lands, and other human-dominated areas in search of food and water. This brings bears into close proximity to humans and increases the chances of bear attacks (Singh et al 2018). Increased sloth bear attacks on humans in Gujarat has increased hostility towards bears, making bear conservation more difficult (Garcia et al. 2016). There is a need to develop a holistic understanding of the cause of such conflicts, which can help to formulate conflict mitigation strategies (Messmer 2000). Research from various parts of the sloth bear's range has revealed that many, if not most of the attacks are avoidable if the local people follow sloth bear safety etiquette.

We initiated the project *AatmavatSarvabhuteshu* in Gujarat as a joint venture between Vadodara Wildlife Division of Gujarat forest department and Wildlife and Conservation Biology (WCB) Research Lab of Hemchandracharya North



Children of 5th grade watching film *Sloth bear: The bear of Indian subcontinent* documentary during outreach program in school. Photo credit: Sachin Daraji

Distribution and relative abundance of Indian Giant Flying Squirrel (*Petaurista philippensis*) in Gujarat, India

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Abstract




We assessed the distribution pattern and abundance of *Petaurista philippensis* in the state of Gujarat, India. It is the only species of flying squirrel found in the western states of India. The species was distributed on a large geographic area with confined populations in the eastern dry and moist deciduous forest stretch with tall trees within the state. During the study period, 33 times flying squirrels were encountered at 14 sites in 7 districts, concentrated mainly in protected areas. The overall encounter rate was 0.50 individuals/km among which, the central districts of Gujarat showed the highest while the north-east districts showed the lowest abundance of *P. philippensis*. It was found to be a tree-dwelling species, positively associated with old-growth forests with tall trees. The abundance rates were found to be associated with forest degradation and hunting practices. Illegal hunting practices persists in some areas of Gujarat, may affect the population number and trend. Apart from forest degradation and fragmentation, hunting for domestic consumption, ethnomedicinal uses, traditions, and human-made forest fires were the major potent threats of flying squirrels as found during the present study.

Keywords: Arboreal, encounter rate, protected areas, rodents, western India

Introduction

With about 2277 species in 481 genera under 33 families, Rodentia is the single largest group of mammals globally (Wilson & Reeder, 2005) with the broadest distribution throughout and occupies almost every habitat in any geographic area. Out of the 48 species (15 genera) of flying squirrels worldwide (Corbet & Hill, 1991, Thorington et al., 1996), India is known to have a diversity ranging between 9-12 species (Corbet & Hill, 1991, Thorington et al., 2012, Menon, 2014); mainly concentrated in the northeast and Himalayan regions. Indian Giant Flying Squirrel (IGFS) dominates all the species being widely distributed in the tropical and sub-tropical forests of south and Southeast Asia (Corbet & Hill, 1992, Nandini, 2000, Wilson & Reeder, 2005, Koli et

Biological distribution of the rich source of marine algae from the rocky shoreline of the coast of Shivrajpur, Gujarat, India

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ABSTRACT

In the marine environment, seaweeds are a rich natural resource. Marine algae deliver several external and internal ecological resources. The distribution of marine algal abundances was among the most studied natural occurrences, and reliable variations are regularly seen in aquatic ecosystems. This study aimed to explore a diverse group of seaweeds observed from the Shivrajpur coast, Gujarat, from December 2021. The study identified 70 species across 36 genera and 24 families. Among these, eighteen species belong to Chlorophyta, twenty-two from Phaeophyta and thirty from Rhodophyta were recorded. Compared to brown and green algae, red algae are the most prominent. But based on abundance, brown algae are dominant. Throughout the study, some economically important seaweeds are also found. Three significant orders, Fucales, Dictyotales, and Ceramiales, are recorded at this coastal site. In addition, many species were recorded from the Dictyotaceae and Sargassaceae families. This research outline provides the diverse seaweed resources available in the chosen location, which will be utilized in future ecological studies.

Keywords: Seaweeds, Distribution, Shivrajpur coast

INTRODUCTION

Seaweeds are the primary producer of the marine environment. They have been developing the base of the aquatic food chain; thus, they are significant to the ecosystem and almost all aquatic animals depend on them (marine algae) (Huynh and Serediak, 2006). Algae remain existing around all across the earth: under the oceans, streams, above land also, on roofs, in a symbiotic relationship between plants and animals, and almost everywhere else, there is enough light to perform photosynthesis. They range in size from unicellular 3–10 microns to 70 microns and long giant kelps grow approximately 50 cm daily (El Gamal, 2010; and Hillison, 1977).

With over 7000 kilometres of coastline, India supports a rich diversity of algae (Oza and Zaidi, 2001). There are many forms of diversity, but compositional diversity, structural diversity, the separation between entities, and functional diversity are significant conceptual elements (Sala and Knowlton, 2006). Gujarat's coast possesses two gulfs, the Gulf of Kachchh (GOK) also the Gulf of Khambhat (GOKh), which are incredibly diverse due to their various coastal features, such as physiography, geomorphology, and coastal habitats. The Gujarat shoreline consists of Deccan traps, tertiary rocks, and recent alluvium and limestones with Pleistocene fossil types. Newer alluvium deposits can be found in the Gulf of Khambhat. The tidal cycle on the Indian coast is semidiurnal, with two high and two low tides each day with different tidal amplitudes (Jha *et al.*, 2009). The marine algal flora of the Indian coast was first published by Iyengar (1927). In the first diversity assessment of seaweeds in India, (Krishnamurthy and Joshi, 1970) reported only 153 species belonging to 95 genera from the entire beach of Gujarat. Gujarat is rich in coastal bio-resources but is also experiencing rapid industrial and infrastructure growth (Jha *et al.*, 2009). These development activities affect marine resources. There is limited data on the diversity of marine algae on the coast of Shivrajpur, so this study aimed to determine the distribution of marine algae from the coast of Shivrajpur, Gujarat.

MATERIAL AND METHODS

In the present study, algae were collected from Shivrajpur beach in Gujarat, a coastal town in the Devbhoomi Dwarka district of Gujarat, India (Figure 1). The rough bottom in this area promotes algae variety. There are few tiny, rounded rocks. To get further visibility at the collection site, samples were taken at a low tidal height (0.05 meter) and grabbed some photographs of their natural habitat (Figure 2).

Sargassum swartzii: A source of silver nanoparticles, synthesis and its antibacterial activity

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ABSTRACT

In current trends of green synthesis of nanoparticles is rapidly shifting from plants based to marine algae as it is widely available as well as highly explore for pharmaceutical work. Presented work focuses on synthesising silver nanoparticles using marine algae *Sargassum swartzii* and its characterization through multiple authentic methods like UV-Vis spectrophotometer, X-Ray Diffraction, Fourier transform infrared spectroscopy, Scanning Electron Microscopy and Transmission Electron microscopes. The primary confirmation was done by the visible appraisal of the color difference from the light yellow-brown to dark brown colour. The UV-Visible absorbance spectra verified the formation of silver nanoparticles and spectra increased with incubation time. The Surface Plasmon Resonance (SPR) absorbance peak was observed at 439nm. SEM and TEM confirmed particles' surface morphology and size of AgNPs from 14 to 30nm. XRD approved particles' face-centric cubic and crystal structure and the size (15.33 nm) calculated through the Scherer equation. FTIR analysis reflected the various functional groups associated with the algal extracts, which help in the bindings of Ag molecules during AgNPs synthesis. The synthesized silver nanoparticles revealed significant antibacterial activity against *Bacillus subtilis* (27.17±0.73mm) and *Staphylococcus aureus* (23.53±0.29mm). The work reported that *Sargassum swartzii* widely available brown macroalgae, could be used as an alternative source for synthesis of AgNPs without destroying high plants and the produced AgNPs have efficient antibacterial activity against both gram positive and gram negative bacteria, which can be explore in curing several human diseases.

Keywords: Seaweed, *Sargassum swartzii*, Silver nanoparticles, Antibacterial activity

INTRODUCTION

Nanobiotechnology is an interesting field of current materials science (Roco and Bainbridge, 2005). Plant-based Metallic nanoparticle synthesis has acquired broad interest due to its exquisite physicochemical features and a vast range of biological uses. AgNPs have triggered many studies' interest in nanoparticles because of their optical, electrical, and antibacterial properties (Beyene *et al.*, 2017; and Kora *et al.*, 2010). It has attracted a lot of interest in the pharmaceutical industry due to its extraordinary therapeutic potential, including anti-bacterial, anti-cancer, anti-diabetic, antioxidant, and anti-tumor potential (Stashans *et al.*, 2011; Han *et al.*, 2015; Heo *et al.*, 2009; Lakshmanasenthil *et al.*, 2014). Besides this, AgNPs were also extensively utilized in the agriculture and horticulture field as growth stimulators, fertilizers, pesticides, herbicides, and seed germination promoters (Yan and Chen, 2019; Jasim *et al.*, 2017; Elmer and White, 2016; Alavi and Dehpour, 2009; Worrall *et al.*, 2018; Maruyama *et al.*, 2016; Parveen and Rao, 2015). It has many environmental applications, such as water treatment, purification, and dye degradation (Zahoor *et al.*, 2021). Chemical and physical methods are used to synthesize AgNPs, but several drawbacks, such as the use of toxic material, high energy, high temperature, and pressure, create health and environmental issues (Saha *et al.*, 2017). So, the green synthesis approach suggested for nanoparticle synthesis is a straightforward step method that does not need any special conditions. The Green approach to nanoparticle synthesis appears to be an essential alternative to chemical synthesis methods by choosing environmentally friendly stabilizing and reducing agents (Kathiraven *et al.*, 2015; and Annamalai and Nallamuthu, 2015). Various plant biomolecules have participated in the active production of metal nanoparticles (Dahl and Hutchison, 2007; and Wei *et al.*, 2009). The microbes, fungi, plants and plants portion were employed for the biological synthesis of nanoparticles (Sinha *et al.*, 2009). Green synthesis from plant material is beneficial, but the source of terrestrial plants is limited; on the other hand, marine algal biomass is abundant and discarded as weeds in many countries. Thus, using the marine resource for the betterment of human life through nanotechnology is our in-depth desire.

Marine brown algae are available in high quantities in the coastal area of Gujarat, India (Jha *et al.*, 2009). Also, the process of collection is easy and affordable. Moreover, it has a significant source of primary and secondary metabolites and high metal uptake ability compared to the plants (Rico *et al.*, 2017; Yu *et al.*, 1999), which may help in the utilization of minerals and synthesis of AgNPs. So, in many present research works, seaweeds were represented as a potential source of silver nanoparticles. The several previous works on the number of marine algae which were utilized as a source of nanomaterials are *Padina pavonia*, *Pyropia yezoensis*, and *Sargassum* species such as *Sargassum angatifolium*, *Sargassum muticum*, *Sargassum cinereum*, *Sargassum cinctum*, *Sargassum polycystum*, *Sargassum vulgare*, *Sargassum tenerium*, *Sargassum wightii* (Singaravelu *et al.*, 2007; Krishnan *et al.*, 2022; Ballesteros *et al.*, 2022; Mohandass *et al.*, 2013; Roy and Anantharaman, 2017; Thangaraju *et al.*, 2012; Govindaraju *et al.*, 2015; Kumar *et al.*, 2012; Govindaraju *et al.*, 2009). The single report on *Sargassum swartzii* for AgNPs synthesis is given by Kala *et al.* (2015). So, this species was selected for the silver nanoparticles in the present work.

Sargassum swartzii belongs to the Phaeophyceae family. It was reported as a dominant species on the shivrajpur beach (Okha coast) of Gujarat, India (Jha *et al.*, 2009) and is also distributed in the many regions of Asia, which include a broad range of active substances such as polysaccharides, terpenoids, fucoxanthin, steroids, flavonoids, proteins and polyphenols (Suganya *et al.*, 2020). The brown algae *Sargassum* is known as the *Sargassum* bank, because of the prevailing distribution and vast biomass in the coastal regions. Marine macroalgae *Sargassum* can be a significant bio factory for producing AgNPs due to its high stability, safety, no toxicity, and ample biological activity and a large number of bioactive compounds (Liu *et al.*, 2008 and 2014). This genus's economic potential is concentrated in alginate production, which is used as a gelling agent, emulsifier and stabilizer in industries similar to red algae. Marine algae are good and cost-effective sources of phytochemicals that can be used to synthesize metallic nanoparticles due to their abundance and quick availability. Looking at the above review work, abundant availability and limited work have been done on *Sargassum swartzii*, so this work has been aimed to synthesize silver nanoparticles using *Sargassum swartzii*.

A STUDY FACTORS INFLUENCING ON AGRICULTURAL CREDIT WITH SPECIAL REFERENCE TO LENDING BY BANKS IN SELECTED DISTRICT OF NORTH GUJARAT**Miss Jasminiben R Patel,**

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ABSTRACT

Agriculture credit has increased in recent years as a percentage of agricultural inputs as well as the value of agricultural output. When it comes to agricultural loans, geographical differences in the amount of money that commercial banks are willing to provide are enormous. Meanwhile, the agricultural sector's contribution to overall GDP is eroding rapidly. Here, we use Arellano-Bond Regression with Dynamic Panel Data Analysis to analyse the influence of direct and indirect agriculture loans on agricultural production while also accounting for regional differences in agriculture, credit disbursement, and agricultural output. We found a direct and immediate influence on agricultural production from the quantity of direct farm financing we provided in our research. Indirect agricultural credit accounts also have a favourable influence on agricultural production, although with a one-year lag time. These findings show that, despite the fact that the current institutional credit delivery system has several flaws, Agribusiness finance is still playing an important role in helping the growth of Indian horticulture, despite factors such as a lack of credit available to small and marginal ranchers, a lack of medium and long-term lending, and a reliance on assets purchased by big agricultural credit providers.

INTRODUCTION

India's economy relies heavily on agricultural production. For 2019-20, agriculture and related sector activities will employ 54.6% of the total workforce (Census 2011) and generate 17.8% of the country's Gross Value Added (at current prices). The Indian government has made a number of initiatives to ensure that the country's agricultural industry grows in a sustainable way. It has been decided to increase the income of farmers. Additionally, the "Pradhan Mantri Fasal Bima Yojana" (PMFBY) was introduced in 2016 in order to reduce agricultural risk. Schemes such as the formation and development of 10,000 FPOs and the Agriculture Infrastructure Fund have also recently been introduced to support the industry. Total area under cultivation in the nation is estimated at 328.7 million hectares, with an estimated net area of 139.4 million and a cropping intensity of 143.6 percent, according to Land Use Statistics 2016-17.

The net area seeded is 42.4 percent of the total area of the planet. The net irrigated area is 68.6 million acres.

Provisional estimates of Annual National Income issued by the Central Statistics Office (CSO), Ministry of Statistics & Programme Implementation reveal that agriculture and allied industries generated around 17.8 percent of India's GVA at current prices in 2019-20, slightly higher than 17.7 percent in 2015-16. Agriculture and associated sectors' GVA and their percentage in the country's overall GVA at current prices during the previous five years.

Gujarat is one of India's fastest growing states. Since the 10th Five Year Plan era, the state has followed a progressive example of headway with the essential improvement of significant areas including energy, industry, and farming, by which it has accomplished aggressive twofold digit development rates. Around 6.2 percent of India's whole land region and 4.99 percent of the country's total population are found in



Measuring patient satisfaction in emergency department: An empirical test using structural equation modeling

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ABSTRACT

Background: Patient satisfaction is gaining an attention as an important quality indicator tracked closely by healthcare providers and emergency departments (EDs). Unfortunately, the primary factors driving patient satisfaction remain poorly studied in literature at developing countries.

Objectives: The aim of the study is to determine the association of latent construct with patient satisfaction in emergency department (ED) using structural equation modeling (SEM).

Methods: A total of 219 ED patients from 9 different healthcare facilities were employed to measure the patient satisfaction via PSQ-18. An exploratory factor analysis was used to group items and SEM were applied to identify the factors.

Results: Time and access to care had a significant influence on general satisfaction. Interpersonal communication had positive and significant impact on general satisfaction. Financial aspects had negative and significant influence on general satisfaction. Technical quality was failed to influence general satisfaction of patients of emergency department.

Conclusions: To enhance the level of patient satisfaction and to deliver better experience by improving the quality of healthcare services, the care provider shall increase their attention to the influencing factor such as time, access to care, and financial aspects.

ARTICLE HISTORY

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KEYWORDS

Patient satisfaction; structural equation modeling; access to care; convenience; emergency department

1. Introduction

Patient satisfaction is employed as an important marker for quality of medical care in a competitive medical market place [1,2]. Satisfaction is clearly a multidimensional concept and there is no single, easily understood definition that would apply to all patients [3]. Patient judgment and feedback towards satisfaction is used as an outcome measure in evaluating health and quality medical services, to improve the competitive position, and to outline the strategy for further growth [4-6]. According to the Technical Assistant Research Programs (TARPs), Patient satisfaction impacts patient loyalty, improves patient retention and they will be less vulnerable to the price wars [7]. In fact, a satisfied patient will comply to discharge instructions, and can favor physicians' treatment by ensuring positive health outcome [8] and building a healthy relationship with physician and healthcare institution [9,10]. In many countries, importance of patient satisfaction is routinely included in accreditation standards for quality improvement [11]. The quality of healthcare delivery system in developed nations had a significant impact on developing countries because their healthcare delivery system and service quality provision are more advanced and they are achieving their desired goals positively in terms of satisfying their clients. As

a result, they have received particular importance as a determinant of quality healthcare [12]. Therefore, it is compulsory to access the level of patient satisfaction, so that decision-makers can take initiatives and actions to increase the satisfaction level. The ultimate goal is to enhance the quality of life and patient satisfaction.

Observed climate change already has direct impacts on economies, ecosystems and human health [13]. Heat waves have been linked to increases in emergency-related morbidity [14]. Heat waves raise emergency department admissions across numerous demographic and disease categories among the study carried out in various developed countries [14-20]. India has a high current exposure to heat waves, and with a limited adaptive capacity [21,22], impacts of increased heat waves might result in the patient admission to the emergency department with health morbidity [23-26]. Presentation during high ED occupancy was associated with increased in-hospital mortality [27]. Importantly, satisfaction in emergency department has been reported as a key determinant of hospital's reputation [28] and has shown significant influence on patients' view, [29,30] patients' loyalty, retention and adherence [31-34]. For many patients, relatives and friends the emergency department (ED) is considered as a point of entry [35] and identified

SYNTHESIS, CHARACTERIZATION AND BIOCHEMICAL STUDIES OF CERIUM(III), PRASEODYMIUM(III) AND NEODYMIUM(III) CHELATES WITH 1-HYDROXY-2-PROPANONE

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ABSTRACT

The combination of selective rare earth metal ions with biologically active molecule to form metal-ligand complex is an important area of current research. Lanthanide ions are having typical chemical and physical properties. For example, Lanthanide contraction, magnetic properties etc. On complexation of bio-active molecule capable of forming chelate ring with three lanthanide metals ion Ce (III), Pr (III), and Nd (III), there is a drastic change in chemical and biological properties have been observed. Less explored and biologically active 1-Hydroxy-2-propanone ligand is used to form complexes. Thus obtained complexes are subjected to characterization by laboratory methods and instrumental methods including spectroscopic methods. Antimicrobial studies were carried out by standard methods and then catalytic activities of Ce-HA, Pr-HA and Nd-HA complexes are studied by using standard chemical reaction. The difference in properties of metal ions, ligand and chelates is becoming a very important study area.

Keywords: Antimicrobial activity, Biologically active molecule, Catalysis, Lanthanide complexes.

1. INTRODUCTION

Up to now, a vast experience has been accumulated in the field of synthesis and study of lanthanide complexes. In present paper we describe the synthesis of several lanthanide complexes (Ce, Pr and Nd) with 1-hydroxy 2-propanone ligand (Fig. 1). Hydroxyacetone (acetol) contains both hydroxyl and carbonyl functional groups therefore it is an extremely reactive compound. It is water soluble and miscible with ethanol and ethyl ether [1]. Hydroxyacetone was first prepared by reaction between bromoacetone and potassium or sodium acetate or formate followed by the hydrolysis by methyl alcohol [2]. Hydroxyacetone undergoes rapid polymerization. It rapidly undergoes aldol condensation under alkaline medium. It can form hemiacetal cyclic dimer. Hydroxyacetone can be prepared by degradation of various sugars. It is formed by the Maillard reaction in foods [3]. Acetol 200 mg tablet is used for epilepsy and as an anticonvulsant drug which controls seizures and trigeminal neuralgia. Trivalent lanthanide ions form more stable complexes with oxygen-donor ligands in comparison with nitrogen-donor ligands. They form complexes with 8, 9 or 10-12 coordination numbers [4].

Lanthanides can form stronger complexes by complexation with chelating ligands than monodentate ligands because of the chelate effect. Lanthanides elements have numerous applications in combination with other elements. Approximately 16,000 metric tonnes lanthanides are consumed yearly. Every year a large amount of lanthanide complexes, including lanthanide oxides, are used as a catalysts in various industries. Because of their particular electronic configuration, lanthanide complexes have leads to many efforts on the design and synthesis as potential anticancer and antibacterial agents [5-8]. Due to their biological effectiveness, lanthanide complexes can be used as MRI contrast agents [8, 9]. Thus, lanthanide complexes can be used as biological probes in the areas of clinical chemistry and molecular biology.

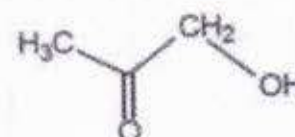


Fig. 1: 1-Hydroxy-2-propanone

REVIEW

Open Access

A review on phytoconstituents of marine brown algae



Masuma M. Hakim* and Illa C. Patel

Abstract

Background: From the last few years, the development and discovery of bioactive compounds and their potential properties from marine algae have been enhanced significantly. The coastal area is a huge storehouse for propitious algae. It has been the genuine reality that the consequence of marine algae as a source of different compounds is increasing.

Main body: Numerous advanced research devices are available for the discovery of synthetic compounds but still many researchers are working on natural bioactive compounds to discover their biological properties, which are useful to society. Marine algae are taking the preponderance of consideration from investigators owing to its phenomenon of biological activity like anti-cancer, anti-viral, cholesterol-reducing, and many more. A variety of compounds are collected from algae with specific purposes as they remain in an extremely ambitious and hard state; this condition is responsible for the synthesis of very particularly effective bioactive compounds. The present article is concentrating on the brown algae of the Gujarat coast, phlorotannins, polyphenol, phytosterol from brown algae, and their various applications. The main importance has been given to the secondary metabolites and various applications of marine brown algae.

Conclusion: From this review, it can be concluded that the prominent bioactive compounds from brown algae can cure many serious diseases. Besides, the potential biological activities of a special bioactive compound may represent the interest in the industry of pharmaceuticals, cosmeceutical, and functional foods.

Keywords: Marine Brown algae, Bioactive compound, Applications

Background

Seaweeds mean the varieties of macro algae available abundantly at sea or nearby areas which can be used commercially. Macroalgae/seaweeds are categorized as green algae (Chlorophyta), brown algae (Phaeophyta), and red algae (Rhodophyta) according to their pigmentation, nutritive, and chemical composition. Brown, red algae are mainly used in human nutrition as a source of many mineral elements, vitamins, protein, amino acids, etc. Brown algae are more abundant in a shallow rocky coastal area, especially when exposed at low tide. The vegetation of the algae provides an ideal habitat, food, and shelter for various animals. They act as epiphyte

fauna. The holdfast of seaweeds binds the sediments together and prevents coastal erosion [1]. These are vast and various groups of organisms that play an important role in the marine ecosystem [2]. Marine algae have always aroused great interest in Asian culture as marine food sources [3]. Seaweeds come in an incredible variety of attractive shapes, color, and size, and are found in all the ocean of the world. In India, brown algae represent 0.2%, red algae 27.0%, and the other 72.8%. About 206 algae are reported in the mangrove environment [4].

Marine algae live in a harsh condition that promotes the formation of oxidizing agents and secondary metabolites [5], and these types of compound have the responsibility for specific biological activity [6]. A variety of chemically active metabolites in their body, potentially help to protect themselves against other organisms.

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Antibacterial and Larvicidal Activity of Biologically Synthesized Silver Nanoparticles from *Bambusa arundinaceae* Leaves Extract

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ABSTRACT

The increased morbidity and mortality due to the resistance developed in the pathogenic microorganism against antibiotic drugs and mosquito-borne diseases is an emerging issue in medical research. We need to find the new antimicrobial compound and effective biocontrol agent to reduced transmission of pathogenic infection. Due to diverse chemical and mechanical properties, silver nanoparticles produced by the green synthesis method are increasing demand for various pharmaceutical activities. In the present study, the aqueous extract of *Bambusa arundinaceae* leaves were used for the synthesis of silver nanoparticles. The synthesized (*Bambusa arundinaceae* derived silver nanoparticles) BA-AgNPs were characterized using UV-vis spectroscopy, FTIR, SEM and their antibacterial along with larvicidal potential was evaluated. Antioxidant capacity was measured using the DPPH method. SEM analysis revealed that BA-AgNPs were predominantly spheroidal shape with particle size distribution in a range of 20 - 80 nm. Lower IC_{50} value (0.71 mg/ml) of biosynthesized AgNPs showed higher antioxidant activity compared to *B. arundinaceae* leaf extract (0.92 mg/ml) alone. BA-AgNPs were tested against mosquito larvae (*Aedes aegypti* and *Cx. quinquefasciatus*) and their mortality was examined. In larvicidal bioassay, biologically synthesized AgNPs were more toxic (LC_{50} = 50.8 mg/L and 100.8 mg/L) than silver nitrate (LC_{50} = 79.0 mg/L and 146.0 mg/L) to fourth instars larvae of *A. aegypti* and *Cx. quinquefasciatus* respectively. BA-AgNPs demonstrated the highest mortality in fourth instars larvae of *A. aegypti* then in *Cx. quinquefasciatus*. The biosynthesized BA-AgNPs showed a strong antimicrobial activity by causing inhibition of growth with a well diffusion assay. BA-AgNPs showed considerably higher antimicrobial activities against *Escherichia Coli* (*E.Coli*) when compared with both $AgNO_3$ and streptomycin alone. The results of this experiment suggest that biologically synthesized BA-AgNPs are a quite ideal candidate for the development of new antimicrobial drugs. The collective effect of BA-AgNPs with streptomycin was higher as compared to BA-AgNPs alone which indicates the synergistic effect of these components.

Key words: Antibacterial, Antioxidant, *Bambusa arundinaceae*, Larvicidal, Silver nanoparticles

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INTRODUCTION

The prevalence of bacterial resistance to conventional antibiotics has become one of the main health problems

around the globe and increasing the economic burden on the health sector. Pollution, mutation and altered environmental condition are possible factors increase the number of multi-drug resistant bacterial strains.^[1] *Aedes aegypti* acts as a vector of parasites that cause dengue fever, chikungunya, zika fever and other disease agents in human beings. Mosquitoes like *Culex* species (*Culex quinquefasciatus*) are a principal vector of bancroftian filariasis transmitted to humans.^[2] Synthetic insecticide has limited in used due to harmful effects on human





Four New Records of Brachyuran Crabs (Crustacea: Decapoda: Brachyura) from India

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Abstract

The present study is a part of long term ongoing study on brachyuran crab diversity of India. The specimens were collected from intertidal zone as well as from the fisheries by-catch captured using commercial trawler. The specimens were identified up to species level using standard literature. From the collection, four species of brachyuran crabs, *Schizophrys pakistanensis* Tirmizi & Kazmi, 1995 (Majidae), *Macromedaeus voeltzkowi* (Lenz, 1905) (Xanthidae), *Pseudosesarma brehieri* Ng, 2018 (Sesamidae) and *Ilyograpsus paludicola* (Rathbun, 1909) (Macrophthalmidae) are first time reported from India. The present study records significant expansion in the distribution range of these species. The diagnostic characteristics and remarks on the taxonomy and distribution of each species are given in this paper.

Keywords Range extension · Crustacea · Brachyura · Gujarat · West Bengal

Introduction

The coastline of India is around 7516.6 km long (Ahmad 1972) that can be divided into two major regions: West coast and East coast. The coastal area of both coastal regions supports variety of marine habitats like rocky shore, sandy shores, mudflats, estuaries, mangroves and coral reef which support unique marine biodiversity. Amongst various decapod crustacean inhabiting coastal waters India, brachyuran crab diversity is studied well (Fabricius 1775; Henderson 1893; Alcock and Anderson 1894, 1899; Alcock 1895, 1898; Gravely 1927; Pillai 1951; Chhapgar 1957a, b; Deb 1998; Dev Roy 2013; Dev Roy and Nandi 2007, 2008, 2012; Beleem et al. 2019). Recently, Trivedi et al. (2018) compiled checklist of marine brachyuran crabs of India reporting 910 species belonging to 361 genera and 62 families and stated that east coast (803 species) of India is more diverse in as compared to west coast (446 species).

Trivedi et al. (2018) stated that main reason behind high diversity of marine brachyuran crabs from east coast as compared to west coast could be presence of areas like Chilka lake, Gulf of Mannar and Andaman and Nicobar Islands which are studied extensively by several researchers for brachyuran crab diversity (Kemp 1915; Gravely 1927; Dev Roy and Das 2000; Jayabaskaran et al. 2000). The present study is a part of long term ongoing study (2009 onwards) on brachyuran crab diversity of India. In this long term study, different coastal areas of India are being surveyed for collection of fresh specimens of brachyuran crab as well as old unidentified specimens of brachyuran crab deposited in various repositories across India are also being examined.

In the present study, we report occurrence of four species of brachyuran crab viz. *Ilyograpsus paludicola* (Rathbun, 1909) *Schizophrys pakistanensis* Tirmizi & Kazmi, 1995, *Pseudosesarma brehieri* Ng, 2018 and *Macromedaeus voeltzkowi* (Lenz, 1905) for the first time from India. The present study showed significant extension in the distribution range of these species and also adds four more species in the existing checklist of marine brachyuran crabs of India.

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Materials and Methods

The specimens of brachyuran crabs inhabiting intertidal zone were collected during low tide from rocky and muddy intertidal zone of Gujarat and West Bengal state respectively using

Study of Prevalence of tick *Hyalomma excavatum* (Acari: Ixodidae) on *Bubalus bubalis* in Patan District, Gujarat state, India

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Abstract

The domestic water buffalo (*Bubalus bubalis*) primitively domesticated in Asia for milk and meat purpose but their health is highly compromised due to the infestation by ectoparasites so affected via vector borne disease agents. The present work was carried out to study prevalence of common tick *Hyalomma excavatum* parasitizing *B. Bubalis* population in Patan district, Gujarat state, India. The study was carried out from June 2019 to March 2020. In the present study, a total of 1595 *B. bubalis* (712 males, 883 females) were examined out of which 489 (30.66%) *B. bubalis* were tick infected while 1106 (69.34%) were free of tick. Infestation rate was very high in the female (28.15%) host individuals as compared to males (2.51%). Adult individual hosts showed high rate of infestation as compared to sub adults and calves. Maximum infestation of *H. excavatum* was observed around udders and anus in female and male individuals respectively. Present study reveals vital epidemiological information of *H. excavatum* infestation on *B. bubalis* population in Patan district which will be helpful in designing control and management policy for tick infestation.

Keywords: Ectoparasite Tick, Prevalence, Buffalo, Patan, Gujarat

1 Introduction

Ectoparasites are one of the major concerns of veterinary problems affecting the livestock industries in many parts of the world (Hourrigan, 1979; Colebrook and Wall, 2004). Out of all ectoparasites; lice, ticks and mites are the major transporters of certain pathogens (Loomis, 1986). Globally, the

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Shell utilization pattern by the hermit crab *Diogenes custos* (Fabricius, 1798) along Gulf of Kachchh, Gujarat, India

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Abstract

Present work aims to study the gastropod shell utilization pattern of hermit crab *Diogenes custos* in the intertidal zone of Gulf of Kachchh, Gujarat, India. Hermit crab specimens were collected randomly during the low tide timings using hand picking method in February 2019 and November 2019. Data on abundance of common gastropod species were also collected using a quadrat sampling method. Hermit crab wet weight (HW) and their shield length (SL) (represent the size of the hermit crabs) were measured. Gastropod shells were identified up to species level and different morphological characters such as shell dry weight (DW), shell length (SHL), shell volume (SHV), shell aperture length (SAL), and shell aperture width (SAW) were measured. Total 2000 individuals of *D. custos*, 1171 males (58.6%), 763 females (38.1%) and 66 ovigerous females (3.3%) occupying 49 species of gastropods were collected. *Pollia undosa* (21.9%) was highly occupied by *D. custos* followed by *Cantharus spiralis* (14.5%), *Tenguella granulata* (9.9%), *Chicoreus virgineus* (6.45%), *Cerithium caeruleum* (6.05%) and *Nassarius distortus* (6.05%). Regression analysis carried out between *D. custos* morphological characters and gastropod shell morphological characters showed a strong relationship which suggests that shell architecture plays an important role in shell utilization pattern of *Diogenes custos*. The abundance of *Pollia undosa* was very high in the intertidal zone as compared to other commonly occupied gastropods species which also suggests that gastropod shell availability in the habitat also has pronounced effect on shell utilization pattern of *D. custos*.

Keywords: *Diogenes custos*, Shell occupation, Gastropod diversity, Gulf of Kachchh, Gujarat

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STUDY OF VARIATION IN NUTRIENT CONTENT OF MUDSKIPPER *Boleophthalmus dussumieri* COLLECTED FROM GUJARAT AND MAHARASHTRA STATE, INDIA

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. Authors RD, MP, NM and JT designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors RD and NM managed the analyses of the study. Author RD managed the literature searches. All authors read and approved the final manuscript.

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Original Research Article

ABSTRACT

In present study, nutritive content of *Boleophthalmus dussumieri* (mudskipper) was analysed. Samples were collected from fish markets of Gujarat state (Ghogha, Sartanpar, Bilimora, Amalsad, Onjal) and Maharashtra state (Kalyan, Bhiwandi, Mira-Bhayandar). Major biochemical components like moisture, protein, carbohydrate and total lipid content were estimated in body muscles of the male and female specimens using standard protocols. Nutritive content of studied species was variable amongst different study sites. Moisture ($84.7 \pm 1.21\%$) and protein content ($36.76 \pm 13.18\%$) were recorded maximum in male body muscle collected from Sartanpar and Mira-Bhayandar respectively, while carbohydrate ($11.67 \pm 6.16\%$) and lipid ($3.21 \pm 1.17\%$) were recorded maximum in female body muscle collected from Sartanpar and Amalsad respectively. Variation occurring in nutritive content of *B. dussumieri* collected from various sites may be due to the effect of geographical area, the environmental factors and available food resources.

Keywords: Nutritive analysis; mudskippers; protein; lipid; carbohydrate; *Boleophthalmus dussumieri*.

1. INTRODUCTION

Nutrition is a core pillar of human development as it plays vital role in physical activities and health.

Besides that, it also regulates the metabolic activities which are essentials for normal cell growth, maintenance and repair [1-2]. Fish flesh is extremely rich in macronutrients (proteins, carbohydrates, lipids

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On the two ‘forms’ of *Dotilla intermedia* De Man, 1888 (Crustacea: Brachyura: Dotillidae) from the Bay of Bengal, India, with description of a new species

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Abstract

Two distinct morphotypes of sand bubbler crab (Dotillidae) from eastern India were assigned to *Dotilla intermedia* De Man, 1888, by British carcinologist, Stanley Kemp in 1919, due to similarities in the areolation of the carapace and the occurrence of these two forms in the same locality. Kemp, however, also illustrated the differences in the morphology of the male thoracic sternums, chelae, and first gonopods and, accordingly, divided *D. intermedia* into two subcategories which he called the “high form” and the “low form”. The recent designation of a lectotype for *D. intermedia*, which corresponds with Kemp’s “high form”, makes it possible to recognize the “low form” as a distinct and new species, *D. fraternalis* n. sp., which is described here. Furthermore, Kemp’s synonymization of *Dotilla clepsydrodactylus* Alcock, 1900, under *Dotilla intermedia* is affirmed here after examination of the surviving syntypes. A lectotype is selected to stabilize the taxonomy of this species.

Key words: Decapoda, Ocypodoidea, *Dotilla fraternalis* n. sp., sympatric species, taxonomy

Introduction

The sand bubbler crab genus, *Dotilla* Stimpson, 1858 (Ocypodoidea: Dotillidae), which is currently comprised of eight species (type species: *Cancer sulcata* Forskål, 1775), has received relatively little taxonomic attention since 1919, when Stanley Kemp published his compendium on the “Scopimerinae” of the Indian Museum. He distinguished this genus from allied genera (i.e., *Scopimera* De Haan, 1833, *Dotillopsis* Kemp, 1919, and *Ilyoplax* Stimpson, 1858) by a few key characters, such as: the male pleon not having constrictions at any of its somites (pleomeres); the anterior margin of the 4th pleomere having a thick row of setae, and which also overlaps with the 5th pleomere; the presence of deep convoluted structures on the lateral region and walls of the carapace; and the absence of brushes of setae between the coxae of the ambulatory legs (Kemp 1919; also Tesch 1918). Kemp (1919) also provided a key to the genus, where he distinguished the eight species primarily by the arrangement and pattern of the grooves and areolae on the carapace.

At present, 7 of the 8 recognized species of *Dotilla*; namely *D. blanfordi* Alcock, 1900, *D. intermedia* De Man, 1888, *D. malabarica* Nobili, 1903, *D. myctiroides* H. Milne Edwards, 1852, *D. pertinax* Kemp, 1915, *D. sulcata* (Forskål, 1775), and *D. wichmanni* De Man, 1892, have been reported from India (Kemp 1919; Trivedi *et al.* 2018). The carapace sculpture, and the male thoracic sternum, cheliped, and G1 provide useful characters for distinguishing species (Kemp 1919; Allen *et al.* 2011).

Dotilla intermedia was described by De Man (1888) based on 32 specimens collected from Sullivan Island, in the Mergui Archipelago (presently Lambi Island, or Lanbi Kyun, in the Myeik Archipelago, Myanmar) in the eastern Bay of Bengal. Kemp (1919) reported two distinct forms of this species from Chandipore, Odisha (western Bay of Bengal), India, which he referred to as the ‘high’ and ‘low’ forms on the basis of differences in the morphology of the male thoracic sternum, chelae, and G1. Allen *et al.* (2011) examined some syntypes of *D. intermedia* deposited

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On the identities of *Nepinnotheres vicajii* (Chhapgar, 1957) and *Arcotheres casta* (Antony & Kuttyamma, 1971) from western India: conspecificity and taxonomy (Decapoda, Brachyura, Pinnotheridae)

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Abstract

The identity of *Nepinnotheres vicajii* (Chhapgar, 1957) (described as *Pinnotheres vicajii*) (Pinnotheridae), a pea crab associated with the bivalve *Marcia recens* (Holten, 1802), is clarified. On the basis of re-diagnosis of holotype male and freshly collected female specimens from its type locality, *P. vicajii* is now assigned to *Arcotheres* Manning, 1993. A second poorly known species from India, *Arcotheres casta* (Antony & Kuttyamma, 1971), originally collected from *Meretrix casta* (Gmelin, 1791) is also synonymized with *A. vicajii*.

Key words: Pea crab, *Arcotheres*, *Marcia recens*, Maharashtra, India

Introduction

Two poorly known species of pinnotherid crabs have been described from venerid clams (Mollusca: Venerida: Veneridae) in western India: *Pinnotheres vicajii* Chhapgar, 1957, from *Paphia malabarica* (Dilwyn, 1817) (now *Marcia recens* (Holten, 1802)) from Mumbai, Maharashtra state; and *Pinnotheres casta* Antony & Kuttyamma, 1971, from *Meretrix casta* (Gmelin, 1791) from Kerala state, both from the west coast of India. The latter species is currently placed in *Arcotheres* Manning, 1993 (Ng *et al.* 2008) and the former species in *Nepinnotheres* Manning, 1993 (Ng & Kumar 2015).

The original figures of both species are not very accurate and insufficient by modern standards. The male holotype of *Pinnotheres vicajii* is here redescribed and figured, supplemented by fresh material from Mumbai. The types of *Pinnotheres casta*, however, are confirmed to be no longer extant, but we have on hand a series of specimens from near the type locality. Comparisons of both species show them be synonyms of each other.

Material and methods

The specimens examined are deposited in the Zoological Reference Collection, Department of Life Sciences, Hem-

First record of Hermit crab *Clibanarius ransonii* Forest, 1953 (Crustacea: Anomura: Diogenidae) from India

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Abstract

Hermit crab species *Clibanarius ransonii* Forest, 1953 is recorded for the first time from India based on specimens collected from the rocky intertidal zone of Veraval and Sutrapada located in Gujarat state of India. The species was described from Tahiti in the South Pacific archipelago and later reported from Indonesia, Vietnam and Taiwan. The present record shows westward extension in the distribution range of the species.

Keywords: Anomurans, Range extension, Rocky shore, Gujarat

1 Introduction

The infraorder Anomura presents a highly diverse group of organisms among decapod crustaceans which includes organisms like mole crabs, king crabs, squat-lobsters, porcelain crabs and hermit crabs (Bracken-Grissom et al., 2013). Hermit crabs are unique anomurans which lack calcified abdomen, and hence some of them occupy gastropod shells to protect their soft abdomen (Bertness, 1981). Approximately 2002 species of hermit crabs are reported worldwide, which are distributed in tropical and subtropical regions (McLaughlin et al., 2010). In India, so far around 112 species of hermit crabs are reported (Trivedi and Vachhrajani, 2017). Hermit crab genus *Clibanarius* Dana, 1852 currently comprises 59 species (McLaughlin et al., 2010) worldwide out of which 17 species are reported from India (Trivedi and Vachhrajani, 2017).

In the present study, *Clibanarius ransonii* Forest, 1953 is recorded for the first time from India, which adds one more species in the diversity of hermit crab belonging to genus *Clibanarius* in Indian waters.

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First record of three species of spider crabs from west coast of India (Crustacea: Decapoda: Brachyura)

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Abstract

The present study records occurrence of three species of spider crabs: *Hyastenus hilgendorfi* De Man, 1887 (Epiplatidae), *Hyastenus spinosus* A. Milne-Edwards, 1872 (Epiplatidae) and *Paramaya mulli* Ng, Prema & Ravichandran, 2018 (Majidae) for the first time from the west coast of India. These species were earlier reported from coastal areas of east coast of India. The diagnostic characteristics and some remarks on the taxonomy of each species are given in this paper.

Keywords: brachyura, new record, Saurashtra coast, Gujarat

1 Introduction

The coastline of India is around 7516.6 km long, which is endowed with diversely rich marine habitats (Ahmad 1972). The coastline of India can be divided into two major coastal regions: east and west coast. Both coastal regions are quite different in terms of geomorphology and coastal habitat type (Trivedi et al. 2018). Amongst, different crustacean fauna inhabiting Indian coastline, diversity of brachyuran crabs is studied well (Henderson 1893; Alcock 1895; Pillai 1951; Chhapgar 1957a, b; Gravely 1927; Dev Roy 2013, 2015; Trivedi et al. 2018). Trivedi et al. (2018) compiled checklist of marine brachyuran crabs of Indian waters and recorded occurrence of 910 species belonging to 361 genera and 62 families. Trivedi et al. (2018) have also commented that east coast (803 species) is highly diverse in marine brachyuran crabs species as compared to west coast (446 species) of India.

In the present study, we recorded occurrence of three species of spider crabs belonging to family Epiplatidae (*Hyastenus hilgendorfi* De Man, 1887; *H. spinosus* A. Milne-Edwards, 1872) and Majidae (*Paramaya mulli* Ng, Prema & Ravichandran, 2018) for the first time from West coast of India. These species were previously recorded from east coast of India.

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A study on Nutritional analysis of commercially important marine brachyuran crabs of Gujarat state, India

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Abstract

In the present study, three commercially important species of brachyuran crabs viz., *Portunus (Portunus) segnis* (Forsk., 1775), *Charybdis (Charybdis) feriatus* (Linnaeus, 1758) and *Portunus (Portunus) sanguinolentus* (Herbst, 1783) were analysed to know their nutritive value. Thus, biochemical components like moisture, protein, carbohydrate and total lipid content were measured in body and claw muscles of the crab specimens using standard protocols. The results showed variations in moisture, protein, carbohydrates and total lipid content of the body and claw muscles of these three commercially important brachyuran crab species. The higher values of moisture (78.80 %) and protein (31.41 %) content were recorded for body muscle of *P. segnis*, while a higher value of carbohydrate content was recorded in claw muscle of *P. segnis* (4.95 %). In contrast, a higher value of lipid content was found in claw muscle of *P. sanguinolentus* (3.26 %). Protein content was recorded higher in both muscle tissues of all the species, as compared to the other biochemical components. In conclusion, this study revealed that *P. segnis* is highly nutritious, in comparison with other studied species of brachyuran crabs.

Keywords: Commercially important brachyuran crab, Portunidae, biochemical composition, nutritional value

1 Introduction

Nutritional analysis is important to know the biochemical composition of commercially important species. Biochemical processes and nutrients play a vital role in physical growth, development and maintenance of normal body function (Nagabhushanam & Mane, 1978). Biochemical component

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An annotated checklist of the mantis shrimps of India (Crustacea: Stomatopoda)

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Abstract

An annotated checklist of the mantis shrimps (Stomatopoda) occurring in India is compiled from published literature and specimens collected from coastal areas of Gujarat state. A total of 72 species, 35 genera, 10 families and 5 superfamilies reported from Indian waters are listed. Four species were recorded for the first time from Gujarat while one species, *Erugosquilla hesperia* (Manning, 1968), is confirmed for the first time from India. The maximum number of species was reported from Tamil Nadu (48 species), while fewest species were reported from Karnataka (2 species). The results also suggest that the east coast is more diverse (66 species) than the west coast of India (32 species).

Key words: new records, biodiversity, crustacean fauna, coastal areas, Indian Ocean

Introduction

India is one of the highly biodiverse countries of the world, which supports unique and endangered animal and plant species (Myers *et al.* 2000). The coastline of India is around 7516 km long including 2094 km long coastline occupied by the Andaman and Nicobar Islands and Lakshadweep Island, (Ahmad 1972; Kumar *et al.* 2006). The coastal areas of India can be divided into two regions, West coast which is covering five states: Gujarat, Maharashtra, Goa, Karnataka and Kerala and East coast stretching over four states: Tamil Nadu, Andhra Pradesh, Odisha and West Bengal (Ahmad 1972; Kumar *et al.* 2006).

The mantis shrimps of the order Stomatopoda are predatory malacostracan crustaceans (Ahyong 2001, 2012). Stomatopods can be easily distinguished from other malacostracans in having triflagellate antennules and the second maxilliped modified into raptorial appendages (Caldwell & Dingle 1976; Ahyong 2001, 2012). Stomatopods capture their prey using their raptorial appendages and on the basis of use of the types of raptorial strike, they are divided into two groups: the ‘smashers’ and the ‘spearers’ (Caldwell & Dingle 1976; Ahyong 2001, 2005, 2012). The largest proportion of species of stomatopods is reported from tropical and subtropical waters, while a few species also occur in temperate and sub-Antarctic waters (Ahyong 2001, 2012). Stomatopods commonly occur in coral reefs and shallow soft substrates but can be found up to depth of 1500 meters (Ahyong 2001, 2012; Ahyong & Jarman 2009; Porter *et al.* 2010). Global diversity of stomatopods is currently represented by around 500 species belonging to more than 120 genera, 18 families and 7 superfamilies of which Squilloidea is the largest (Ahyong 1997; Ahyong & Harling 2000; Ahyong 2001, 2005, 2012; Van Der Wal & Ahyong 2017; Van Der Wal *et al.* 2017, 2019; Ahyong *et al.* 2020).

India has long history of taxonomic studies on various groups of marine and fresh water crustaceans. Fabricius (1798) was first to report stomatopods from India; he described three species of stomatopods from Frederick-snagore (= present day Serampore) of West Bengal coast, Bombay (= present day Mumbai) and ‘India Orientali’



Two species of *Talorchestia* Dana 1853 (Crustacea, Amphipoda, Talitridae) including *T. lakshadweepensis* sp. nov. from the Lakshadweep Islands, India

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Abstract

Two species of the beach-hopper genus *Talorchestia* Dana, 1853 were collected at Cheriyam Island in the union territory of Lakshadweep in south western India. One species was identified as *T. affinis* Maccagnò, 1936, known previously from the Red Sea, Somalia and East Africa and recorded for the first time from India, the other proved to be a new species, *T. lakshadweepensis* sp. nov.

Key words: Crustacea, Amphipoda, taxonomy, *Talorchestia*, new species, marine, India

Introduction

There are very few records of talitrids from India (Table 1). *Talitrus decoratus* Carl, 1934, a terrestrial species, was described from Nilgiris, India. According to Hou & Li (2003) *T. decoratus* is a synonym of *Talitroides topitotum* (Burt, 1934). *Cochinorchestia notabilis* (Barnard, 1935) a marsh-hopper was found under rotten screw palms *Pandanus* in Cochin, south-western India. *Cochinorchestia morini* (Lyla et al., 1998), a second marsh-hopper, was reported from mangroves, (abundant in partially rotten roots of *Rhizophora* sp.) on the Parangipettai coast, Tamil Nadu in south-eastern India. Sivaprakasam (1969) reported a beach-hopper, *Orchestia anomala* from Kilakarai to Pondicherry on the south-eastern coast of India. Lowry & Springthorpe (2015) transferred it to *Floresorchestia* sp. 2. Sivaprakasam (1969) reported what may be the same species of *Floresorchestia* as *Orchestia anomala* from Kilakarai from under stones at the tidal edge, from Pondicherry in loose soil around a freshwater pond in the Botanical garden and from the banks of salt-water ponds and canals in the brackish water lagoon at Tada, Pulicat Lake north of Pondicherry. Tattersall, 1914 described a riparian-hopper, *Talorchestia kempii* from under stones near Sireng stream, at about 1000 m altitude in Assam, Aunachal, Pradash, India. Lowry & Myers (2019) transferred this species to the genus *Indiorchestia*.

There are a number of records of *Talorchestia* from India, *Talorchestia martensii* of Chilton (1921) reported from Chilka Lake, a large saline lake on the north-eastern coast in the Bay of Bengal, appears to be an undescribed species according to Lowry & Springthorpe (2019). Graveley (1927) reported *T. martensii* without documentation from Krusadai Island, Gulf of Manaar, in south-eastern India. Barnard (1935) reported many specimens of *T. martensii* (unconfirmed) from several localities, Visakhapatnam on the east coast of India and Travancore in the extreme south-west corner of India. Nayar (1959) recorded many specimens of *T. martensii* from the Cooum and Adyar rivers in Tamil Nadu. The illustrations do not allow a definitive identification even to genus according to Lowry & Springthorpe (2019). Nayar (1967) reported *T. martensii* from Thoothukudi (as Tuticorin) Tamil Nadu and also from Mandapam coast, Gulf of Mannar, Tamil Nadu (he only illustrated the gnathopods). Sivaprakasam (1969) considered *T. martensii* to be the most common talitrid species in collections from eastern India. "It has been collected from the sea shore among sand and decaying seaweeds and also from the loose soil along estuaries, brackish

Study of Prevalence of tick *Hyalomma excavatum* (Acari: Ixodidae) on *Bubalus bubalis* in Patan District, Gujarat state, India

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Abstract

The domestic water buffalo (*Bubalus bubalis*) primitively domesticated in Asia for milk and meat purpose but their health is highly compromised due to the infestation by ectoparasites so affected via vector borne disease agents. The present work was carried out to study prevalence of common tick *Hyalomma excavatum* parasitizing *B. Bubalis* population in Patan district, Gujarat state, India. The study was carried out from June 2019 to March 2020. In the present study, a total of 1595 *B. bubalis* (712 males, 883 females) were examined out of which 489 (30.66%) *B. bubalis* were tick infected while 1106 (69.34%) were free of tick. Infestation rate was very high in the female (28.15%) host individuals as compared to males (2.51%). Adult individual hosts showed high rate of infestation as compared to sub adults and calves. Maximum infestation of *H. excavatum* was observed around udders and anus in female and male individuals respectively. Present study reveals vital epidemiological information of *H. excavatum* infestation on *B. bubalis* population in Patan district which will be helpful in designing control and management policy for tick infestation.

Keywords: Ectoparasite Tick, Prevalence, Buffalo, Patan, Gujarat

1 Introduction

Ectoparasites are one of the major concerns of veterinary problems affecting the livestock industries in many parts of the world (Hourrigan, 1979; Colebrook and Wall, 2004). Out of all ectoparasites; lice, ticks and mites are the major transporters of certain pathogens (Loomis, 1986). Globally, the

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On the two ‘forms’ of *Dotilla intermedia* De Man, 1888 (Crustacea: Brachyura: Dotillidae) from the Bay of Bengal, India, with description of a new species

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Abstract

Two distinct morphotypes of sand bubbler crab (Dotillidae) from eastern India were assigned to *Dotilla intermedia* De Man, 1888, by British carcinologist, Stanley Kemp in 1919, due to similarities in the areolation of the carapace and the occurrence of these two forms in the same locality. Kemp, however, also illustrated the differences in the morphology of the male thoracic sternums, chelae, and first gonopods and, accordingly, divided *D. intermedia* into two subcategories which he called the “high form” and the “low form”. The recent designation of a lectotype for *D. intermedia*, which corresponds with Kemp’s “high form”, makes it possible to recognize the “low form” as a distinct and new species, *D. fraternalis* n. sp., which is described here. Furthermore, Kemp’s synonymization of *Dotilla clepsydrodactylus* Alcock, 1900, under *Dotilla intermedia* is affirmed here after examination of the surviving syntypes. A lectotype is selected to stabilize the taxonomy of this species.

Key words: Decapoda, Ocypodoidea, *Dotilla fraternalis* n. sp., sympatric species, taxonomy

Introduction

The sand bubbler crab genus, *Dotilla* Stimpson, 1858 (Ocypodoidea: Dotillidae), which is currently comprised of eight species (type species: *Cancer sulcata* Forskål, 1775), has received relatively little taxonomic attention since 1919, when Stanley Kemp published his compendium on the “Scopimerinae” of the Indian Museum. He distinguished this genus from allied genera (i.e., *Scopimera* De Haan, 1833, *Dotillopsis* Kemp, 1919, and *Ilyoplax* Stimpson, 1858) by a few key characters, such as: the male pleon not having constrictions at any of its somites (pleomeres); the anterior margin of the 4th pleomere having a thick row of setae, and which also overlaps with the 5th pleomere; the presence of deep convoluted structures on the lateral region and walls of the carapace; and the absence of brushes of setae between the coxae of the ambulatory legs (Kemp 1919; also Tesch 1918). Kemp (1919) also provided a key to the genus, where he distinguished the eight species primarily by the arrangement and pattern of the grooves and areolae on the carapace.

At present, 7 of the 8 recognized species of *Dotilla*; namely *D. blanfordi* Alcock, 1900, *D. intermedia* De Man, 1888, *D. malabarica* Nobili, 1903, *D. myctiroides* H. Milne Edwards, 1852, *D. pertinax* Kemp, 1915, *D. sulcata* (Forskål, 1775), and *D. wichmanni* De Man, 1892, have been reported from India (Kemp 1919; Trivedi *et al.* 2018). The carapace sculpture, and the male thoracic sternum, cheliped, and G1 provide useful characters for distinguishing species (Kemp 1919; Allen *et al.* 2011).

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On the identities of *Nepinnotheres vicajii* (Chhapgar, 1957) and *Arcotheres casta* (Antony & Kuttyamma, 1971) from western India: conspecificity and taxonomy (Decapoda, Brachyura, Pinnotheridae)

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Abstract

The identity of *Nepinnotheres vicajii* (Chhapgar, 1957) (described as *Pinnotheres vicajii*) (Pinnotheridae), a pea crab associated with the bivalve *Marcia recens* (Holten, 1802), is clarified. On the basis of re-diagnosis of holotype male and freshly collected female specimens from its type locality, *P. vicajii* is now assigned to *Arcotheres* Manning, 1993. A second poorly known species from India, *Arcotheres casta* (Antony & Kuttyamma, 1971), originally collected from *Meretrix casta* (Gmelin, 1791) is also synonymized with *A. vicajii*.

Key words: Pea crab, *Arcotheres*, *Marcia recens*, Maharashtra, India

Introduction

Two poorly known species of pinnotherid crabs have been described from venerid clams (Mollusca: Venerida: Veneridae) in western India: *Pinnotheres vicajii* Chhapgar, 1957, from *Paphia malabarica* (Dilwyn, 1817) (now *Marcia recens* (Holten, 1802)) from Mumbai, Maharashtra state; and *Pinnotheres casta* Antony & Kuttyamma, 1971, from *Meretrix casta* (Gmelin, 1791) from Kerala state, both from the west coast of India. The latter species is currently placed in *Arcotheres* Manning, 1993 (Ng *et al.* 2008) and the former species in *Nepinnotheres* Manning, 1993 (Ng & Kumar 2015).

The original figures of both species are not very accurate and insufficient by modern standards. The male holotype of *Pinnotheres vicajii* is here redescribed and figured, supplemented by fresh material from Mumbai. The types of *Pinnotheres casta*, however, are confirmed to be no longer extant, but we have on hand a series of specimens from near the type locality. Comparisons of both species show them be synonyms of each other.

Material and methods

The specimens examined are deposited in the Zoological Reference Collection, Department of Life Sciences, Hem-

First record of Hermit crab *Clibanarius ransoni* Forest, 1953 (Crustacea: Anomura: Diogenidae) from India

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Abstract

Hermit crab species *Clibanarius ransoni* Forest, 1953 is recorded for the first time from India based on specimens collected from the rocky intertidal zone of Veraval and Sutrapada located in Gujarat state of India. The species was described from Tahiti in the South Pacific archipelago and later reported from Indonesia, Vietnam and Taiwan. The present record shows westward extension in the distribution range of the species.

Keywords: Anomurans, Range extension, Rocky shore, Gujarat

1 Introduction

The infraorder Anomura presents a highly diverse group of organisms among decapod crustaceans which includes organisms like mole crabs, king crabs, squat-lobsters, porcelain crabs and hermit crabs (Bracken-Grissom et al., 2013). Hermit crabs are unique anomurans which lack calcified abdomen, and hence some of them occupy gastropod shells to protect their soft abdomen (Bertness, 1981). Approximately 2002 species of hermit crabs are reported worldwide, which are distributed in tropical and subtropical regions (McLaughlin et al., 2010). In India, so far around 112 species of hermit crabs are reported (Trivedi and Vachhrajani, 2017). Hermit crab genus *Clibanarius* Dana, 1852 currently comprises 59 species (McLaughlin et al., 2010) worldwide out of which 17 species are reported from India (Trivedi and Vachhrajani, 2017).

In the present study, *Clibanarius ransoni* Forest, 1953 is recorded for the first time from India, which adds one more species in the diversity of hermit crab belonging to genus *Clibanarius* in Indian waters.

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First record of three species of spider crabs from west coast of India (Crustacea: Decapoda: Brachyura)

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Abstract

The present study records occurrence of three species of spider crabs: *Hyastenus hilgendorfi* De Man, 1887 (Epiplatidae), *Hyastenus spinosus* A. Milne-Edwards, 1872 (Epiplatidae) and *Paramaya mulli* Ng, Prema & Ravichandran, 2018 (Majidae) for the first time from the west coast of India. These species were earlier reported from coastal areas of east coast of India. The diagnostic characteristics and some remarks on the taxonomy of each species are given in this paper.

Keywords: brachyura, new record, Saurashtra coast, Gujarat

1 Introduction

The coastline of India is around 7516.6 km long, which is endowed with diversely rich marine habitats (Ahmad 1972). The coastline of India can be divided into two major coastal regions: east and west coast. Both coastal regions are quite different in terms of geomorphology and coastal habitat type (Trivedi et al. 2018). Amongst, different crustacean fauna inhabiting Indian coastline, diversity of brachyuran crabs is studied well (Henderson 1893; Alcock 1895; Pillai 1951; Chhapgar 1957a, b; Gravely 1927; Dev Roy 2013, 2015; Trivedi et al. 2018). Trivedi et al. (2018) compiled checklist of marine brachyuran crabs of Indian waters and recorded occurrence of 910 species belonging to 361 genera and 62 families. Trivedi et al. (2018) have also commented that east coast (803 species) is highly diverse in marine brachyuran crabs species as compared to west coast (446 species) of India.

In the present study, we recorded occurrence of three species of spider crabs belonging to family Epiplatidae (*Hyastenus hilgendorfi* De Man, 1887; *H. spinosus* A. Milne-Edwards, 1872) and Majidae (*Paramaya mulli* Ng, Prema & Ravichandran, 2018) for the first time from West coast of India. These species were previously recorded from east coast of India.

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A study on Nutritional analysis of commercially important marine brachyuran crabs of Gujarat state, India

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Abstract

In the present study, three commercially important species of brachyuran crabs viz., *Portunus (Portunus) segnis* (Forsk., 1775), *Charybdis (Charybdis) feriatus* (Linnaeus, 1758) and *Portunus (Portunus) sanguinolentus* (Herbst, 1783) were analysed to know their nutritive value. Thus, biochemical components like moisture, protein, carbohydrate and total lipid content were measured in body and claw muscles of the crab specimens using standard protocols. The results showed variations in moisture, protein, carbohydrates and total lipid content of the body and claw muscles of these three commercially important brachyuran crab species. The higher values of moisture (78.80 %) and protein (31.41 %) content were recorded for body muscle of *P. segnis*, while a higher value of carbohydrate content was recorded in claw muscle of *P. segnis* (4.95 %). In contrast, a higher value of lipid content was found in claw muscle of *P. sanguinolentus* (3.26 %). Protein content was recorded higher in both muscle tissues of all the species, as compared to the other biochemical components. In conclusion, this study revealed that *P. segnis* is highly nutritious, in comparison with other studied species of brachyuran crabs.

Keywords: Commercially important brachyuran crab, Portunidae, biochemical composition, nutritional value

1 Introduction

Nutritional analysis is important to know the biochemical composition of commercially important species. Biochemical processes and nutrients play a vital role in physical growth, development and maintenance of normal body function (Nagabhushanam & Mane, 1978). Biochemical component

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An annotated checklist of the mantis shrimps of India (Crustacea: Stomatopoda)

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Abstract

An annotated checklist of the mantis shrimps (Stomatopoda) occurring in India is compiled from published literature and specimens collected from coastal areas of Gujarat state. A total of 72 species, 35 genera, 10 families and 5 superfamilies reported from Indian waters are listed. Four species were recorded for the first time from Gujarat while one species, *Ergosquilla hesperia* (Manning, 1968), is confirmed for the first time from India. The maximum number of species was reported from Tamil Nadu (48 species), while fewest species were reported from Karnataka (2 species). The results also suggest that the east coast is more diverse (66 species) than the west coast of India (32 species).

Key words: new records, biodiversity, crustacean fauna, coastal areas, Indian Ocean

Introduction

India is one of the highly biodiverse countries of the world, which supports unique and endangered animal and plant species (Myers *et al.* 2000). The coastline of India is around 7516 km long including 2094 km long coastline occupied by the Andaman and Nicobar Islands and Lakshadweep Island, (Ahmad 1972; Kumar *et al.* 2006). The coastal areas of India can be divided into two regions, West coast which is covering five states: Gujarat, Maharashtra, Goa, Karnataka and Kerala and East coast stretching over four states: Tamil Nadu, Andhra Pradesh, Odisha and West Bengal (Ahmad 1972; Kumar *et al.* 2006).

The mantis shrimps of the order Stomatopoda are predatory malacostracan crustaceans (Ahyong 2001, 2012). Stomatopods can be easily distinguished from other malacostracans in having triflagellate antennules and the second maxilliped modified into raptorial appendages (Caldwell & Dingle 1976; Ahyong 2001, 2012). Stomatopods capture their prey using their raptorial appendages and on the basis of use of the types of raptorial strike, they are divided into two groups: the ‘smashers’ and the ‘spears’ (Caldwell & Dingle 1976; Ahyong 2001, 2005, 2012). The largest proportion of species of stomatopods is reported from tropical and subtropical waters, while a few species also occur in temperate and sub-Antarctic waters (Ahyong 2001, 2012). Stomatopods commonly occur in coral reefs and shallow soft substrates but can be found up to depth of 1500 meters (Ahyong 2001, 2012; Ahyong & Jarman 2009; Porter *et al.* 2010). Global diversity of stomatopods is currently represented by around 500 species belonging to more than 120 genera, 18 families and 7 superfamilies of which Squilloidea is the largest (Ahyong 1997; Ahyong & Harling 2000; Ahyong 2001, 2005, 2012; Van Der Wal & Ahyong 2017; Van Der Wal *et al.* 2017, 2019; Ahyong *et al.* 2020).

India has long history of taxonomic studies on various groups of marine and fresh water crustaceans. Fabricius (1798) was first to report stomatopods from India; he described three species of stomatopods from Frederick-snagore (= present day Serampore) of West Bengal coast, Bombay (= present day Mumbai) and ‘India Oriental’



Two species of *Talorchestia* Dana 1853 (Crustacea, Amphipoda, Talitridae) including *T. lakshadweepensis* sp. nov. from the Lakshadweep Islands, India

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Abstract

Two species of the beach-hopper genus *Talorchestia* Dana, 1853 were collected at Cheriya Island in the union territory of Lakshadweep in south western India. One species was identified as *T. affinis* Maccagno, 1936, known previously from the Red Sea, Somalia and East Africa and recorded for the first time from India, the other proved to be a new species, *T. lakshadweepensis* sp. nov.

Key words: Crustacea, Amphipoda, taxonomy, *Talorchestia*, new species, marine, India

Introduction

There are very few records of talitrids from India (Table 1). *Talitrus decoratus* Carl, 1934, a terrestrial species, was described from Nilgiris, India. According to Hou & Li (2003) *T. decoratus* is a synonym of *Talitroides topitutum* (Burt, 1934). *Cochinorchestia notabilis* (Barnard, 1935) a marsh-hopper was found under rotten screw palms *Pandanus* in Cochin, south-western India. *Cochinorchestia morini* (Lyla et al., 1998), a second marsh-hopper, was reported from mangroves, (abundant in partially rotten roots of *Rhizophora* sp.) on the Parangipettai coast, Tamil Nadu in south-eastern India. Sivaprakasam (1969) reported a beach-hopper, *Orchestia anomala* from Kilakarai to Pondicherry on the south-eastern coast of India. Lowry & Springthorpe (2015) transferred it to *Floresorchestia* sp. 2. Sivaprakasam (1969) reported what may be the same species of *Floresorchestia* as *Orchestia anomala* from Kilakarai from under stones at the tidal edge, from Pondicherry in loose soil around a freshwater pond in the Botanical garden and from the banks of salt-water ponds and canals in the brackish water lagoon at Tada, Pulicat Lake north of Pondicherry. Tattersall, 1914 described a riparian-hopper, *Talorchestia kempii* from under stones near Sireng stream, at about 1000 m altitude in Assam, Aunachal, Pradash, India. Lowry & Myers (2019) transferred this species to the genus *Indiorchestia*.

There are a number of records of *Talorchestia* from India, *Talorchestia martensii* of Chilton (1921) reported from Chilka Lake, a large saline lake on the north-eastern coast in the Bay of Bengal, appears to be an undescribed species according to Lowry & Springthorpe (2019). Graveley (1927) reported *T. martensii* without documentation from Krusadai Island, Gulf of Manaar, in south-eastern India. Barnard (1935) reported many specimens of *T. martensii* (unconfirmed) from several localities, Visakhapatnam on the east coast of India and Travancore in the extreme south-west corner of India. Nayar (1959) recorded many specimens of *T. martensii* from the Cooum and Adyar rivers in Tamil Nadu. The illustrations do not allow a definitive identification even to genus according to Lowry & Springthorpe (2019). Nayar (1967) reported *T. martensii* from Thoothukudi (as Tuticorin) Tamil Nadu and also from Mandapam coast, Gulf of Mannar, Tamil Nadu (he only illustrated the gnathopods). Sivaprakasam (1969) considered *T. martensii* to be the most common talitrid species in collections from eastern India. "It has been collected from the sea shore among sand and decaying seaweeds and also from the loose soil along estuaries, brackish

Celebration of International Bear Day 2020 during COVID-19

The Wildlife and Conservation Biology Research Lab, HNG University (India) initiated a sloth bear conservation and community outreach programme in 2019 in collaboration with Vadodara Wildlife Division, Gujarat state forest department. The goal is to increase awareness and tolerance of sloth bears (*Melursus ursinus*) by local communities through bear safety education and mass awareness campaigns. At the same time, the European Association of Zoos and Aquaria (EAZA) Bear Taxon Advisory Group (Bear TAG) started celebrating "Happy Bears Day" with the goal of raising awareness about all 8 bear species. We thought to join in this annual celebration through our community outreach programme in India.

The role of zoos has changed significantly in recent decades. While entertainment was the only goal in the past, today education, research, and species conservation are the most important tasks of zoos. Zoos have a potential attitude-shaping role and can reach millions of visitors around the world. The community outreach center developing in Gujarat, India is recognised as an exclusive center created for sloth bear conservation education, but we took the opportunity of a special event to cover all the species. The event had a dual purpose: firstly, to inform visitors about the 8 bear species and the threats they face, and secondly to raise funds to aid bears in the wild.

EAZA bear-keeping zoos were informed about the event through emails and social media, and could download the program's logo and numerous bear education panels created by the [SotoZoo](#) education team: these included a Bears of the World map in 8 different languages and the foldable bear cube showing all 8 bears. Many of the EAZA member zoos joined Happy Bears Day, and a really colorful program was offered to the guests. This year, unfortunately due to the COVID-19 pandemic, it was not possible to organize any in-person events. The Wildlife and Conservation Biology Lab, along with IUCN SSC Bear Specialist Group (BSG), Sanctuary Asia Foundation, and The Corbett Foundation cooperatively adapted to this situation by organizing a YouTube live talk series on "The Bears of India." This is the first of its kind event organized to raise awareness about Indian bears.

The live talk series occurred from 10-14 May 2020, with a talk each day focused on one of the four bear species of India. The series was kicked off with a presentation on "The Bears of the World—Is Conservation Making a Difference?" by Dave Garshelis, Co-Chair of the BSG. This was followed by a talk on sloth bears by Harendra Bargali, Asiatic black bears by S. Sathyakumar, brown bears by Bipan Rathore, and sun bears by Janmejay Sethy. The event concluded on 14 May with 3 talks on current bear research in India by



Part of the education and awareness material provided: range maps of the bears of India.



Acumen into the effect of alcohols on choline chloride: L-lactic acid-based natural deep eutectic solvent (NADES): A spectral investigation unified with theoretical and thermophysical characterization

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ABSTRACT

Deep eutectic solvents (DESs), an alternative to hazardous solvents is grabbing an outsized attention due to their adaptable structure and amended thermophysical properties. Recently, remarkable and new collection of nature-based solvents also termed as natural deep eutectic solvents (NADESs) have been put forth for large scale applications. Considering these facts, the current study offer an insight into the preparation of NADES from Choline Chloride (CC) as hydrogen bond acceptor (HBA) and L-lactic acid (LA) as hydrogen bond donor (HBD) in 1:2 M ratio and abbreviated as CC-LA. In view to its broad hydrophilicity, the effect of alcohols such as ethanol (ET) and ethylene glycol (EG) as additional HBD (cosolvents) were examined in the prepared NADES (CC-LA) in different molar ratios as a function of temperature to tailor-made the thermophysical properties of pure constituents that may oblige such systems for highly advantageous industrial and commercial applications. This cosolvents-modified binary mixtures were fathomed using spectroscopic (FT-IR, NMR (¹H- and ¹³C-) and 2D ¹H-¹H COSY) techniques which rooted the specific nature of interactions i.e., new hydrogen bonding networks involved therein as well as the interstitial accommodation of alcohols within the cavity formed by NADES. The computational simulation approach evaluated Total Energy (T.E.) to explicate the effect of the energy of molecular orbitals which further significantly validated our experimental findings. Also, the concept of 3D-molecular electrostatic potential (3D-MEP) is presented to predict the coordination (electrophilic and nucleophilic) sites between HBA and HBD. In addition, various thermophysical properties viz., density (ρ), speed of sound (u), viscosity (η) and refractive index (n_D) of the prepared NADES-based binary mixtures (CC-LA + ET/EG) were rationalized as a function of temperature. Also, excess molar volume (V_m^E), excess isentropic compressibility (K_s^E), excess speed of sound (u^E), deviation in viscosity ($\Delta\eta$), and deviation in refractive index (Δn_D) are correlated and fitted using Redlich-Kister (R-K) equation which inferred how alcohols as cosolvents influence the plausible hydrogen bonding interactions within the examined systems.

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1. Introduction

Room temperature ionic liquids (RT-ILs) possess unique and tunable thermophysical properties, such as good thermal stability, fair miscibility, negligible vapor pressure, and no flammability which makes them an obvious and suitable alternative to volatile organic compounds (VOCs) [1–4]. Conversely, numerous drawbacks has been witnessed with these RT-ILs such as limited solute solubility, unfavorable toxicity, complex synthesis route, high viscosity, hostile biodegradability, and staggering expense [5–7]. Hence, the perfect solvent selectivity bearing several factors such as their effectiveness, and productivity of a chemical process is a monotonous job. To this, a new class of natural deep eutectic

solvents (NADES) being environment-friendly, cost-effective, easy-to-prepare, and green entity has emerged out as a promising and encouraging media replacement to RT-ILs and VOCs [9–13]. It was Abbott et al. who first coined the term – deep eutectic solvents (DES) composed of Choline chloride (CC) as hydrogen bond acceptor (HBA) and Urea as (HBD) via simple and sustainable synthesis route resulting in a clear and homogeneous liquid having lower freezing point than their original constituents [13]. Subsequently, other researchers have reported several novel DESs comprising of various HBAs (ammonium and phosphonium salt) and HBDs (amides, glycol, carboxylic acids, carbohydrates and amino acids) [8,9]. It was Choi et al. who introduced the term NADESs consisting of metabolites as HBDs viz., some sugars, amino acids, and organic acids like Malic acid, Citric acid, Lactic acid, and Succinic acid [10]. However, a particular bend towards CC as HBA is extensively noticed in DES synthesis as it consists of vitamin B-complex

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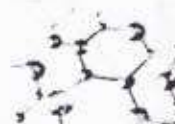
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RESEARCH ARTICLE

ASSESSMENT OF SOME NATURAL BIOACTIVE COMPOUNDS FOR INHIBITORY ACTIVITY AGAINST NOVEL COVID-19: A COMPUTATIONAL STUDY

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Molecular Docking, COVID-19, Bioactive Compounds, Inhibition, Drug Likeness

Abstract

COVID-19 is a new coronavirus originated from Wuhan, China. In 2019. Twenty eight natural bioactive compounds (namely Amentoflavone, Apigenin, Bilobalide, Bilobetin, Catechin, Epigallocatechin, Fustin, Gallocatechin, Ginkgetin, Ginkgolide A, Ginkgolide B, Ginkgolide C, Glycitein, Isoginkgetin, Isorhamnetin, Kaempferol, Luteolin, Myricetin, Nobiletin, Procyanidin, Quercetin, Quercitrin, Rutin, Sciadopitysin, Tamarixetin, Ginkgolide J, Ginkgolide M, and Ginkgolide K) are selected for computational theoretical calculations of molecular docking with crystal structure of COVID-19 Main Protease 6LU7 and COVID-19 chymotrypsin-like protease Kinase- 2GTB. Lipinski's rule of five for drug likeness is applied to consider bioactive molecule as potential drug molecule. The interaction study is carried to assess to deactivate progression of COVID-19 using Auto Dock (4.2). Calculations are carried out on efficient shape-based search lemarckian genetic algorithm principle and a score base function. The binding energies are found between -5.59 to -1.75 in COVID-19 Main Protease 6LU7 and between -6.35 to -2.08 in chymotrypsin-like Protease 2GBT. Results from calculated data reveal that there is hydrogen bonding, electrostatic and vanderwaals are possible types of interactions. This data can help in identify best antiviral drug and consider some of the natural bioactive molecules as food supplements for development of inhibitor in the treatment of covid-19 stains.

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Introduction:-

WHO has declared the COVID-19 a pandemic.1 after it was identified in Wuhan, a city in the Hubei province of china rapidly. Not only in china but in many countries of world including India it has spread. This is a new coronavirus because previously, it was never seen in humans. It coined as Coronavirus Disease 2019 (COVID-19) by the World Health Organization (WHO). In January 2020, it rapidly spread in China resulting in an epidemic throughout china, followed by an increasing number of cases in other countries throughout the world. For COVID-19 patients' common symptoms are Fever, Fatigue, Dry cough, Anorexia, Myalgias, Dyspnea and Sputum

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Thermophysical, acoustical, spectral and DFT study of intermolecular interactions of terpinolene with cresols

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Densities and speed of sound have been measured experimentally for binary mixtures of terpinolene with cresols (o-cresol, m-cresol, p-cresol) at three different temperatures 303.15, 308.15 and 313.15 K at atmospheric pressure. From primary physical properties, some secondary properties like molar volume (V_m), excess molar volume (V_m^E), partial molar volume (\bar{V}_m^a), excess partial molar volume ($\bar{V}_{m,i}^E$), apparent molar volume ($V_{m,\phi,1}$), deviation in speed of sound (Δu), isentropic compressibility (κ_s), deviation in isentropic compressibility ($\Delta\kappa_s$), acoustical impedance (Z), deviation in acoustical impedances (ΔZ), intermolecular free length (L_f), partial molar isentropic compression ($\bar{K}_{s,m,i}^E$), excess partial molar isentropic compression ($\bar{K}_{s,m,i}^E$) and apparent molar isentropic compression ($K_{s,m,\phi,1}^E$) have been calculated. Infinite dilution apparent molar volume ($V_{m,\phi,1}^\infty$), infinite dilution apparent molar isentropic compression ($K_{s,m,\phi,1}^\infty$), empirical parameters S_p , B_p and S_k , B_k of the Redlich-Rosenberg-Mayer equation with the limiting apparent molar expansibility (E_p^∞) have been also calculated along with some theoretical speed of sound calculating relations such as Nomoto relation (u_{nom}), ideal mixture relation (u_{imr}), Junji relation (u_{junji}) and Free length theory relation (u_{fl}) with their standard deviation (σ). All the calculated values of excess/deviation properties have been fitted with the fourth order Redlich-Kister polynomial equation and their standard deviation (σ) values are also calculated. FTIR spectral analysis of binary mixtures at 1:1, 1:1 and 1:1 composition ratios have been carried out at 298.15 K. Computational calculations such as optimization of pure and binary mixtures in gas phase, bond length, Mulliken charges, theoretical vibrational frequencies and NBO calculations on basis of the DFT (Density Functional Theory) have been also carried out. The results are discussed in term of presence of intermolecular interactions, types, strength and behavior with change of temperatures and cresol components in binary mixtures.

Keywords: Densities, Speed of sound, Deviation properties, FT-IR analysis, DFT, Binary mixtures


The study of thermophysical properties plays a significant role to understand the presence of intermolecular interactions in liquid mixtures as we know that intermolecular interactions play a vital role in many physical techniques such as extraction, separation and also in many sophisticated analytical techniques such as HPLC, HPTLC etc. Terpinolene is used in many products of day to day use because of its taste, odour and pharmaceutical applications^{1,2}. This kind of combined study using thermophysical, spectral and computational calculations give us the information about the behavior of terpinolene molecules in different solvents' environment. As we know that the intermolecular interactions depend upon the properties of the functional groups of solvent, the study of thermophysical properties in combination with spectral and quantum computational calculations make better interpretation as well as understanding of types of interactions such as electrostatic, non-electrostatic and

hydrogen bonding etc. So in this work, we have selected cresol (o-cresol, m-cresol, p-cresol) components as a second component of binary mixtures because cresol molecules contains -OH (hydroxyl), -CH₃ (methyl) and also aromatic ring. Studies of thermophysical data by changing cresol molecules from o-cresol to p-cresol, also gives an information that how different substitution position of cresol molecules affect the intermolecular interactions with terpinolene component in the mixture.

Materials and Methods

All chemicals of AR grade were used for this present study and were used after purification using standard methods^{3,4}. Furthermore, details about its suppliers were as per given in Table 1. The comparison of experiment and literature values of densities and speed of sound were given in form of Table 2 and the data of this table shows very close proximity.

First record of Brachyuran crab *Rhinolambrus lippus* (Lanchester, 1901) (Crustacea: Decapoda: Parthenopidae) from India

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ZOOBANK: <http://zoobank.org/urn:lsid:zoobank.org:pub:52342876-9992-452F-92F7-A34AD00A1C5B>

ABSTRACT

The present paper reports the occurrence of the rare parthenopid species *Rhinolambrus lippus* (Lanchester, 1901) for the first time from India. The species is so far reported from Malaysia, Djibouti and Madagascar.

KEYWORDS

Brachyura, new record, Gulf of Mannar, geographic distribution, Indo-Pacific region

The taxonomy of the family Parthenopidae has changed a lot over the years with many genera reclassified under new subfamilies (Ng *et al.*, 2008). Tan (2004) undertook a study on the revision of Parthenopidae and revised the taxonomy of the subfamilies including subfamily Parthenopinae (Tan and Ng, 2007). Tan and Ng (2007) listed 32 genera under Parthenopinae, by elevating many subgenera (*sensu* Flipse, 1930) to genera including the subgenus *Rhinolambrus* A. Milne-Edwards, 1878. *Rhinolambrus* differs from other genera in the presence of a 'neck' like structure at the gastrobranchial notch which is part of the longitudinal elongation of the epistome (Tan *et al.*, 1999). *Rhinolambrus* currently contains 13 species (Ng *et al.*, 2008) distributed in the Indo-Pacific region out of which 6 species: *R. contrarius* (Herbst, 1804), *R. cybelis* (Alcock, 1895), *R. lamelliger* (White, 1847), *R. longispinus* (Miers, 1879), *R. pelagicus* (Rüppell, 1830), and *R. turriger* (White, 1847) are reported from India (Trivedi *et al.*, 2018). The present study reports the occurrence of a seventh species *Rhinolambrus lippus* (Lanchester, 1901) for the first time from India. The affinities of this species with other closely related species is discussed in the report.

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Redescription of *Arcotheres pernicola* (Bürger, 1895) (Crustacea: Decapoda: Brachyura: Pinnotheridae) from the oyster *Magallana gryphoides* (Schlotheim, 1820) in India

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Abstract

The identity of *Arcotheres pernicola* (Bürger, 1895) (Pinnotheridae), a pea crab supposedly associated with the mussel *Perna*, has been unclear as the type specimen is in poor condition. Specimens collected from the oyster *Magallana gryphoides* (Schlotheim, 1820) from Alibaugh, Maharashtra state, India, are here referred to *A. pernicola* and the species is redescribed and refigured. Its affinities with allied congeners are also discussed.

Key words: pea crab, *Perna*, rocky shore, Maharashtra

Introduction

Manning (1993) established the genus *Arcotheres* (type species: *Pinnotheres palaensis* Bürger, 1895) as distinct from *Pinnotheres* Bosc, 1802, on the basis of the digitiform dactylus of the third maxilliped, which is inserted proximally on the ventral margin of the propodus; and the dactyli of the fourth and fifth pereopods being longer and different in structure compared to those of the second and third pereopods, with the fourth pereopod asymmetrical in length (see also Campos & Manning 2001). Gordon (1936) observed that two subgroups can be recognized among species assigned to *Arcotheres* on the basis of the relative lengths of the dactylus of the longer fourth and fifth pereopods. Members of the larger subgroup have the dactylus of the fifth pereopod longer than that of the longer fourth pereopod while in members of the smaller subgroup, the dactylus of the longer fourth pereopod is longer than that of the fifth pereopod (Trivedi *et al.* 2018a). *Arcotheres* currently contains 27 species (Bürger 1895; Gordon 1936; Manning 1993; Campos 2001; Campos & Manning 2001; Ah Yong & Ng 2007; Ng *et al.* 2008, 2017; Ng & Kumar 2015; Trivedi *et al.* 2018a–c), of which eight are known from India (Ng *et al.* 2017; Ng & Kumar 2015; Trivedi *et al.* 2018a–c).

Bürger (1895) described *Arcotheres pernicola* (as a *Pinnotheres*) from specimens supposedly obtained from an unidentified species of “*Perna*” from Ubay, Philippines. Ah Yong & Ng (2007) selected a lectotype (and the only extant specimen) of *P. pernicola* and transferred it to *Arcotheres* on the basis of the elongate dactyli of the fourth and fifth pereopods that are longer than those of the second and third pereopods. This type specimen, however, is in very poor condition, with the carapace soft and broken and the third maxillipeds as well as many of the pereopods broken or missing (Ah Yong & Ng 2007). Ah Yong & Ng (2007) commented that Bürger’s (1895) figures of the specimen are also inaccurate as they show the dactyli of the second and third pereopods to be longer than half the length of the P5 dactylus, but the remnants of the type have the dactylus of the fifth pereopod more than twice as long as those of the second and third pereopods.

Specimens of pea crabs recently collected from the oyster *Magallana gryphoides* (Schlotheim, 1820) (Ostre-



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Biosynthesis and Characterization of Silver Nanoparticles from *Tinospora cordifolia* Root Extract

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ABSTRACT

Green synthesis of silver nanoparticles is one of the promising branches of nanotechnology for applications in different biomedical fields. In the present investigation, methanol extract of *Tinospora cordifolia* root were used as reducing agent. Then the silver nanoparticles are characterized using UV-Vis, SEM, XRD, TEM and FTIR spectroscopic techniques. The functional biomolecules responsible for the reduction of the silver ions and the capping of the silver nanoparticles by the plant extract *Tinospora cordifolia* were identified by the Fourier transform infrared spectroscopy (FTIR) analysis. The TEM analysis shows that the silver nanoparticles with an average size of 100 nm. X-ray diffraction analysis showed that the particles were crystalline in nature.

1. Introduction

In recent years, Silver nanoparticles are receiving great interest due to their diverse applications [1-6]. Green synthesis of silver nanoparticles has become a major focus for researchers due to their simplicity of procedures, nontoxic, stability and eco-friendly [7-8]. The initial step in the synthesis of silver nanoparticles involves reduction of silver ions to neutral atoms with a strong reducing agent. In case of biological synthesis of silver nanoparticles, bio components such as microorganism, plant extract have been found to be excellent sources of natural reducing agents [9-14]. Phytochemicals such as polyphenols and alkaloids etc. have been found to be suitable reducing agents in the synthesis of metal nanoparticles [15-17]. In this study, *Tinospora cordifolia* plant extract was used as a reducing agent to synthesize silver nanoparticles.

Tinospora cordifolia belonging to the family Menispermaceae is a genetically diverse, large, deciduous climbing shrub with greenish yellow typical flowers, found at higher altitude [18]. It is commonly known as "Guduchi" in Ayurveda [19-21]. It has been used as an important drug by ayurveda practitioners in various diseased conditions. The plant mainly contains biologically active chemical constituents like alkaloids, glycosides, steroids, sesquiterpenoid, aliphatic compound, essential oils, mixture of fatty acids and polysaccharides. The plant possesses medicinal properties like anti-diabetic, anti-periodic, anti-spasmodic, anti-inflammatory, anti-arthritis, anti-oxidant, anti-allergic, anti-stress, anti-leptotic, anti-malarial, hepatoprotective, immunomodulatory and antineoplastic activities [22].

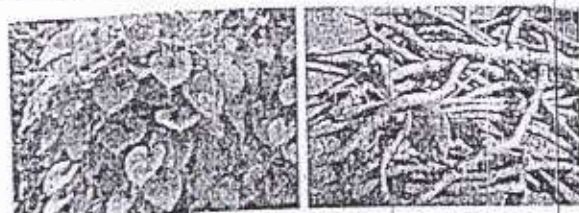


Fig. 1 *Tinospora cordifolia* a) leaves and b) roots

2. Experimental Methods

2.1 Synthesis of Silver Nanoparticles

Silver nitrate was purchased from Sigma Aldrich chemicals. All the glassware were cleaned and washed with double distilled water to remove any impurities and dried in an oven before use. *Tinospora cordifolia* roots were collected and rinsed thoroughly with distilled water and shade dried for 15 days. The roots were finely powdered and used for preparation of the extract. 5 g of such powder was mixed with 250 mL of methanol and the mixture was left at room temperature for two days. The extract was filtered through Whatman no.1 filter paper and the filtrate used for silver nanoparticle synthesis. 0.1 M AgNO₃ was prepared by dissolving 4.25 g AgNO₃ in 250 mL double distilled water. 100 mL of methanol extract of *Tinospora cordifolia* root was added to 100 mL of 0.1 M aqueous AgNO₃ solution at room temperature for the reduction of silver nanoparticles. The reduction of silver ions takes place within 15 min at room temperature. Slowly the color started changing from colorless to brown and finally reddish brown, indicating the formation of silver nanoparticles.

2.2 Characterization of Silver Nanoparticles

2.2.1 UV-Vis Studies of Silver Nanoparticles

The reduction of silver nitrate to pure Ag⁰ ions using methanol extract of *Tinospora cordifolia* root was monitored by measuring the UV-Vis spectrum of the reaction medium. The sample were diluted with 3 mL of acetone and measured for UV-Vis spectrum at room temperature in the range 200 - 800 nm. Acetone was used as reference.

2.2.2 FTIR Analysis

FTIR measurement was carried out to identify the biomolecules present in *Tinospora cordifolia* root extract and the interaction between the nanoparticles were identified by the Fourier transform infrared spectroscopy (FTIR) analysis. FTIR spectra of the purified silver nanoparticles powder were analyzed by FTIR spectroscopy. FTIR results were obtained (Thermo Nicolet, Avatar 370) in the range 4000- 400 cm⁻¹. FTIR spectra were measured using the KBr pellet method. The bio-reduced solution was centrifuged at 2500 rpm for 30 minutes at room temperature to remove free constituents present in the solution and the pellet was obtained. The pellet was redispersed in distilled water. The process of centrifugation and re-dispersion in sterile water was repeated thrice. Then the purified silver nanoparticles were dried in oven at 100 °C. The FTIR spectrum of the dried sample was carried out to study the presence of

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Spectral and Microbial Screening of One-Pot Multicomponent Synthesis of Fused Quinazolinone Derivatives

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ABSTRACT

Heterocyclic compounds containing 2-chloro-3-formyl pyridine and 2-amino thiazole quinazolin-6(7H)-one are reported to possess significant biological activity. Synthesis of 5-(2-chloro-5-(4-substitutedphenyl)pyridin-3-yl)-3-(4-substitutedphenyl)-8,8-disubstituted-8,9-dihydro-5H-thiazolo [2,3-b] quinazolin-6(7H)-one derivatives have been described. These compounds have been characterized on the basis of UV, IR, ¹H NMR, Mass and elemental analysis. Compounds have been evaluated for their antimicrobial activity. Among the series containing some of the compounds showed promising results against standard drugs.

Graphical Abstract



Keywords: Fused Quinazolinone derivatives, Spectral studies, Microbial screening, One-Pot Multicomponent Synthesis.

INTRODUCTION

Recent developments in the chemistry of quinazolinone derivatives have given rise to more than ten thousand publications in patents, and yielded more than one thousand derivatives. The quinazolinone heterocycle is a widely researched and important scaffold in medicinal chemistry because of the variety of pharmacological properties associated with the compounds bearing this heterocycle [1]. Although

Computational Studies on some Flavonoids of Natural Products used against Parkinson's Diseases

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Abstract— Neurodegenerative diseases like Parkinson is understood through pathophysiological mechanisms. Natural products are having the capacity to cross the BBB (blood-brain barrier) and slow the progression of this diseases. Natural products like flavonoids and terpenoids have been reported in the literature for cure of Parkinson's disease. Neurodegenerative disease is the condition of brain cells that lose its ability to generate the neurotransmitters and this leads to the accumulation of protein in the brain. This condition causes memory loss and problems in the cognitive functions. Parkinson's disease is a second neurological disorder; characterized by a selective loss of dopaminergic neurons in the substantia nigra what causes a subsequent reduction of dopamine levels in the striatum. In this study flavonoids of Ginkgo biloba (Apigenin, Catechin, Luteolin Procyanidins, fustin) which are known to slow down progression of Parkinson, are selected for docking study using Argus Lab (4.0.1). Process of docking is carried out using best shape based search algorithm principle. Results show that there is interaction between selected components of Ginkgo biloba and this may be responsible for recovery in patients by using these herbal formulations.

Keyword — Parkinson; Flavonoid; Docking; Interaction; Proteins;

1. Introduction

The second most common neurodegenerative disease is Parkinson's disease which has been increasing by without evidence of healing[1]. A Chronic neurological disease occurs due to decreased dopamine production in the Substantia nigra (it's supplies the basal ganglia)[2] and it's important symptoms are the slowness of movement, impaired balance and a shuffling gait, rigidity[3]. Estimates of the disease range from 5 to 35 new cases per 100,000 individuals and this increases with age[1]. The substantia nigra cells communicate for movement control in the brain by secreting dopamine and neurotransmitters. When substantia nigra cell die, they stop secreting dopamine [4]. This disturbance in the movement control centers of the brain cause the main symptoms or balance problems. To characterize PD, progressive degeneration of dopaminergic neurons causing depletion of striatal dopamine and formation of Lewy bodies in the substantia nigra are the principal neuropathological correlation of motor damage in PD[1].

There are two type of Parkinson's Disease

Primary Parkinsonism:80-85% patients are diagnosed with primary parkinsonism.This type is important for the replacing or increasing the dopamine molecules in the brain. **Secondary parkinsonism:** It's is also called the parkinsonian syndrome or a typical parkinsonism, It includes drug induced parkinsonism,vascular parkinsonism,normal pressure hydrocephalus, corticobasal degeneration, progressive supranuclear palsy and multiple system atrophy[5]. Symptoms of Parkinson's are impaired posture and balance, slowed movement, loss of automatic movements, speech changes, tremor, writing changes, and rigid muscles.

Parkinson's disease is often accompanied by these additional problems like swallowing problems, chewing and eating problems, thinking difficulties, bladder problems, constipation, depression and emotional changes, sleep problems and sleep disorders.[6]

There is a no particular test of PD for diagnosis.The main problem in developing neuroprotective remedies is a limited understanding of the main molecular events that provoke neurodegeneration. In last several years, the natural products used against PD are mainly compounds of products derived from plants [7]. The natural compounds have fewer side effects than the synthetic compounds.These treatment of PD give the disease a chance to be administered effectively, improvement of patient quality of life, and often for decades after onset of the disease leading to symptom control [1].

Decolorization of Coralene Navy Blue 3G dye 215 using in Textile Wastewater

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Decolorization of textile dye coralene navy Blue 3G was carried out using advance oxidation method. In this method catalyst TiO_2 and H_2O_2 were used. The whole experiment was carried out under solar light. The effect of various parameters like photo catalyst, concentration of H_2O_2 , concentration of Dye and pH were, studied. Process of degradation is faster in solar light when TiO_2 in used as catalyst. The decolorization efficiency was inversely related to dye concentration of the effluent. The maximum decolorization occurred in ≤ 240 min in all cases. A mechanism is proposed for the process of degradation considering the various parameters. This advanced oxidation degradation process was applied to treat textile dye in wastewater.

Keywords: Advance oxidation, Coralene navy Blue 3G, H_2O_2 , TiO_2 .

1. Introduction:

Azo dyes constitute the largest class of dyes used in industry. In textile industry, it is estimated that 10–15% of the dye is lost during the dyeing process and released as effluent. Azo dyes are the most important class of synthetic organic dyes used in the textile industry and are therefore common industrial pollutants. They are produced in large amounts and enter the environment during the production and manufacturing processes [1]. They are characterized by the presence of one or more azo group ($-\text{N}=\text{N}-$) bound to aromatic rings. It has been reported that some of them are toxic, mutagenic, and carcinogenic compounds [2]. Azo dyes are resistant to aerobic degradation; however, under anaerobic conditions, the azo linkage is reduced to generate aromatic amines that are colorless but can also be toxic and potentially carcinogenic [3].

There are many kind of dyes available in the market. In view of their chemical structures, dyes can be characterized as azo dyes, anthraquinone dyes, heterocyclic dyes, etc. Dyes can also be characterized according to their application method into Vat dyes, Reactive dyes, Direct dyes, acid dyes, basic dyes, disperse dyes, etc [4]. As these dyes are designed to resist oxidative degradation, they pass through most stages of effluent treatment and ultimately released into environment. Many treatment methods have been reported for dye degradation such as flocculation, coagulation, ultrafiltration, reverse osmosis, biodegradation etc. These methods have their own limitation in terms of high cost, specificity for certain group, disposal of sludge formed, and excessive use of chemicals [5]. Another set of techniques that are relatively newer, more powerful, and very promising called Advanced Oxidation Processes (AOPs) has been developed and employed to treat dye-contaminated wastewater effluents [6].

Advanced Oxidation Processes (AOPs) are alternative techniques of destruction of dyes and many other organics in wastewater and effluents. These processes generally, involve $\text{UV}/\text{H}_2\text{O}_2$, UV/O_3 or $\text{UV}/\text{Fenton's}$ reagent for the oxidative degradation of contaminants. Heterogeneous photocatalysis through illumination of UV or solar light on a semiconductor surface is an attractive advanced oxidation process. Titanium dioxide is a wide band gap Semiconductor (3.2 eV) used successfully as a photocatalyst for the degradation of organic and dye pollutants [7]. However, TiO_2 absorbs a small portion of solar spectrum in the UV region (4–6%). Hence, to reap maximum solar energy, it is necessary to shift the absorption threshold towards visible region. Semiconductor photocatalysis is a newly developed AOP, which can be conveniently applied to dye pollutants for their degradation [8].

Study on volumetric and acoustic properties of binary mixtures of p-Cymene with fluorobenzene, chlorobenzene and bromobenzene at various temperatures

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Volumetric and acoustic properties of p-cymene with fluorobenzene, chlorobenzene and bromobenzene have been investigated using density, (ρ), and speed of sound, (U) measurements over the entire composition range at $T = (303.15, 308.15 \text{ and } 313.15) \text{ K}$. From the experimentally measured density, (ρ); Excess molar volumes, (V_m^E), infinite dilution partial molar volume, ($\bar{V}_{m,i}^\infty$), excess partial molar volume, ($\bar{V}_{m,i}^{E,\infty}$), apparent molar volume, ($V_{m,\phi,i}$), infinite dilution apparent molar volume, ($V_{m,\phi,i}^\infty$), with empirical parameters, S_v , B_v and limiting apparent molar expansibility, (E_ϕ^∞) have been calculated. Deviation in speed of sound, (ΔU), deviation in isentropic compressibility, ($\Delta\kappa_s$), deviation in acoustic impedance, (Δz), infinite dilution partial molar isentropic compressibility, ($\bar{K}_{s,m,i}^\infty$), excess partial molar isentropic compressibility, ($\bar{K}_{s,m,i}^{E,\infty}$), apparent molar isentropic compressibility, ($K_{s,m,\phi,i}$), infinite dilution apparent molar isentropic compressibility, ($K_{s,m,\phi,i}^\infty$) with empirical parameters S_k and B_k and intermolecular free length (L_f) have been calculated using experimentally measured speed of sound, (U). To derive fitting coefficients, (A_i) with standard deviation, (σ), excess properties were fitted to the Redlich-Kister type polynomial equation. Various theoretical speed of sound and average deviations have been calculated using well established equation like Nomoto, (U_{nm}), Ideal Mixing Rule, (U_{imr}), Junji, (U_{junji}) and Jacobson's Free Length Theory, (U_{flt}). The variation of these properties with composition and temperature has been discussed in terms of molecular interaction on mixing and their interacting abilities have also been compared.

Keywords: Density, Speed of sound, Excess molar volume, Isentropic compressibility, Acoustic impedance

1 Introduction

A study on spectral, thermodynamic and transport properties such as FT-IR, density, viscosity, refractive index and speed of sound for binary and multicomponent liquid mixtures are reported by many research groups in recent years¹⁻⁷. Thermodynamic and transport properties are essential for a process design as well as understanding a structure orientation in liquid mixtures. The excess thermodynamic properties of binary liquid mixtures have been extremely helpful to get data on the intermolecular interactions and geometrical impacts in the frameworks^{8,9}.

The knowledge of physicochemical properties of binary liquid mixtures have significance importance in theoretical and applied areas of research, and such outcomes are frequently used in designing processes (flow, mass transfer or heat transfer calculations) in many chemical and industrial units. The excess property values obtained from these physical property

data reveal the physicochemical behaviour of the liquid mixtures regarding the arrangement of structure and intermolecular interactions between the component molecules in the mixture¹⁰. p-Cymene (1-methyl-4-(propan-2-yl) benzene) is a naturally obtained from oils of cypress and essential oils in various plant species. The study of volumetric and acoustic properties of p-cymene with organic solvents help us to understand the nature and behavior in binary mixture. The study of these parameters helps us in various separation techniques, mass transfer phenomena as well as in various analytical techniques^{11,12}.

In present study, the density, sound velocity and its related properties such as excess molar volumes and deviation in sound velocities were studied. Some theoretical sound velocities of binary mixture were calculated by using well known relations and were compared with experimental values. The results were interpreted in terms of intermolecular interaction between the components of binary mixture.

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Volumetric, acoustical and computational study on molecular interactions in binary mixtures of Ricinoleic acid with some halobenzenes

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Densities (ρ) and speed of sound (u) of binary liquid mixtures of Ricinoleic acid with some halobenzenes at 303.15, 308.15 and 313.15 K and atmospheric pressure have been reported over the entire composition range. From the experimentally measured density (ρ), excess molar volumes (V_m^E), have been calculated. Deviation of the speeds of sound (Δu), isentropic compressibility (κ_s), deviation in isentropic compressibility ($\Delta \kappa_s$), deviation in acoustic impedance (Δz) and intermolecular free length (L_f) have been calculated using experimentally measured speed of sound, (u). Various theoretical speeds of sound and average deviations have been calculated using well established equations like Nomoto (U_{nm}), Ideal Mixing Rule (U_{imr}), Junji (U_{junji}) and Jacobson's Free Length Theory, (U_{flt}). To derive fitting coefficients, (A_i) with standard deviation, (σ), excess properties have been fitted with the Redlich-Kister type polynomial equation. The variation of these properties with composition and temperature has been discussed in terms of molecular interaction on mixing and their interacting abilities. Observations reveal that there have been strong interactions between components. Strength of interactions between components has been described with theoretical computational calculations.

Keywords: Density, Speed of sound, Excess molar volume, Isentropic compressibility, Computational calculation, NBO analysis

Castor oil is pale-yellow thick oil and it is rich in Ricinoleic acid which has a powerful therapeutic effect. It is used as an excellent anti-oxidant and anti-inflammatory oil. Castor oil has been used for many years for the treatment of many skin infections and for healthy hair growth, it was used to preserve food due to its strong antimicrobial properties in earlier times. In India, it was a popular folk medicine that was used as a laxative and to improve memory. It plays an important role in Indian traditional medicine (Ayurvedic medicine) till date. Castor oil, as a component of less expensive vegetable oils can be used as feedstock in the production of biodiesel and this fuel can be use in cold winters¹.

Study of binary mixture of liquids in terms of theoretical models plays vital role to understand the type and relative strength of various weak or strong molecular interactions present in complex fluid state². Density measurements of binary liquid mixtures are essential for determination of composition of binary mixtures usually for non-ideal mixtures where direct experimental measurements are performed over the entire composition range².

Ricinoleic acid is major component of castor and there are a few methods available for separation. Separation of Ricinoleic acid is a tedious and time consuming, which raises its cost, so new effective methods for separation of Ricinoleic acid from castor oil are required. Our group has been studying behavior of Ricinoleic acid in different group of solvents by providing electron donating electron accepting environments to find its interaction with them.

Detailed literature review has revealed that no study has been carried out on the physico-chemical properties of Ricinoleic acid, the main component of castor oil. In the present paper, it was decided to study density and speed of sound effect on binary mixtures of Ricinoleic acid with halo substituted benzenes.

Material and Methods

Chemicals

Ricinoleic acid (with >95% purity, Tokyo Chemical Industry Co. Ltd., Tokyo, Japan), fluorobenzene (with 99% purity, S. D. Fine Chem. Ltd., India), chlorobenzene (with 99% purity, S. D. Fine Chem. Ltd., India), bromobenzene (with 99% purity, S. D. F.

EFFECT OF OPERATIONAL PARAMETERS ON DEGRADATION OF CORALENE NAVY BLUE 3G DYE BY SOLAR AND ULTRAVIOLET IRRADIATION

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Abstract:

The photocatalytic degradation of Coralene Navy Blue 3B has been studied in the presence of titanium dioxide powder illuminated with a solar light and UV light. The effect of hydrogen peroxide on the degradation process was also determined. It was found that the color removal efficiency was affected by the concentration of dye, amount of TiO₂ added, and the pH of the solution. The degradation of dyes obeys first-order kinetics, with the apparent first-order rate constant increasing with decreasing dye concentration. The rate constants were evaluated as a function of the concentration of dye, amount of TiO₂, and pH.

Keywords: UV irradiation, Coralene Navy Blue 3G, H₂O₂, TiO₂.

1. Introduction:

Textile dyes are an abundant source of colored organic compounds that present an increasing environmental danger. During dye production and textile manufacturing processes a large quantity of wastewater containing dyestuffs with intensive color and toxicity can be introduced into the aquatic systems [1]. Ankleshwar is known as textile city of Gujarat. There are many major textile processing units which use million liter of water every day and generate huge quantity of effluent containing dyes [2]. For the removal of dye pollutants, many traditional physical techniques (adsorption on activated carbon, ultra filtration, reverse osmosis, coagulation by chemical agents, etc.) can generally be used efficiently [3]. Since sunlight is abundantly available natural energy source, its energy can be conveniently exploited for the irradiation of semiconducting materials. UV irradiation is yet another high energy source for degradation of organics present in the effluents. In photocatalytic process, electron-hole recombination is a major problem to circumvent. In photo catalysis, UV irradiation source stands up among other sources to avoid this problem. So it was decided to study the influence of solar light and UV light independently on the photocatalytic degradation of dyes [4].

Recently, advanced oxidation processes (AOPs) were developed to oxidize organic compound into CO₂, H₂O & inorganic ions or biodegradable compound. These methods are environmentally friendly. There for, AOPs are considered as promising treatment methods for waste waters [5]. TiO₂ semiconductor is often used as catalytic agents because of their high stability, low costs, high efficiency and nil toxicity [6]. Hydroxyl radical (H•) and superoxide radical anions (O₂^{•-}) are suggested the primary oxidizing species in the photocatalytic oxidation processes. These oxidative reactions would result in the bleaching of the dye [7].

RESEARCH ARTICLE

Varying Body Composition and Growth in Indian Adolescents from Different Socioeconomic Strata

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Abstract: Background: Early growth stunting has been associated with modifications in body composition and its direction differs with the local environment. Data on the association between body composition with growth and the influence of socioeconomic strata (SES) on the same is scarce in Indian adolescents.

Objectives: The study aimed to examine (i) the associations of SES with body composition and growth (ii) the relationship between body composition and lifestyle factors (physical activity, diet) across SES and (iii) interrelationship between the body composition and growth.

Methods: A cross-sectional study on apparently healthy adolescents (10-14years, n=604) from different SES, was conducted in Gujarat, Western India. Outcome parameters included anthropometry, body composition, moderate to vigorous physical activity (MVPA) and dietary intake.

Results: 84%, 66% and 39% boys, whereas 61%, 43% and 26% girls from upper, middle and lower SES respectively, were underfat; amongst upper SES, 22% boys and 8% girls were obese ($p < 0.001$). 24% boys and 19% girls from lower SES were stunted ($HAZ < -2$) ($p < 0.001$). In all SES, %fat mass (FM) showed an inverse correlation, while %fat free mass (FFM) showed a positive correlation with MVPA. Comparing the prevalence of stunting across the %body fat categories revealed that 15% of the underfat boys and 16% of the underfat girls were stunted ($p < 0.001$).

Conclusion: SES shows a significant impact on body composition with a majority of lower SES adolescents being underfat. Underfat adolescents were at a greater risk of being stunted.

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Keywords: Adolescents, body composition, growth, physical activity, socioeconomic strata, stunting.

1. INTRODUCTION

Adolescence is a critical phase of human life where the nutritional needs are high due to increased physical growth and changes in the body composition. These changes in the body composition are attributed to and influenced by modifications in the lifestyle, food habits and ethnicity of the population [1, 2]. Given that adolescence is a critical period for growth, nutrient imbalances during this period can result in long lasting consequences such as growth failure, alteration in body composition, depressed immunity, anaemia and vulnerability to several diseases [3-5].

In developing countries such as India, due to the influence of socioeconomic gradients, adolescents belonging to the upper socioeconomic strata (SES) have less constraints

on achieving their full genetic growth potential than adolescents belonging to the middle and lower SES [6]. SES differences also influence sufficient availability of food both in terms of quantity as well as quality; therefore the accessibility of adequate nutrition is determined by the SES of an individual [1]. SES influences not only the diet, but also other lifestyle factors like physical activity. Participating in regular physical activity during adolescence helps in the development of healthy bones and muscles along with prevention of obesity [7, 8]. Physical activity and nutritional habits also have a significant impact on energy balance and hence are instrumental in determining the body composition of an individual [9, 10]. Furthermore, the growth phase during childhood and adolescence also involves massive changes in both fat mass and fat free mass, i.e. the body composition. It is thus vital to understand variations in the body composition occurring during growth, so as to understand the abnormal variants, which are usually associated with disease [2]. Research has shown that early growth stunting has been associ-

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AN ANNOTATED CHECKLIST OF MARINE BRACHYURAN CRABS OF GUJARAT

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Gujarat state has longest coastline in the country. The coastal areas of the state can be divided into three regions, Gulf of Kachchh, Saurashtra coast and Gulf of Khambhat. These regions are endowed with wide variety of marine habitats supporting enormous varieties of marine invertebrates. Amongst the marine invertebrate fauna, crustaceans are least studied for their diversity. The present work on marine brachyuran crab diversity was carried out from 2011 to 2018. Brachyuran crab species listed in the literature published from Gujarat is checked for taxonomic validation and compiled in the form of list. Specimens were also collected from different coastal areas, fish landing centers and local fish market of the state and identified up to species level using different taxonomical keys. Total 146 species belonging to 84 genera and 28 families are recorded from Gujarat. Maximum diversity is recorded from Gulf of Kachchh followed by Saurashtra coast and Gulf of Khambhat. In terms of local endemism, total 52, 31 and 16 species were only recorded from Gulf of Kachchh, Saurashtra coast and Gulf of Khambhat respectively while 6 species were commonly found in all the three regions. Occurrence of two species *Ilyoplax frater* (Kemp, 1919) and *Ilyoplax stevensi* (Kemp, 1919) were also recorded for the first time from Indian coast. The results show that Gulf of Khambhat has least diversity and need to be explored more for brachyuran crab diversity.

Keywords: Taxonomy, Marine Crustaceans, Distribution Extension, Gujarat

AN ANNOTATED CHECKLIST OF STOMATOPODS
(CRUSTACEA: STOMATOPODA) OF INDIA

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The stomatopod fauna is one of the least studied groups of crustaceans occurring in Indian marine waters. The present study was carried out to prepare a taxonomically validated checklist of stomatopod species recorded from India. Detailed literature review was carried out to make list the stomatopods species recorded from Indian waters. All the species records were checked for their taxonomic validation. The authors have also conducted field work for the specimen collection in the coastal areas of Gujarat state. Total 79 species of stomatopods belonging to 36 genera and 9 families are so far reported from India. Maximum diversity was recorded from east coast (74 species) of India as compared to west coast (31 species). In state wise occurrence, maximum diversity was recorded from Tamil Nadu (50 species) while least diversity was recorded from Karnataka (2 species). In case of local endemism, 47 and 5 species were only recorded from east and west coast on India while 25 were commonly occurring on the both coasts. In the present study occurrence of total 4 species: *Stomatopoda smithii* Pocock, 1893, *Clorida bombayensis* (Chhapgar & Sane, 1967), *Harpisquilla arpax* (de Haan, 1844), *Miyakella nepa* (Latreille in Latreille, Le Peletier, Serville & Guérin, 1828) is first time reported from Gujarat, while occurrence of *Erigosquilla massavensis* (Kossmann, 1880) from Gujarat shows distribution range extension of the species on west coast of India. The current study suggests that the coastal areas of west coast need more surveys to study stomatopod diversity.

Keywords: Taxonomy, Synonyms, Checklist, Stomatopods, Gujarat

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STUDY OF GASTROPOD SHELL PREFERENCE *DIOGENES CHHAPGARI* TRIVEDI,
OSAWA & VACHHRAJANI, 2016

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Diogenes chhappari Trivedi, Osawa & Vachhrajani, 2016 is newly described species of hermit crab from coastal areas of Gulf of Khambhat, Gujarat and very little is known about its ecology. The present study is a first approach to study the ecological aspect of the species. Sampling for the collection of the species was carried out using hand picking method from October to December, 2018 in the mudflat habitat of Dandi, Gujarat and Mumbai, Maharashtra. The specimens were identified up to species level and categorized in three groups viz. male, female and ovigerous female. The crab specimens were weighed and their size (shield length) was measured. The gastropod shells were identified using standard literature and keys and different morphological characters were measured. Total 1437 individuals of hermit crab were captured (1086 males, 243 females and 108 ovigerous females), occupying 13 different species of gastropod shells. Amongst all the shell species identified, *Cantharus spiralis* was highly occupied by the crab species followed by *Semiricinula fissi*, *Nassarius stolatus*, *Latinus nassoides*, and *Umbonium vestiarium*. *D. chhappari* males were significantly larger in size than the female and ovigerous females. Body size and weight of the hermit crab showed significant correlation with different morphological characters of gastropod shell. Strong correlation was recorded between crab body size and shell dry weight which shows shell weight has significant impact on shell selection pattern of hermit crab.

Keywords: Hermit Crabs, Morphology, Gastropods, Mudflat, Gulf of Khambhat, Mumbai

STUDY OF GASTROPOD SHELL UTILIZATION PATTERN OF
CLIBANARIUS SIGNATUS HELLER, 1861

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Clibanarius signatus Heller, 1861 is a common species of hermit crab found on the rocky shore habitat of Saurashtra coast of Gujarat state, India. Sampling for the collection of the species was carried out using hand picking method in June, 2018 and December, 2018 in the rocky shores of Veraval. The specimens were identified up to species level and categorized in three groups viz. male, female and ovigerous female. The crab specimens were weighed and their size (shield length) was measured. The gastropod shells were identified using standard literature and keys and different morphological characters were measured. Total 2000 individuals of hermit crab were captured (680 males, 611 females and 709 ovigerous females), occupying 29 different species of gastropod shells. Amongst all the shell species identified, *Cerithium caeruleum* was highly occupied by the crab species followed by *Lunella coronata*, *Tenguella granulata*, *Tarbo brunneus* and *Polia undosa*. Male and female of *C. signatus* utilized a wide range of shell species, while ovigerous female used a specific set of gastropod shell species. *C. signatus* males were significantly larger in size than the female and ovigerous females. Significant correlations were observed between various morphological characters of crabs and shells. Shell dry weight showed strong correlation with all the morphological characters of hermit crab. Literature shows that *C. caeruleum* is occurs in high density as compared to other gastropod species in the sampling area. Above mentioned results revealed that different morphological characters and availability of gastropod shells have profound impact on shell preference of *C. signatus*.

Keywords: Gastropod Diversity, Shell Utilization, Hermit Crabs, Rocky Shore, Gujarat

Marine Algae Diversity at Coastal Area of Veraval, Gujarat

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ABSTRACT

The Veraval coast situated at (20°54'30° N 76°21'20° E) the gulf of Kachchh, western coast of Gujarat, India. This site has a rich diversity of marine algae, corals and gastropods at intertidal region. The main aim of present study focused on occurrence and diversity of marine algae at coastal site. The study carried out in month of December- 2019. Algae collection was done during low tide situation, at this condition algae were collected with their holdfast/rhizoid. Total 33 species of algae were collected from three different phylum. Among these maximum 18 species were recorded from red algae, 8 species were recorded from green algae and 7 species were recorded from brown algae.

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Flower-Mediated Phytosynthesis of Silver Nanoparticles from *Butea monosperma* Lam. and their Evaluation for Antibacterial Activity

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ABSTRACT

The green synthesis of metallic nanoparticles is the simplest, affordable and eco-friendly approach, which attracted researchers because of their immense applications. The plant-mediated synthesis of nanoparticles plays an important role in the field of nanobiotechnology as they devoid of harmful chemicals. Plenty of reports were available on synthesis of silver nanoparticles using the vegetative parts of plant especially foliar/leaf parts but reports on floral/flower parts utilized for silver nanoparticles synthesis were limited. Although flowers were found as potential source of many important phytochemicals which can be used for treatments of many diseases and *Butea monosperma* Lam. Flowers were utilized for curing several diseases so, here its extract were used for synthesis of

silver nanoparticles by using it as capping and stabilizing agent. The present study, deals with synthesis of silver nanoparticles (AgNPs) from *Butea monosperma* Lam. Flower extracts through greener approach and then synthesized AgNPs were characterized using UV- visible spectrometry, X-Ray diffraction (XRD), Fourier transform infra-red (FTIR) spectroscopy and Scanning electron microscopy (SEM) which confirms its synthesis from silver metal. Further, the anti-bacterial properties of the synthesized silver nanoparticles were studied, and the results revealed that the flower mediated silver nanoparticles had showed strong anti-bacterial activity against *Pseudomonas sp.*, *Escherichia coli*, *Bacillus subtilis* and *Staphylococcus aureus*.

KEYWORDS: Phytosynthesis; Silver nanoparticles; *Butea monosperma*; Anti-bacterial activity; Flower.

Introduction

In recent years, the nanobiotechnology is one of the most active areas now gaining attraction among many researchers. There are various methods like chemical and physical methods are extensively used for silver nanoparticle synthesis, but these methods are quite expensive and hazardous to the environment. Silver nanoparticles are considered as a unique metal due to their specific shape, size and applications to the various field of science (Sathishkumar *et al.*, 2009; Yuri *et al.*, 2011). Since last some years, the use of biological organisms such as microorganisms and plant extracts could be a possible alternative to chemical and physical methods as an eco-friendly approach and green synthesis (Sastry *et al.*, 2004; Bhattacharya *et al.*, 2005; Mohanpuria *et al.*, 2007). Simultaneously, the plant extracts are rich in bioactive compounds and have recently been used for green synthesis of nanoparticles. Many different plant leaves and herbs used for the synthesis of nanoparticles have been reported previously (Ahmed, 2016). Moreover, it is observed that the plants are considered to possess various phytochemicals such as alkaloids, flavonoids, phenols, terpenoids, quinones,

aldehydes, ketones and amides which act as enzymes, cofactors and reducing agents in the presence of metal salts (Rao, 2013). Previously, leaf and barks of plants were used to synthesize the silver nanoparticles (Awwad *et al.*, 2013; Prakash *et al.*, 2013; Ahmed *et al.*, 2016; Hamelian *et al.*, 2018), moreover the floral parts also possess many phytochemicals, which further utilized for many herbal formulation. *Butea monosperma* (flower of the forest) is an important medicinal plant belonging to Papilionaceae family. All the parts of this plant like leaves, flowers, stem, stem bark, seeds and roots have medicinal potential to cure various diseases and have been widely used in Ayurveda and traditional medicine (Kirtikar and Basu, 1999; Nadkarni, 2007). The flowers are very attractive and bright orange to orange in colour. Further, traditional healers recommend the flowers for curing skin related diseases. Flowers of *B. monosperma* contains some important phytochemicals such as anthocyanins, triterpene, isobutrin, flavonoids, steroids, butein, saponin, steroid and tannin (Vaidya and Pandita, 2017; Padghan, 2018). The flowers are known to have anti-inflammatory and antioxidant properties due to presence of flavonoids (Shahavi, 2008).



SHORT NOTE

Justicia beddomei, a source of comprehensive vasicinone production

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ABSTRACT

The present study formulates a method for comprehensive production of vasicinone, a quinazoline alkaloid, from multiple plant parts of *in vitro* and in-field-grown *Justicia beddomei*. HPTLC analysis of plant parts was executed with methanolic extract using toluene: butanol: butyl acetate (9:0.5:0.5; v/v/v) as the solvent system. Validation of methodology was accomplished using TLC plates (silica gel 60 F₂₅₄, pre-coated aluminium sheet) following the ICH manual to maintain accuracy, precision and repeatability with a linearity ranging 2–6 µg/spot. Validation data offers precision to the methodology adapted in the present study (LOD 1 µg/spot and LOQ 3 µg/spot). It was evident that *in vitro* samples produced relatively higher levels of vasicinone than that of their in-field counterparts. The highest vasicinone (2.07±0.025% of dry weight) production was quantified from *in vitro* stem, signifying a new resource for the production of vasicinone from identified parts of *in vitro* and in-field propagated *J. beddomei* plants.

ARTICLE HISTORY

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KEYWORDS

Alkaloid; HPTLC; *in vitro*;
 in-field; medicinal plant

Introduction

Justicia beddomei (C.B. Clarke) Bennet [syn. *Adhatoda beddomei* C.B. Clarke] belonging to family Acanthaceae is widely distributed throughout India. The plant is characterized with evergreen broad leaves and can reach up to a height of 80 cm (Sudha and Seeni 1994). Various diseases such as fever, cough, leprosy, heart troubles, blood disorders, haemorrhage and tuberculosis can be cured with the plant extracts of *J. beddomei*. The ethanolic leaf extracts of this plant possess different phytochemicals like vitamin E, campesterol, β-sitosterol, stigmasterol, phytol, and squalene that exhibit antimalarial, hepatoprotective, anticarcinogenic, hypoglycemic, antimicrobial, anticancer, anti-arthritis and antioxidant activities (Srinivasan et al. 2014). In a study, it was revealed that *J. beddomei* contains major alkaloids such as adhatodine, vasicine, vasicinol, 5-methoxyvasicine, and vasicoline. Based on the nature of functional group and dissociation properties, 'vasicine' and 'vasicinone' were identified as the representative standard compounds, with the aid of MS/MS spectra (Singh et al. 2015). Although production of vasicinone,

the photochemical oxidation derivative of vasicine, has been reported chiefly in *J. adhatoda* (syn. *A. vasica*) (Suthar et al. 2010) a prime member of Acanthaceae, yet insignificant attempt has been made on production, quantification and pharmaceutical exploitation of vasicinone from *J. beddomei*. Since the seed germination rate of *J. beddomei* is poor and limited number of studies have been reported for the mass propagation of this plant as well (Sudha and Seeni 1994), it is pertinent to search for an alternative approach for both mass multiplication of *J. beddomei* and production of vasicinone. In this context, plant tissue culture is the best approach for simultaneous production of quality, disease-free plants, and additional production of secondary metabolites without disturbing the natural flora of *Justicia* (Sudha and Seeni 1994; Abhyankar and Reddy 2007). Nevertheless, no reports have been found in support of simultaneous production of vasicinone from *in vitro* and in-field plant parts of *J. beddomei* till date. The present study was conducted for simultaneous quantification of vasicinone production from both in-field and *in vitro*-grown plant parts of *J. beddomei*.



Research Article

Natural production and quantification of ellagic acid in multiple plant parts of three *Terminalia* spp.

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ABSTRACT

Ellagic acid (EA) is a natural phenol antioxidant, found in multiple fruits. Chemically, it is a dilactone of hexahydroxydiphenic acid. Owing to its immensely beneficial anti-proliferative, antioxidant, and anticancerous activities, it needs to be quantified in natural resources. An effective densitometric high-performance liquid chromatography (HPTLC) method was established for the simultaneous quantification of ellagic acid from different plant parts of *Terminalia arjuna*, *T. bellerica*, and *T. chebula*. The method was validated for intra- and inter-day precision, reproducibility, and specificity. The intraday precision and interday precision was 1.5% and 1.2% relative standard deviation (RSD), respectively. The reproducibility of standard EA was precise and the seven lanes provided similar banding pattern. The linearity curve for the EA produced a correlation coefficient (r) value of 0.98992, with regression equation $Y=6330.441+935.150*X$, and with a standard deviation value of 4.59%. For chromatogram development, toluene: ethyl acetate: formic acid (5: 5: 2.5) was optimized as mobile phase. With the exception of fruits of *T. bellerica*, all the plant parts of all three species contain a significant amount of EA; the highest EA content being (0.733 $\mu\text{g} / \mu\text{g}$ dry weight) found in the roots of *T. bellerica*. In this study, the proposed HPTLC method for simultaneous quantification of EA was conducted in a simple, sensitive, specific, and precise manner that can be recommended for routine quality control and quantification of EA in plant materials.

Keywords: Anticancer, antioxidant, flavonoids, fruits, HPTLC, phenol, quantification, secondary metabolite

Abbreviations: HPTLC = High-performance liquid chromatography; LOD = Limits of detection; LOQ = Limit of quantifications; RSD = Relative standard deviation; TB = *T. bellerica*; TC = *T. chebula*; TA = *T. arjuna*

INTRODUCTION

Among the various secondary metabolites, polyphenolic compounds are prevalently found in several fruits, vegetables, beverages like tea, red wine, and in many

medicinal plants as well (Amakura *et al.*, 2000). One of such polyphenolic compounds, ellagic acid (EA), a dimeric derivative of the gallic acid, exists in fruits (such as walnuts, peaches, cranberries, raspberries, strawberries, grapes, and pomegranates) in the form of hexahydroxydiphenic acid and

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Attributes of *Aloe vera* gel and chitosan treatments on the quality and Biochemical traits of post-harvest tomatoes

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ABSTRACT

In this research paper, we report the efficiency of *Aloe vera* gel and chitosan, as edible coatings, in extending the post-harvest shelf-life of tomato fruits (*Solanum lycopersicum* Mill.), along with their biochemical attributes and antioxidative capacities. The tomato fruits were coated with *A. vera* gel or chitosan or a combination of both (*A. vera* + chitosan). Tomato fruits without any coating served as the control. Under all three coating treatments, the fruits showed a gradual increase in the total soluble sugar, total phenolic, and lycopene contents, and pectate lyase activity, and a gradual decrease in the titratable acidity and ascorbic acid content, as well as differentially induced antioxidative activities during cold storage, in comparison with the control fruits. The combined *A. vera* gel and chitosan treatment showed the best efficiency in delaying the ripening process and extended the fruit shelf-life up to 42 days.

1. Introduction

The climacteric tomato fruit (*Solanum lycopersicum* Mill.) has a very short post-harvest life owing to the losses of its quality and storage survivability due to many environmental factors, including its high respiration and transpiration rates, susceptibility to pathogens, and induced rate of ripening and senescence (Zapata et al., 2008). The quality of post-harvest tomatoes deteriorates continuously. The quality parameters of fruits include their flavour, colour, firmness, and nutritional traits, as well as shelf-life, processing quality, and resistance against diseases. Depending on the environmental circumstances, tomato fruits can depreciate very rapidly after harvest and also during transport and storage. Owing to the economic impacts of spoiled foods and health concerns over the safety of foods containing environmentally hazardous chemicals, emphasis has been laid on compounds of natural origin or bioproducts (Stavropoulou et al., 2014).

Consumable or non-toxic coatings made of biological compounds are being developed as safer substitutes for expanding the shelf-life of unpreserved foods and improving food consistency. There are many reports on the adaptation of biological compounds as edible coatings to prevent commodity weight loss, including celluloses, starch, wax, zein, milk proteins, lipids, and alginate (Mahfoudhi et al., 2013).

Aloe vera (L.) Burm.f. (synonym *Aloe barbadensis* Millier) belongs to

the plant family Liliaceae. It is widely used in pharmaceuticals and cosmetics as well as in the food industry since it contains biologically active compounds which have antimicrobial and antioxidative properties (Vega-Gálvez et al., 2011). Certain compounds within *A. vera* have been identified as bioactive molecules, such as soluble sugars, acemannan, mineral salts, proteins, fibres, organic acids, amino acids, minerals, phenolic compounds, and vitamins (Boultrou and Belmid, 2006). Recent research has demonstrated the efficacy of *A. vera* extracts against several types of diseases of vegetables and fruits which are caused by fungal pathogens (Castillo et al., 2010). Recently, coatings containing *A. vera* pulp have been studied for their ability to sustain the quality of, and reduce microorganism growth on, several fruits (Benítez et al., 2015; Vieira et al., 2016).

The polysaccharide chitosan [β -(1-4)-2-amino-2-deoxy-D-glycopyranose] is acquired from the deacetylation (at high pH) of natural chitin. The use of chitosan as an edible coating has shown potential for increasing the shelf-life and improving the quality of fruits, and it is also regarded as a secure biomaterial (Hong et al., 2012; Jongsci et al., 2013; Xing et al., 2016; Kumar et al., 2017; Silva et al., 2018). Chitosan has many important characteristics, such as its biocompatibility, antimicrobial activity, biodegradability, and non-hazardous profile, and has been considered for applications in different fields, with primary importance not only in the food and pharmaceutical industries but also in

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ORIGINAL RESEARCH PAPER

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TEMPORARY RECORDS MANAGEMENT IN GUJARAT HEALTH DEPARTMENT: MEN TO MACHINE

Journal Management

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ABSTRACT

all that know what is the situation of record management. In Gujarat the only best Hospital Management and Healthcare Management System is existing in Gujarat Health department which is facility based only in Public Healthcare Sector in India. But unfortunately there are very less number of Indian states who really utilized optimum financial resources through NRHM scheme in best way. Only Gujarat Government in health department made it possible. Now we all will observe that Gujarat Government has brought huge amount of money resources to implement the records Quality Management in Government Healthcare System.

KEYWORDS

INTRODUCTION OF NATIONAL RURAL HEALTH MISSION

The Govt. of India has understood the significance of Wellbeing and advancement of the nation. Remembering this view, the Govt. had led the National Provincial wellbeing Mission (NRHM) in its underlying time allotment was 2005-12. The primary point to enhance the essential structure and conveyance of Medicinal services benefits particularly in rustic parts of the nation. Ordinary concentration and thought has been given to states with less pointers/foundation. This Mission has a reasonable vision of bringing the wellbeing through the enhancement in huge wellbeing services.

Evolution of SHM & SHS

At nationalized stage, the NHM has a Mission Steering Group (MSG) directed by the Union Minister for Health & Family Welfare and Empowered Programme Committee (EPC) led by the Union Secretary for Health & FW. The EPC will execute the Mission in the overall direction of the MSG.

At State level, the Mission would work under the whole leadership of the State Health Mission headed by the Chief Minister of the State. Tasks under the Mission would be performed through the State Health & Family Welfare Society. The formations of the Mission and their connections are pointed out in the following sections 1.1.

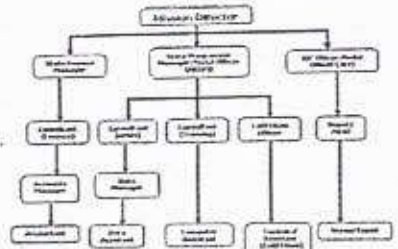


Figure 1: Hierarchy of SPMU-NRHM at State Level

Source: <http://nrhm.martnachal.gov.in/SPMU.html>

Hospital Management Information System, 21st Century in Gujarat

The establishment of controlling hypothesis, distinctive states like Rajasthan, Delhi, and Gujarat and so on have built up their different circular IT based answer for make increasingly proficient healing by the board. Here the point of the analyst to contemplate the present model of sorting out healing facility data and investigated the effect of this model on the ordinary execution of area clinics in Gujarat.

Project Current Status:

Total Doctor's facility associated 6 noteworthy Hospital Management Information System (Medicinal School), 24 Minor Hospital Management Information System

- HMIS module utilization in the state 71.33%
• OPD Enrollment more than 146.08 lakhs
• IPD Enrollment more than 17.77 lakhs
• Plan to broaden this in 2 Dental Universities and 2 Mental Doctor's facilities

Brief overview of HIMIS

Condition prior to Project:

For the healing facility directors it was convoluted or we can say that they didn't get the data of every division, asset booking, online patient clinical information, and patient's statistic subtleties online to a specific degree. A great deal of time and labor was squandered for gathering the accessible data.

Before this venture, the administration got the data from all healing facility toward the month's end which was the measurements of a month ago and for the following month. The central issue that heads confront was that it was hard to think about the execution of the healing center, number of conveyances occurred, number of births and passings and in addition the episode of a pandemic on its time inside the month.

Major Concerns:

The real Concerns/issues worried in getting HMIS venture to current stage were as per the following:

- Conquer Starting Therapeutic Staff showdown
• Aware and prepared to all concerned Restorative Staff
• Master Information Gathering
• Having a segment astute structure for inconvenience free support
• Flexibilities in necessities
• Wide Spread Territory
• Making certain availability of compulsory framework involving PC equipment and network for all Hospital Management Information System
• Data duplication to Focal Server

Requirements (Components & Technology) For HMIS

HMIS is developed on Microsoft NET technology with SQL server 2005 as the data store. The HMIS solution is three tier circulated structural design available over internet. Crystal reports & SQL reporting services are used for reporting functions.

Hardware Essentials:

- Xeon Based Database server

Attempts to Find Three Bear Species in Meghalaya, India

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The distribution of Asiatic black bears (hereafter ABB; *Ursus thibetanus*), sun bears (*Helarctos malayanus*) and sloth bears (*Melursus ursinus*) intersect in northeast (NE) India (Choudhury 2011, 2013). All 3 species were once recorded in Meghalaya, Assam, and Nagaland. Previously, we conducted workshops in these 3 states (Sharp et al. 2017), and developed particularly strong ties with Meghalaya, prompting us to do more focused work there. We aimed to determine which species were present (now and historically), where they lived, and if they might be competing for diminishing habitat. Here we present brief results (see Sharp et al. [2019] for more details).

Study Site and Methods

We were directed toward Balpakram National Park (BNP), in the Garo Hills region of southwestern Meghalaya, as a site where all 3 species might still occur. The 220-km² park (est. 1987) is sacred to the local Garo people. Due to poor road access, heavy monsoon rains, and local tribal customs and mythology, the forests have been relatively undisturbed, and seemed like rich habitat for bears.

We attempted to determine bear presence through sign surveys, camera trapping, and interviews. During November 2018 – February 2019, we conducted surveys in a variety of habitats in different areas in and outside the park. We used the width of hind foot claw marks from bears climbing trees to distinguish ABBs from sun bears, following Steinmetz and Garshelis (2008). We searched for termite mounds in the hopes of finding sloth bear digging.

We set camera traps in places that seemed promising to photograph a bear, based on local knowledge, accessibility, travelways, and trees with existing bear marks. We were not permitted to use bait or lure. Cameras were operational for 10–98 days, December–March (dry season).



Balpakram National Park and the adjacent Siju Wildlife Sanctuary, in the South Garo Hills of Meghalaya, Northeast India, contains the westernmost record of a sun bear (1980s). We were only able to document presence of Asiatic black bears there in 2018–2019. Credit: A. Malik

Purchase Intention of the Consumers towards Organic food Products: Role of gender

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Abstract: The consumers are increasingly becoming aware of the food safety issues and environmental issues because of their increased concern about health, the environment's health and its global implications. Organic food now has become a viable alternative for an increasing number of consumers, who are worried about the presence of chemicals residue and the negative consequences on the environment caused by intensive production methods. The planned behaviour of the consumer in context of attitude, knowledge, lifestyle, health awareness, environmental concerns, subjective norms, perceived behavioural control, and ethical orientation significantly affects the intention of the consumer to purchase the organic food. An attempt is made by the researcher therefore to decode the purchase intention of the consumers towards organic food products. This paper is a combination of literature review, research questionnaire and analysis of data. It is based on five point scale. The survey based study was conducted on the 1000 customers who are aware of organic food products across five major cities viz Ahmedabad, Barodn, Rajkot, Bhavnagar and Surat of Gujarat State. This paper offers an analysis on which are the important criterias which must be considered while taking the decision to purchase organic food products when only male customers decide to purchase organic food products, when only female customers decide to purchase organic food products, and when both of them decide to purchase the organic food products together.

Key words – Criterias, Female Consumers, Gujarat State, Male Consumers, Organic Food Products, Purchase Intention

1. Introduction

In today's world consumer's food pattern is rapidly changing. The niche market of organic is at the verge of boom. It has been that from last few years the organic products production and availability in the market has been increased and made a significant development in the economy. Several people have started to consider organic food instead of conventional food because it is healthier and less prone to chemicals. This kind of purchasing behaviour plays an important role among consumer attitude and perception aspect towards buying of organic food products. Further this, the issues, concern and major reasons have been identified through a broad review of earlier studies. Approach for buying organic food are mainly influenced by gender, age, income, level of education and the presence of children in the household. The main reasons are concerns about health and nutrition, superior taste, care for the environment, food safety, lack of trust in conventional food, care for animal welfare, support the local economy, freshness, curiosity or because they are considered trendy. Further people consume this type of food from different reasons but most of them are related to animal welfare and environmental friendly. Many results indicate that the factors of influence over the consumers depend on gender and age. The organic food is mostly appreciated for its taste and quality. Women are also influenced by price and by the trendy fact of being "organic". Major differences have been noticed between people with different age regarding promotions, recommendations from acquaintances and advertising. Youngsters are more influenced by advertising than any other group of age while adult people are influenced by promotions.

PHYSIOCHEMICAL CHARACTERIZATION AND EVALUATION OF ANTIMICROBIAL ACTIVITY OF SOME RARE EARTH METAL CHELATES DERIVED FROM 1-HYDROXYPROPAN-2-ONE

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Abstract : 1-hydroxypropan-2-one was used as a biologically active molecule to form lanthanide metal complexes. Three mononuclear lanthanide complexes of the type $[La(HA^-)_2(HA)(H_2O)_5] \cdot yH_2O$ Where, Ln = La(III), Sm(III) and Gd(III) were synthesized and their functional groups were elaborately demonstrated using UV-visible, IR spectroscopy, elemental analysis (CHNO analysis), mass spectroscopy, magnetic susceptibility and molar conductivity. Thermal properties of the complexes were studied using the thermo gravimetric analysis (TGA). IR spectral studies revealed that 1-hydroxypropan-2-one behaved as a bidentate ligand and it was structured with metal ion by the two oxygen atoms. The coordination number of three complexes was achieved by involving mono-dentate aqua groups in the coordination sphere. The catalytic activities have been investigated for the complexes. The synthesized metal complexes were elaborately performed for antimicrobial activity.

Index Terms - Antimicrobial activity, biologically active molecule, Catalytic activities, Lanthanide complexes, Mononuclear, Thermal Properties.

I. INTRODUCTION

1-hydroxypropan-2-one is a ketone compound which is also known as Acetol. 1-hydroxypropan-2-one contains both highly active hydroxyl and carbonyl functional groups [1]. Because of these two highly active functional groups 1-hydroxypropan-2-one act like bidentate chelating ligand in present study. 1-hydroxypropan-2-one is commercially available, but it also may be synthesized on a laboratory scale by a substitution reaction on bromoacetone[2]. 1-hydroxyacetone can be produced by degradation of various sugars. In foods, it is formed by the Maillard reaction [3]. Acetol is also used as main constituent of skin tanning agent in cosmetic industry [4]. 1-hydroxypropan-2-one is an anticonvulsant that is used to control seizures and trigeminal neuralgia in the form of 200mg tablet. 1-hydroxypropan-2-one exists in all living organisms, ranging from bacteria to humans. Outside of the human body, 1-hydroxypropan-2-one has been detected, but not quantified in, several different foods. This could make 1-hydroxypropan-2-one a potential biomarker for the consumption of these foods. 1-hydroxypropan-2-one is an intermediate in glycine, serine, and threonine metabolism[5,6]. The lanthanides have not been largely examined from biological point of view but it appears to possess some interesting pharmacological activities. It needs no discussion that the lanthanides have been investigated and widely described from the chemical viewpoint and they provide fascinating new possibilities for research in the coming decades[7]. Metal ions play an important role in the action of drugs. They are involved in specific interactions with antibiotics, proteins, membrane components, nucleic acids and other biomolecules. Many drugs possess modified toxicological and pharmacological properties in the form of metal complexes[8]. The metal which is probably the most widely studied in this respect is Gd(III) ion which has proved beneficial in many treatments such as Gd(III) compounds are components of MRI contrast agents. Lanthanide complexes are of increasing importance in cancer diagnosis and therapy, owing to the versatile chemical and magnetic properties of the lanthanide (III) ion. Lanthanides and lanthanide compounds have fascinated a great deal of significance in recent years because they have applications in medicinal inorganic chemistry and in materials science. In medicine, lanthanide complexes are utilized as contrast agents for magnetic resonance imaging(MRI) and are gaining importance in other diagnostic procedures and also as radio therapeutic drugs[9,10]. The redox stability of Lanthanide ions makes them extremely suitable for cellular applications in the presence of biological reducing agents like ascorbate and thiols, with the added advantage of favorable luminescent properties attributable to $4f \rightarrow 5d$, charge-transfer, and $f \rightarrow f$ transitions [11]. Due to the potential utility of lanthanides in the area of medicinal chemistry, investigators interested in the latest developments in this emerging field. These facts motivate us to explore the coordination behavior of 1-hydroxypropan-2-one with lanthanide metal ions. The present study reports on the synthesis, characterization and antibacterial activities of the ligand and its lanthanide metal complexes.

II. MATERIALS AND METHODS

All the chemicals and glass wares used all through the experimental work were of analytical grade. The metal carbonates of La(III), Sm(III) and Gd(III) and the ligand 1-hydroxypropan-2-one used were also of analytical grade. All the solvents used for recording spectra were of spectroscopic grade. For synthesis of metal-ligand complexes, perchlorates of lanthanum, samarium and gadolinium were prepared by adding metal carbonates in standardized 0.3 M perchloric acid solution. Aqueous solution of 0.1 M 1-hydroxypropan-2-one was used as a ligand solution[12]. The bacterial species used for antibacterial screening were *Escherichia coli* (*E. coli*), *Pseudomonas aeruginosa* (*P. aeruginosa*), *Staphylococcus aureus* (*S. aureus*), and *Staphylococcus pyogenus* (*S. pyogenus*). The bacterial species used for antifungal screening were *Candida albicans* (*C. albicans*), *Aspergillus niger* (*A. niger*), *Aspergillus clavatus* (*A. clavatus*). The bacterial species used in this study were obtained from Institute of Microbial Technology, Chandigarh.



Role of GST (Goods and Services Tax) on Dairy Industries in India

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Abstract

Indian dairy industries have witnessed considerable changes since the introduction of 'Operation Flood' Programme in the year 1970 by national Dairy Development Board. At present dairying is one of the most important means of providing livelihood and nutritional security to the rural masses. According to The "Indian Dairy Industry Database 2018-2023" report, India has emerged as one of the world's biggest producers of milk, with the total milk production rising from 122 Million Metric Tons in 2010 to 171 Million Metric Tons in 2017. Taxes are one main source of revenues of the government. Governments make use of taxation as a tool to generate revenue, discourage undesirable behavior, reduce inequality, and distribute resources and to protect local industries. Before the introduction of GST in India, many challenges were prevailed in Indian taxes system like cascading impact, multiplicity of taxes at the centre and state levels, multiplicity of tax rates. In order to remove above challenges Government of India introduced GST in India from 1 July 2017. Goods and Services Tax (GST) are currently on dairy products is set between 5% to 18% (May,2017) This makes it one of the simplest forms of revenue generating tax to government. This paper is about role and impact GST on Dairy industries

Key words: Dairy Industries, Dairy product Goods and Services Tax (GST) GST Revenues

Introduction

The dairy industries has become boon for dairy farmers. It play a vital role in the development of traditionally weak, the small landholders, landless labourers and women. It has become main source of yearly income for farmer, rural people or tribal people. It is estimated that up to 60-65 percent of the income of this group (marginal and small-scale farmers) now comes from dairying. Over the period, dairying has also acquired the contours of a fully-fledged industry in the country and has positively improved the life of those engaged in this business, directly or indirectly, bringing significant socioeconomic changes.. Millions of rural smallholder milk producers dominate India's dairy industry, contributing 62 percent of total milk produced in the country. The milch animals are fed on crop residues and milch animal dung is used as manure for crops. Livestock plays a vital role in the economy; animal husbandry is the most important economic activity in rural areas. The dairy sector today provides 80 million farm households with the triple benefits of nutritive food, supplementary income and productive employment

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Synthesis of Some Novel Chromene Derivatives and Its Biological Evaluation.

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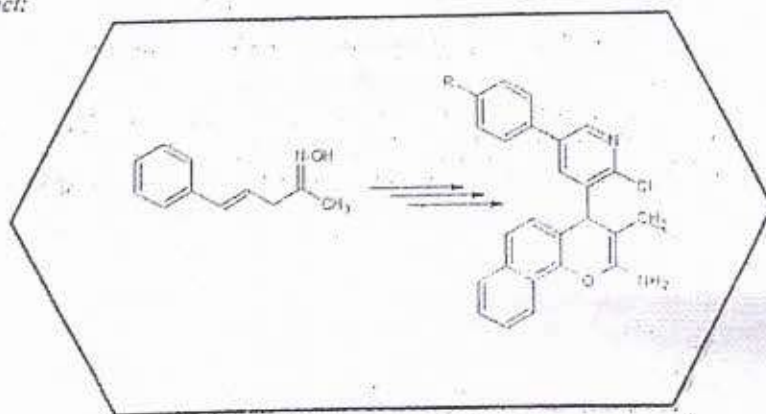
Abstract: A novel series of 2-amino-4-[2-chloro-5-(4-substitutedphenyl)pyridin-3-yl]-4H-chromene-3-carbonitrile derivatives were efficiently synthesized. Chromene (Benzopyran) was one of the privileged scaffold which appears as an important structural component in various natural products and also possess useful photochemical properties. The derivatives of benzopyran moiety can be capable of interacting with a variety of cellular targets which leads to their wide ranging biological activities such as antitumor, antihepatotoxic, antioxidant, anti-inflammatory, diuretic, anticoagulant, antispasmodic, estrogenic, antiviral, antifungal, antimicrobial, anti-helminthic, hypothermic, vasodilatory, anti-HIV, antitubercular, herbicidal, anticonvulsant and analgesic activity. The structure of the synthesized compounds are established based on ¹H.C, IR, NMR, MASS Spectrometric methods and elemental analyses. All the prepared compounds were screened for their antibacterial activities and antifungal activities.

Keywords: Pyrimidochromene, Amidines, antimicrobial and antifungal activity.

Date of Submission: 08-12-2020

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Graphical abstract:



1. INTRODUCTION

Benzopyran (chromene) is one of the privileged medicinal pharmacophore, which appears as an important structural component in natural compounds and generated great attention because of their interesting biological activity. Benzopyrans are an important group of organic compounds that are used as bactericides [1-3], fungicides [4], anti-inflammatory [5], and anticancer agents [6]. Benzopyrans derivatives are an important class of compounds, widely present in plants, including edible vegetables and fruits [7]. Chromene constitutes the backbone of various types of polyphenols and is widely found in natural alkaloids, tocopherols, flavonoids, and anthocyanins [8]. The biological activity of some natural chromene-based structures led to the development of synthetic analogs, some of them displaying remarkable effects as pharmaceuticals [8, 9-12]. These pharmacological properties make us thought in the synthesis of some benzopyran derivatives in hoping that maybe have a prospective pharmaceutical importance.

In-vitro Antiglycation Activity of Zinc Oxide Nanoparticles Synthesized from
the Bioactive Fraction of *Bambusa arundinacea* Leaf Extract.Hitesh V. Patel^{1*}, Dipeksha Macwan², Devang B. Khambholja³, and Himanshu S. Bariya⁴.¹Head and Assistant Professor, Department of Biochemistry, Shri A. N. Patel PG Institute of Science and Research, Sardar Patel University, Anand -388 001 (Gujarat)²Research Student, Department of Biochemistry, Shri A. N. Patel PG Institute of Science and Research, Sardar Patel University, Anand -388 001 (Gujarat)³Assistant Professor, Department of Medical Lab. Technology, B. N. Patel Institute of Paramedical and Science, Sardar Patel University, Anand -388 001 (Gujarat)⁴Department of Life Science, Hemchandracharya North Gujarat University, Patan-384265 (Gujarat)

ABSTRACT

The present study was conducted to investigate an *in vitro* antiglycation capacity of biologically synthesized zinc oxide nanoparticles (ZnO NPs) from zinc acetate and sodium hydroxide utilizing an antioxidant-rich fraction of *Bambusa-arundinacea* leaf extract. ZnO NPs were characterized by FTIR, TEM and UV-Vis spectroscopy. The antiglycation potential of ZnO NPs was measure by using the formation of AGEs fluorescence intensity and the level of fructosamine in bovine serum albumin (BSA)-glucose assay. The inhibitory activity of glycosylated Hb was also measured. Four fractions were collected using column chromatography of *Bambusa arundinacea* leaf extract named F1, F2, F3 and F4. The results showed that F3 exhibits the greatest phenolic content (87.36 ± 9.32 mg gallic acid equivalent (GAE)/g) and flavonoid content (29.65 ± 6.52 mg quercetin equivalent (QE)/g). In the DPPH radical scavenging activity, F3 had the lowest IC₅₀ values of 46.7 µg/ml indicate the highest antioxidant potential. Based on this observation, F3 was used as a reducing agent for the synthesis of ZnO NPs. The Result of TEM showed that ZnO NPs were spherical in shape with a size range of 60-98 nm. The result showed that ZnO NPs at different time duration (1-4 weeks) have significantly inhibited the formation of AGEs in terms of the fluorescence intensity of glycated BSA of the study. The ZnO NPs also markedly declined the level of fructosamine and formation of glycosylated Hb which are directly associated with the reduction of advanced glycation end products (AGEs) formation. Overall, the study suggests biologically synthesized zinc nanoparticles showed the strong antiglycation potential and considered as a potential source of therapeutic agents for AGEs related disorder.

Keywords: Antiglycation, *Bambusa arundinacea*, Nanoparticles, Zinc oxide

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Assess the Mental Wellbeing of Girl Students with Demographic and Social Factor

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Abstract

'Girl students' performance totally depends on their mental and physical strength. So, to assess the student's mental health is noteworthy. The Warwick Edinburgh Mental well-being scale (WEMWBS) is a reliable and validated tool to assess the mental wellbeing of the students in India. This study aims to assess the WEMWBS and compare scale with the demographic and social factors in India. The convenient sampling method was used to assess WEMWBS for 200 girl students. WEMWBS was significantly associated with the family affluence score (WEMWBS increased with increasing household socio-economic status) and had an association with the age, gender or marital status. The derived conclusion helped to make improvement in the mental strength of the students in India. WEMWBS is a measure of mental thriving focusing inside and out on positive parts of mental wellbeing as a short and psychometrically vigorous scale, with no roof impacts in a populace test, it offers guarantee as a device for observing mental prosperity at a populace level. While WEMWBS should engage those assessing emotional well-being advancement activities, it is essential that the scale's affectability to change is built up before it is prescribed in this unique circumstance.

Keywords: Mental wellbeing scale, demographic, social factor

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INTRODUCTION

In the world, many tools available to check the mental wellness of the people of the nation like EIS Emotional Intelligence Scale, EQ-5D VAS EuroQol Health Status Visual Analog Scale, GHQ-12 General Health Questionnaire, GLS Global Life Satisfaction, HEPS Health Education Population Survey, SDHS Short Depression-Happiness Scale, SPWB Scale of Psychological Well-Being, SWLS Satisfaction with Life Scale, PANAS Positive and Negative Affect Scale, PANAS-PA Positive and Negative Affect Scale-positive sub-scale, PANAS-NA Positive and Negative Affect Scale-negative sub-scale, WHO-5 WHO Wellbeing Index, WEMWBS Warwick-Edinburgh Mental Well-being Scale and so forth.

REVIEW OF LITERATURE

The arrangement of markers chose to constitute a commonsense decision, perceiving that psychological wellness, and particularly positive, emotional well-being, is to create region and a developing idea [1, 2]. The pointers do not give a conclusive response to

the topic of estimating emotional wellness, however, reflect what has been conceivable inside the limitations of: hypothesis, the confirmation base, information accessibility, and the accessibility of good scales/inquiries to sufficiently catch information on a development [3]. It is trusted that the markers will add to more noteworthy comprehension of all measurements of psychological well-being and to the future improvement of this field [4]. In the long haul, the marker set might be balanced and adjusted as needs be [5]. In an expansive broadly illustrative populace test, two kinds of prosperity were recognized and dependably surveyed: hedonic and eudemonic [6]. Relationships with mental prosperity were moderately free of indications of psychological sickness. Mental prosperity can stay even within the sight of mental enduring [7]. Notwithstanding offering rigor for research and scoring to psychological wellness, WEMWBS' positive concentration offers a formative point of view, orientating policymakers, customized members and overview respondents towards mental prosperity and empowering distinguish



Impact of socio-economic factors on oral health

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Abstract: Impact and consequences of oral ill-health on individuals and folks has been noticed since years which eventually results in pain, suffering, impairment of function, and limitation in quality of life. Oral health and general health both are inseparable. Study of the Global Burden of Disease 2016, evaluated that oral diseases affected half of the world's population (3.58 billion people) with dental caries (tooth decay) in permanent teeth being the most prevalent condition assessed. In majority of literatures, significant association between socio-economic and geographical factors relate to oral health is mentioned i.e. accessibility to dental care, affordability to cost of care, cultural issues, insurance, and anxiety affect the oral health. Oral health promotion and behavior modification are the need of the hour because majority of oral diseases are preventable by simple and cost-effective means.

Index Terms - Oral Health, Socio-Economic Status

I. INTRODUCTION

To live the highest quality of life is an individual's one of the fundamental right irrespective of race, environment, religion and socio-economic condition (Mahajan, 1991). Oral health has been an inseparable from general health as it is considered as gateway of overall health. Oral health is considered as one of the key indicator of overall health, well being, and oral health related quality of life. World Health Organization (WHO) stated oral health as "a state of being free from chronic facial pain and mouth pain, oral and throat cancer, oral sores and infections, gum (periodontal disease), tooth decay, tooth loss and other kinds of diseases disorders that may limit person's capacity in chewing, biting, smiling, speaking, and the psychological wellbeing." For the burden of oral ill-health, seven oral conditions and diseases are responsible i.e. dental caries (tooth decay), periodontal (gum) diseases, oral cancers, and oral manifestations of HIV, Roth-dental trauma, cleft lip, and palate along with noma. The majority of conditions are either largely preventable or can be treated in their initial stage of manifestation.

II. OBJECTIVES OF THE STUDY

To narrate the association between oral health and overall health along with global and national burden of oral diseases, To study the condition of oral health relate to socio-economic status.

III. METHOD AND MATERIAL

This study is aimed to narrate global and national burden of oral disease and to study the condition of oral health relate to socio-economic status. Secondary data is considered from a public domain like WHO, World Dental Federation, and peer reviewed journals.

ROOT CAUSE ANALYSIS OF MALNUTRITION AMONG ADOLESCENT GIRLS: A LITERATURE REVIEW

Abstract

According to the World Health Organization (WHO), malnutrition refers to deficiencies or imbalances in the intake of nutrients among people. Nutrition plays an important role in the proper growth and development of adolescents, women, and children. According to published studies, the prevalence of underweight, stunting, wasting is reduced among adolescent girls, although, nearly 70% of adolescent girls in India are still anaemic and half of the adolescents are below the body mass index (BMI). Moreover, nearly half of the adolescent girls are suffering from different micronutrient deficiencies. There are several factors i.e. adolescent age, environmental conditions, social-cultural economic factors, age at menarche, lifestyle, skipping a meal, early marriage, adolescent pregnancy, gender inequality, and food faddism having a significant influence on determining their nutritional status. The Burden of malnutrition is a predictable reality among Indian adolescent girls. As adolescent malnutrition is a public health problem, effective public health interventions must be implemented to combat malnutrition.

Keywords: Burden of Malnutrition, Adolescent Girls, Underweight, Stunting, Wasting, Body Mass Index.

Introduction

The world adolescence has been in usage since the 15th century, which has coined from adolescence, a Latin word to mean "grow up" or "to grow into maturity" (Lerner, R. M., & Steinberg, 2004). Adolescents constitute about 22.8% of the population in India (Aparajita et al., 2010). Malnutrition is posing a great threat to adolescents, especially in developing countries like India (WHO, 2016). In a position of countries from lowest to highest on stunting, India ranks 114 out of 132 countries, with the incidence of stunting at 38.7% and wasting, India ranks 120 out of 130 countries at 15.1 % (Bali, 2016). In India more than 1/3rd of the world's malnourished children. Half of the world's malnourished children reside in 3 countries like Bangladesh, India, and Pakistan[™] (Narayan, John, & Ramadas, 2019).

Malnutrition affects body growth and development, especially during the important period of adolescence (Ka, Ss, Og, & Adama S, 2017). The consequences are underweight children, anaemic mothers, marasmic babies, scurvy, beriberi, pellagra, vitamin A deficiency blindness and other deficiency syndromes (WHO, 2000). So many different types of factors have

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KNOWLEDGE, ATTITUDE AND PRACTICE OF ANEMIA: A CROSS-SECTIONAL STUDY

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ABSTRACT

BACKGROUND: Anemia is one among serious public health problems, particularly, in a developing nation like India. To find out situation analysis of any public health condition or to assess effectiveness of implemented public health program, study of gap analysis has significant role. Nutritional knowledge related gap is one among major causes for nutritional problems. Moreover, intergenerational impact results due to uptake of improper practices.

OBJECTIVES: To assess the burden of anemia and to study knowledge, attitude and practice among young women for the use of Iron Folic Acid (IFA) tablets relate to anemia.

MATERIAL AND METHODS: This cross-sectional study was conducted in a North Gujarat region. A total of 1000 young women were included in this study. A predesigned, pretested, questionnaire was used to assess objective of the study.

RESULTS: According to NFHS-V, 2019-20, prevalence of anemia among non-pregnant women is 65.1 % in Gujarat. The present study found that 40-60% of respondents could identify the major symptoms, causes and consequences of anemia. Least knowledge was found about inhibitors and enhancers. 54% of respondents like to consume iron-rich food. Only 32.6% of respondents had a positive attitude towards IFA tablets. 39% knew the importance of complementary food along breastfeeding. 32% of respondents used to consume citric food. 28.7% of school going girls used to consume IFA tablets weekly and only 26% of girls used to go for deworming annually. In non-going school girls, only 16% of young women used to consume IFA tablets. Only 10.4% of respondents used to/preferred to consume iron enhancers with IFA tablet.

CONCLUSION: Young women depicted intermediate knowledge towards anemia but not adequate attitude and practice. Initial uptake and adherence to IFA tablets is extremely low

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Factors affecting the utilization of maternal and child health care services in North Gujarat

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Abstract--The present study intended to examine the factors affecting the utilization of maternal health care services in the north Gujarat region of India. The study used Data collected from various hospitals of different districts of North Gujarat. Both bivariate and multivariate techniques have been applied for data analysis. Logistic regression techniques and concentration curve and index have been used. Findings of the study indicate that there were wider socio-economic differential exits in the utilization of MCH services (full ANC, Safe delivery and post-natal care) in all the district under study. The result shows that the farther population from healthcare centre is less likely to utilize maternal and child health care services. The economic inequality in accessing the all three components of maternal health care utilization was higher in the urban area. As the educational level, wealth index, employment, autonomy and exposure to mass media of women increases the utilization of these services increases significantly.

Keywords---adolescents, maternal health, utilisation of health services, maternal health services, ante-natal care (ANC), delivery, socioeconomic factors, postnatal care (PNC), female Genital Mutilation (FGM), mother and child tracking system (MCTS).



Occupational Health Hazards and its consequences among healthcare personnel working in Operation Theatre

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Abstract:

Introduction: In the healthcare industry, operation theatre employees play an important role in the organizational workings. They are serving others, so it is important that they must be away from any work-related injury or illness. Occupational health is a vital part of the health care personnel. Any work place injury can deteriorate their productivity and efficiency.

Aim: This study aimed to understand various occupational hazards and its consequences faced by the health care workers working in the operation theatre.

Methodology: The study used secondary data sources related to occupational health hazards among operating room staff. This study executed different kind of hazards which affects the working pattern of the employees which are surgeons, anesthetist, staff nurses, assistants and other supporting staff.

Findings: Occupational hazards prevention is a crucial act to gain the productivity and employee health. There are numerous health hazards found in the premises of an operation theatre, categorized as- accidental, physical, chemical, biological, psychosocial and many other. The employee faces risk ranges from needle stick injury, exposure to harmful chemicals, odd posture, exposure to body fluids, stress and also violence.

Conclusion: Operation theatre staff comes in contact with the harmful agents quite often. So proper prevention and if exposed, early reporting and management is necessary to promote health and well-being of the employees and increased productivity.

Keywords: Occupational health, occupational hazards, stress, needle stick injury, risk factors

1. Introduction

Occupational health is a field of public health to promote and maintain highest degree of physical, mental and social well-being of workers in all occupations.

Occupational health care is the service that assist the employers or their representatives to ensure that the workplace is safe and healthy according to accepted occupational health and safety guidelines and requirements.

The main focus of the occupational health is to prevent the workplace and employees from the hazards at its origin. Any work-related harm or accidents to get prevented on early stage. The main importance of it is to improve efficiency and productivity by less missing of employees from illness or injuries.

In the healthcare sector, it is very crucial for the workers to maintain their occupational health. Healthcare professionals face many occupational risks while performing their duties. Where they are surrounded by numerous risk factors, especially the employees working in the operating room. The workplace hazards they facing are of various in nature. They are psychological, ergonomic, chemical

Assessment of Occupational Health and Safety in Health Care Workers: A case study in Tertiary Care Hospital

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Abstract: This study is based on the research conducted on the health care workers in the tertiary care hospitals. It involves the workers who deals with the patients on regular basis. Occupational health and safety is multidisciplinary approach which concerned with the health and safety of the employees at workplace. Adequate safety at workplace ensures good productivity and good psychological health of the employees. National Institute of Occupational Health (NIOH) in Ahmedabad ensures the provision of health and welfare of the employees. At present, only 15% of employees worldwide have the access to the benefit of occupational health and safety. The aim of the study is to assess the occupational health and safety of the employees in the hospitals. For this purpose, qualitative research approach is accepted and samples are randomly selected. Data is collected through a structured questionnaire and other secondary data and documents. Total number of 100 responses are collected. The conclusion is made from this study is that the occupational health of the employees is an under looked topic in the hospital. Health care workers are not getting proper training as well as any benefits if exposed to any occupational hazards. This study is limited to only three health care professions.

Key words: Occupational Health, Occupational hazards, work related diseases, health statistics

Introduction:

Occupational Health is an area of study which works to promote and maintain highest degree of physical, mental and social well-being of workers in all occupations. In the practice of occupational health, it involves various disciplines such as occupational medicine, nursing, ergonomics, psychology, hygiene, safety and others. Primary prevention of hazards which comes under the aspect of health and safety at workplace is being dealt by Occupational health. The health care workers have several risk factors at workplace which leads to cancer, accidents, respiratory diseases, musculoskeletal disorders, stress related disorders, communicable diseases and many others.

Occupational health and safety is a multidisciplinary field concerned with safety, health and welfare of employees at work. Adequate safety at workplace has a positive impact on productivity and development of employees as well as the institution. The major occupational diseases of concern in the health care are needle stick injuries, accidents, nosocomial infections and chemical injuries. Globally, more than 2.78 million people die annually as a result of workplace related incidents or diseases, which leads to one death every fifteen seconds. The quality of occupational safety is characterized by- the indicators reflecting the level of injury, the average number of days of the incapacity of the employee to work, employee's satisfaction with working condition and employee's motivation to work safely.

Workplace Hazards

Workplace hazards present the risk to the health and safety of the employees. These includes, physical, chemical, biological, ergonomic condition and psychosocial factors. Various kind of Personal Protective Equipment can help to reduce the risk of workplace hazards.

Physical hazards include fall, burn, cut by any means of equipment or instruments. Falls on slippery surface are a very common cause of injuries in the health care sector. it also includes noise, vibration and ionizing radiation.

Biological hazards include infectious microorganism, virus, bacteria and toxins produced by organisms. In health care workers, exposure to blood and body fluids which spreads infectious disease by blood borne pathogens are most hazardous.

Dangerous chemicals pose a chemical hazard in the workplace. There are numerous hazardous chemicals such as formaldehyde, glutaraldehyde, nitrous oxide, alcohol and others. They may cause neurotoxicity, asthma, skin irritation and sensitivity.

Psychosocial risk factors include risk to the mental and emotional well-being of workers such as long work hours, shift work, work-life balance and job insecurity.

Background:

Depending on the specific industry and sectors, occupational safety and health risk factors varied. In the healthcare sector, workers expose to plenty of hazards which adversely affect their health and well- being. Some examples of them are long working hours, shift work, physically demanding tasks, exposure to infectious materials and chemicals and stressful environment. To look into the whole, musculoskeletal injury is the most common hazard that the health care worker is facing. According to the Bureau of Labor statistics, US hospitals recorded 2,53,700 work related injuries and illness in 2011, which is 6.8 work related injuries and illness for every 100 full time employees.

National policies formulated by the Labor Ministry on occupational safety and health in factories and docks with advice and assistance from Directorate General of Factory Advice Service and Labor Institutes (DGFASLI) in India. The DGFASLI provides technical support in formulating rules, conducting occupational safety surveys and also for conducting occupational safety training programs.

Attitude of Healthcare workers towards Disaster Management practices in a Hospital of Gujarat

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Abstract

Background: Effective management of a disaster requires preparedness and appropriate attitude of healthcare workers. Attitude of the healthcare workers will impact their response during any emergency situation coping. This study was conducted to assess overall attitude towards disaster management among the healthcare staff of 650 bedded hospital in North Gujarat region.

Methodology: This is a cross sectional survey study carried out on 201 healthcare staff of the hospital under study. The data was collected through an online questionnaire consisting the demographic details of the participants and followed by questions regarding the attitude of participants toward disaster management and disaster management practices in the hospital. Data was coded and analysed with MS Excel and SPSS.

Result: From the responses we received, it was conclude that 45.8% staff of the study hospital have taken the training for disaster management and 44.8% staff have faced disaster during their work experience at the hospital. Among the respondents, majority are students (56.2%), nursing staff (25.4%), doctors (11.9%) and others (6.5%). Looking to their perception, 39.3% staff believes that the disaster preparedness in the hospital is sufficient, 22% says it is insufficient while 38.8% have neutral response.

Conclusion: Attitude of health care workers towards disaster management is very important as it impacts their response during any emergency situation. Study showed the awareness regarding the disaster occurrence and vulnerability of the hospital and health care workers' attitude requires improvement. Which can be positively impacted by trainings, mock-drills, making them aware about their roles during a disaster and disaster policy related information.

Keywords: Disaster management, Attitude, Perception, preparedness

Introduction

A disaster is an unexpected event either natural or man-made origin which can cause great destruction of property, environment and human life.^{1,2} Effective management of a disaster require preparedness and appropriate attitude. Attitude of the healthcare staff

will impact their response during any emergency situation handling.

Preparedness for any disaster requires implementation of various practices in the hospital and willingness of the healthcare workers to actively participate in the disaster management process. This

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Predicators for Oral Health Behaviour: Situation Analysis

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ABSTRACT

The optimum status of oral health is considered the key to the maintenance of general health and to enjoying an upright quality of life as oral health is the gateway to the body. The quality of life is largely affected by oral-dental conditions. The disease burden of oral ill-health is parallel to other non-communicable diseases. If oral treatment is not attended to in its early stage then it results in high cost and complications. This review aimed to document oral health behavior variables and identify the predictors of compliance with oral health behavior. Followed to a literature review, the socio-demographic status of individuals, notably education, income, occupation, and area of residence are significantly associated with oral health behavior. Inequality in the accessibility of oral healthcare services to individuals, perceived anxiety, cost of treatment, perceived emergency for dental visits, taboos relate to scaling, brush changing pattern, duration and direction of brushing, use of cleaning aid, social security (insurance) are predictors to look before formulating any new interventions. To lower the oral health burden and to improve oral health-related quality of life, there is a need to do modifications in oral health behavior via knowledge, positive attitude, and good practices.

Keywords: Oral Health behavior, Knowledge, and Oral Health Hygiene

INTRODUCTION

The optimum status of oral health is considered the key to the maintenance of general health and enjoying an upright quality of life as oral health is the gateway to the body. The quality of life is largely affected by oral-dental conditions. Distorted oral health results in pain, disability, suffering, low self-esteem, and loss of productivity dental caries and periodontitis are the most commonly seen oral health diseases. Oral diseases act as one of the foremost contributors to the global disease burden. Oral conditions may be seen at any stage of life and their appearance affects the sense of self-esteem, diet pattern, and ability to communicate. Numbers of common oral diseases are caries, periodontal ill health, sub-mucosal fibrosis, malocclusion, oral cancer, sub-mucosal fibrosis, etc. Even oral lesions have a common occurrence in patients suffering from HIV/AIDS along with other systemic conditions. The disease burden of oral ill-health is

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Compliance in Internal Assessment against National Accreditation Board for Hospitals & Healthcare Providers Standards in Super Specialty Hospital in Gujarat relate to 5th Edition

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ABSTRACT

BACKGROUND: As healthcare beneficiaries' expectations are up surging, ensuring equity in healthcare delivery accreditation is a significant tool from the quality management perspective. The study of compliance helps to find gap analysis in the internal assessment that refers to a comparison of ongoing policies, procedures, infrastructure, and standard operating procedures compared to NABH standards.

OBJECTIVES: To evaluate the Hospital Compliance against the 5th Edition of NABH and to assess the discrepancies in the compliance. Training topics for capacity buildings

MATERIAL AND METHODS: Descriptive cross-sectional study was carried out in a super specialty hospital. 150 files were included in the study.

RESULTS: 57% of compliance was found for the accreditation standards of NABH. Areas of a gap of less than 50% were identified; hospital infection control, patient safety, quality improvement, and human resource management. In the comparison of clinical staff, nonclinical staff were having higher non-compliance rate.

CONCLUSION: It is recommended that Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS) should be delivered to all the personnel of the hospital. The significance of the material safety data sheet, hand hygiene, a crash cart, and the presence of posters needs to be addressed thoroughly. The need for informed consent and doctors' involvement needs to be focused on. Surveillance for medication and equipment must be monitored.

KEYWORDS: *compliance, accreditation, hospital*

INTRODUCTION

Hospitals and healthcare services are a significant component of our social system. Healthcare settings are not only important for the patients but also the workforce of hospitals and the general public. Nowadays, the significance of

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Importance of Recruitment Leading to the Progression of the Human Resource Department (HRD)

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ABSTRACT

The recruitment process is seen as essential to the organization's successful growth, and advancement. To complete various organizational duties and operations, it is crucial to make sure that suitable persons are chosen for the right jobs at the right time. Additionally, the candidates must possess the necessary competencies, skills, and knowledge. Before being chosen, candidates must go through several rounds of interviews and in some situations may even have to participate in additional processes like written examinations, group discussions, etc. one of the most important considerations when choosing applicants is whether or not they can perform their work obligations under their employer's expectations. Introduction to recruitment, the recruitment process, sources of recruitment and recruitment principles are the primary topics that have been considered in this research work.

Keywords: Candidates, Management, Organization, Effectiveness in Recruiting.

INTRODUCTION OF RECRUITMENT:

A crucial step in human resource management is recruitment. It is a crucial instrument that is employed by numerous companies or firms. Competition in the workplace takes the shape of hiring. Organizations can use this tool to move toward their overarching corporate aim. Because any business strategy is said to fail in the absence of the talent to carry it out, upper management must pay careful attention to recruitment. According to the number of steps or processes specified in our textbooks, recruitment has. A sequence of steps follows recruitment. Individualized screening, selection, orientation, placement, and performance management are a few examples. These actions are all somewhat dependent on the labour markets where specific organizations are present (R. Kapur, 2020).

Organizations look for potential employees, and vice versa, throughout the recruitment process. Success in recruiting hinges on timing. There needs to be a communication channel for the recruitment process to be successful.

Planning must go into recruitment for an organization to succeed. Before hiring, an organization needs to be aware of crucial elements: Before hiring, an organization needs to be aware of two crucial elements; (1) the number of personnel required for the position, and (2) the deadline for hiring. Additionally, the period between when the applicant submits their resume and employment application and when they are hired should be taken into account. About 43 days pass on,

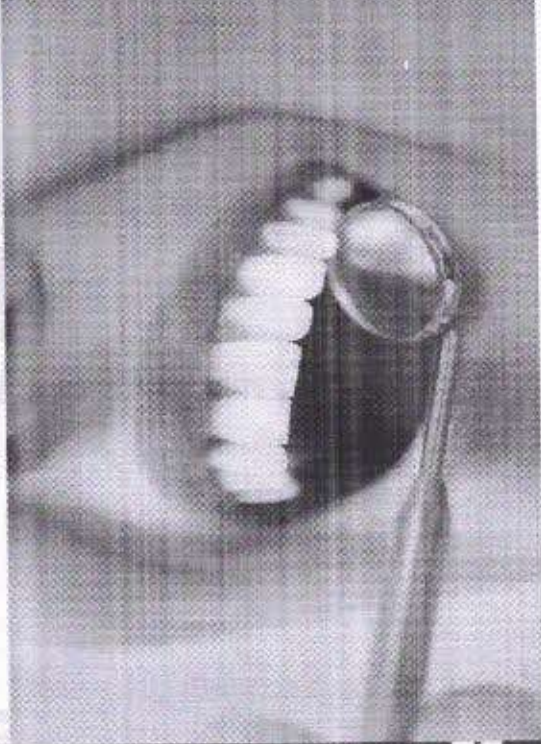
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Oral Health

Practices and Prevention

Dr. Kinjal G. Jani Dr. K. K. Patel

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Oral Health: Practices and Prevention Dr. Kinjal G. Jani, Dr. K. K. Patel, Dr. Harsh H. Vyas, Dr. Bhupinder Chaudhary

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PRIMARY HEALTH and Sustainable Development Goals

Dr. K. K. Patel
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PRIMARY HEALTH AND SUSTAINABLE DEVELOPMENT GOALS

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Research Publications-08
Books-9, Seminars-Conference, Paper -07, Participation-13, Membership-1, Life Time Membership-02, University Committees: Board of Study (Chemistry)

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First record of *Metopograpsus cannicci* Innocenti, Schubart and Fratini, 2020 (Crustacea: Decapoda: Grapsidae) from India

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Abstract

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Metopograpsus cannicci Innocenti, Schubart and Fratini, 2020 is distributed in the Red Sea, Iran, along the East African coast, Seychelles, Madagascar, and Mauritius. The present paper reports this species for the first time from India indicating its eastward extension.

Key words: Brachyura, mangroves, new record, rocky shores, West coast of India

Introduction

The genus *Metopograpsus* H. Milne Edwards, 1835 comprises seven species: *M. messor* (Forskål, 1775); *M. thukuhar* (Owen, 1839); *M. oceanicus* (Hombron and Jacquinot, 1846 [in Hombron and Jacquinot, 1842–1854]); *M. latifrons* (White, 1847); *M. quadridentatus* Stimpson, 1858; *M. frontalis* Miers, 1880 and *M. cannicci* Innocenti, Schubart and Fratini, 2020. The taxonomy of *Metopograpsus* is difficult owing to the subtle differences in the morphological features between species (Fratini et al., 2018; Innocenti et al., 2020). Recently Innocenti et al. (2020) examined specimens identified as *M. thukuhar* and on the basis of their morphological and genetic investigations described a new species, *M. cannicci*, referring to it as a pseudocryptic taxon.

Fratini et al. (2018), through molecular phylogenetic investigation found that the hitherto widely distributed *M. thukuhar* comprised two species with different distributions. *M. thukuhar* is confined to Southeast Asia and Pacific islands, while populations from the East African coast, Red Sea and Seychelles were described as the distinct species, *M. cannicci* by Innocenti et al. (2020). In the present study, *M. cannicci* is reported for the first time from India.

Material and Methods

The specimens were collected by hand-picking from the mangrove region of Goa and Gujarat states of India (Fig. 1). The specimens were washed to remove debris and photographed. They were preserved in 90% ethanol and deposited in the Zoological Reference Collection (LFSC.ZRC), Department of Life Sciences, Hemchandracharya North Gujarat University, Patan, Gujarat, India. The size of the specimens was recorded using digital vernier callipers (INSIZE, Model no. 1108200).

Abbreviations

CW, carapace width; CL, carapace length; G1, male first gonopod; coll., collector. Morphological terminology used in this article follows Innocenti et al. (2020).

Results and Discussion

Taxonomy

Order Decapoda Latreille, 1802

Superfamily Grapsoidea MacLeay, 1838


Family Grapsidae MacLeay, 1838

Genus *Metopograpsus* H. Milne Edwards, 1853

Metopograpsus cannicci Innocenti, Schubart and Fratini, 2020 (Fig. 2)

First confirmed record of *Sarmatium crassum* Dana, 1851 (Crustacea: Decapoda: Sesarmidae) from India

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ABSTRACT

The present paper confirms the occurrence of the sesarmid crab *Sarmatium crassum* Dana, 1851 in India. The species has so far been recorded from Samoa, Tahiti, New Caledonia, eastern Australia, Philippines, Madagascar, South Africa, Tanzania, and Eritrea (Red Sea). This is the first record of the species from India.

KEYWORDS

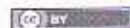
Brachyura, Goa State, mangrove, new record, West coast of India

The taxonomy of the genus *Sarmatium* Dana, 1851, has a very confused history and has been revised on several occasions (Tesch, 1917; Serène and Soh, 1970; 1971; Davie, 1992). The genus *Sarmatium* is closely related to *Neosarmatium* Serène and Soh, 1970 and *Metagrapsus* H. Milne Edwards, 1853 but can be differentiated on the basis of the following characters: ocular peduncle swollen basally, cornea constricted and reduced (*versus* ocular peduncle not swollen basally, cornea bulging and prominent in *Neosarmatium* and *Metagrapsus*; cf. Serène and Soh, 1970; Davie, 1992). *Sarmatium* is currently represented by five species which are distributed in the Indo-Pacific region (Davie, 1992): *Sarmatium crassum* Dana, 1851,

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**An annotated checklist of marine brachyuran crabs (Crustacea, Decapoda, Brachyura)
from Goa, west coast of India with ten new records**

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Abstract

An annotated checklist of marine brachyuran crabs occurring in coastal areas of Goa is compiled based on published accessible literature and specimens collected based on the survey carried out from the coastal areas of Chapora, Mandovi and Sal estuaries between 2016-2020. A total of 103 species belonging to 66 genera and 25 families are recorded so far. Out of the 25 families recorded, family Portunidae showed the highest species diversity (21 species, 7 genera) followed by Sesarmidae (15 species, 8 genera), Xanthidae (9 species, 7 genera). In the present study, we report ten new species: *Portunus reticulatus* (Herbst, 1799), *Metopograpsus latifrons* (White, 1847), *Clistocoeloma lanatum* (Alcock, 1900), *Neosarmatium malabaricum* (Henderson, 1893), *Parasesarma bengalense* (Davie 2003), *Perisesarma dussumieri* (H. Milne Edwards, 1853), *Pseudosesarma glabrum* Ng, Rani and Bijoy Nandan, 2017, *Macrophthalmus (Macrophthalmus) brevis* (Herbst, 1804), *Macrophthalmus (Macrophthalmus) parvimanus* Guérin, 1834 and *Tabuca alcocki* Shih, Chan and Ng, 2018, which are first time reported from the present study area.

Keywords: Brachyuran crabs, Checklist, Goa, West coast of India

Introduction

Goa, the smallest state of India has a coastline of 151 km and is traversed by nine tidal rivers (Kumar *et al.*, 2006; Fernandes *et al.*, 2018). The infraorder Brachyura (true crabs) is the most species-rich decapoda group, with 93 families and over 7000 species worldwide and 62 families and over 910 species in India (Ng *et al.*, 2008; Trivedi *et al.*, 2018). Although the marine brachyuran crab fauna of India has been studied since the mid-1700s (Trivedi *et al.*, 2018), the first publication from Goa was only in the early 1900s by Kemp (1917, 1919a, 1919b) who reported seven species from three families. Later, with the establishment of the National Institute of Oceanography (NIO) in Goa, studies on the edible crab fauna and benthic macrofauna were carried out by Ansari and Harkantra (1975) and Parulekar *et al.* (1980). However, the major and most significant contribution was by the scientists from the Zoological Survey of India (ZSI) who carried out preliminary surveys in the early 2000s, data of which was published subsequently in later years as Dev Roy and Nandi (2005); Dev Roy

**On Indian species of *Nanosesarma*
Tweedie, 1950 (Decapoda: Brachyura:
Sesarmidae)**Vinay P. Padate¹  orcid.org/0000-0002-2244-8338Krupal J Patel^{2,4}  orcid.org/0000-0003-0810-4210Chandrashekher U. Rivonker³  orcid.org/0000-0002-5828-5032Jigneshkumar N. Trivedi⁴  orcid.org/0000-0002-1308-7104

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ZOOBANK: <http://zoobank.org/urn:lsid:zoobank.org:pub:38D424BA-8675-4A80-88DD-0ADB8407698>

ABSTRACT

Four species of sesarmid crabs of the genus *Nanosesarma* Tweedie, 1950, have been reported from India: *Nanosesarma andersoni* (De Man, 1888), *Nanosesarma batavicum* (Moreira, 1903), *Nanosesarma jousseaumei* (Nobili, 1906), and *Nanosesarma minutum* (De Man, 1887). In the present study, one more species, *Nanosesarma sarii* Naderloo and Türkay, 2009 is reported for the first time from India along with the diagnosis and illustrations of the five Indian *Nanosesarma* species.

KEYWORDS

Brachyura, Goa, Gujarat, intertidal area, new record, West coast of India

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First Record of *Maritigrella fuscopunctata* (Prudhoe, 1978) (Polycladida: Cotylea: Euryleptidae) from the Coastal area of Mainland India

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Abstract

The present study confirms the first record of the rare Euryleptid species *Maritigrella fuscopunctata* (Prudhoe, 1978) in Gujarat state, India. The species has so far been recorded from the Lakshadweep Islands in the south of India, suggesting its first record from mainland India.

Keywords Intertidal region · Rocky shore · Saurashtra coast · Shivrajpur · Gujarat

Introduction

Polyclads are colourful, leaf-shaped flatworms inhabiting marine waters of tropical and subtropical regions possessing varying colour morphs (Quiroga et al. 2006; Bolanos et al. 2007; Apte and Pitale 2011). Globally the order Polycladida comprises of around 1015 species of marine Platyhelminthes which is divided into two suborders Acotylea (558 species) and Cotylea (457 species) based on the presence or absence of sucker (Tyler et al. 2006–2021). In India, studies carried out on polyclads are very scanty. A total of 71 species of marine flatworms have been recorded from India (Dixit et al. 2021; Pitale and Apte 2021). The diversity of polyclads from Gujarat state includes only five species viz. *Pseudoceros indicus* Newman & Schupp, 2002, *P. stellae* Newman & Cannon, 1994, *P. susanae* Newman & Anderson, 1997, *P. bolool* Newman & Cannon, 1994 and *Thysanozoon brocchii* (Risso, 1818) (Bhadja 2010; Pitale and Apte 2017; Thakkar et al. 2017). The present study recorded *Maritigrella fuscopunctata* for the first time from the coastal area of Gujarat state which shows the distribution range extension of the species to the coastal area of mainland India.

Material and Method

The specimen was observed in the rocky intertidal region of Shivrajpur coast (22°19'58"N, 68°57'21"E), Devbhumi Dwarka district, Gujarat (Fig. 1). The survey was carried out in March 2021 during the low tide time in the intertidal zone. The study area was thoroughly scanned by overturning the rocks and seaweeds for screening the presence of polyclads. The specimen was photographed *in situ* with the help of a Canon EOS I300D camera for recording true colours for proper species identification and later preserved in 70% alcohol and deposited in the Zoology Reference Collection (LFSC.ZRC) Department of Life Sciences, Hemchandracharya North Gujarat University, Patan, Gujarat, India. Abbreviations: BL, body length; BW, body width; coll. collector. Species identification was done based on the external morphology and colour pattern of the specimen with the help of available literature and original description.

Results

Systematics

Order: Polycladida Lang, 1884.
Suborder: Cotylea Lang, 1884.
Family: Euryleptidae Lang, 1884.
Genus: *Maritigrella* Newman and Cannon, 2000.
Maritigrella fuscopunctata (Prudhoe, 1978) (Fig. 2).
Pseudoceros fuscopunctatus– Prudhoe, 1978: 595–597, Figs. 4a-c and 5a-c.

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First Record of Galatheid Squat Lobster, *Shinkaia crosnieri* Baba & Williams, 1998 (Decapoda: Galatheoidea) From Cold-seep Environment of the Indian Ocean

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Abstract

In this paper, we report the first record of the deep-water squat lobster, *Shinkaia crosnieri* Baba and Williams 1998 from the Indian waters. Specimens were collected from cold seep environment located at 1750–1760 m depth in the Krishna–Godavari basin, western Bay of Bengal, India. This species was only distributed in the Western Pacific, and the present observation assumes significance as it extends the distribution record west to the Indian Ocean. Notes on its morphological diagnosis and geographical distribution are also provided.

Keywords Cold seep · Deep-sea · Krishna–Godavari basin · Squat lobster · Anomura · First record

Introduction

Baba and Williams (1998) described a new genus and species of deep-sea squat lobster, *Shinkaia crosnieri* Baba and Williams, 1998, from hydrothermal vents off Bismarck Archipelago, Papua New Guinea, and Okinawa Trough, off southwestern Japan from a depth range of 1330–1483 m (Fig. 1). Since then, no other species of this genus has been described, therefore, it is the only monotypic genus in the family Munidopsidae. Chan et al. (2000) reported two male specimens from an 800 m deep

hydrothermal vent off northeast Taiwan (Fig. 1). Watabe and Miyake (2000) recorded this species from a 1500 m deep hydrothermal vent on the Hatoma Knoll off Iriomote-jima, southern Japan (Fig. 1). Subsequently published literature (Baba et al. 2009; Fujikura et al. 2002; Dong and Li, 2015; Yang et al. 2016; Cheng et al. 2020; Xiao et al. 2020) reported this species from cold-seep environments in the South China Sea, and from several vent fields around Okinawa Trough in the East China Sea, such as Minami-Ensei Knoll, Izena Caldron, Iheya field, Sakai field (Fig. 1).

In the Indian Exclusive Economic Zone, only two cold-seep environments have been recorded till date in the Krishna–Godavary (K–G) (Mazumdar et al. 2019) and Cauvery–Mannar basins (Mazumdar et al. 2021). Geomorphic features in the KG offshore basin include delta front between the outer shelf and upper slope incised with numerous canyons (Ramana et al. 2009), bathymetric mounds formed due to deeply buried shale diapir and sedimentary ridge controlled by toe thrust fault system (Dewangan et al. 2010), and several mass transport deposits in the upper slope region associated with diapirism, faulting, and gas venting (Ramprasad et al. 2011).

The cold seep in the K–G basin was first discovered by Mazumdar et al. (2019) during cruise SSD-045 onboard Oceanographic Research Vessel Sindhu Sadhana during early 2018. Located at 900–1800 m depths, and characterized

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Burrow Morphology of Brachyuran Crab *Dotilla blanfordi* Alcock, 1900 from Gulf of Khambhat, Gujarat, India

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Abstract: The present study was conducted to understand the burrow morphology of brachyuran crab *Dotilla blanfordi* Alcock, 1900 at Dandi beach located in Gulf of Khambhat of Gujarat state, India. Burrows were selected randomly and their opening diameter was recorded. Diluted resin was poured in the burrows to generate burrow cast. If the occupant crab emerges out of the burrow, it was captured and carapace width and gender was recorded. The shapes of complete burrow casts were identified and measurements of various morphological characters of burrow cast were recorded. Total 7 different burrow shapes were identified, out of which single tube burrow was the most common as compared to other burrow shapes. The crab carapace width showed significant relationship with burrow opening diameter, burrow depth, burrow length and burrow volume. Juveniles (<3.45 mm CW) were making burrow of only 3 shapes while adults (>3.45 mm CW) were making burrow of all the seven shapes. Burrow depth, length and volume were significantly higher in adult crabs as compared to juveniles. No significant variation was observed between burrows of male and female individuals. The present study showed that burrow morphology is highly affected by the crab body size and also varies significantly with different life stages of the crab. Juveniles make shallow and simple burrows as their smaller gill areas stores lesser amount of respiratory water which needs to be changed frequently. However, adults make complex burrows to perform various tasks including copulation and reproduction.

Keywords: Behavioural adaptation, Burrow architecture, Burrow shapes, Crab, *Dotilla blanfordi*, Sandy shore

Citation: Upadhyay K.S., Patel K.J., Prajapati J.M., Rabari V.M., Thacker D.R., Patel H.V. and Trivedi J.N.: Burrow morphology of brachyuran crab *Dotilla blanfordi* Alcock, 1900 from Gulf of Khambhat, Gujarat, India. Intern. J. Zool. Invest. 8(2): 251-261, 2022.

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Introduction

Burrowing is a widespread behaviour observed in several invertebrates (Matsumasa *et al.*, 1992;

Lomovasky *et al.*, 2006) as well as in vertebrate fauna (Moulton *et al.*, 2006; Schwaibold and Pillay,

ON ACTIVITY PATTERN OF THE MUDFLAT INHABITING
 CRAB *DOTILLA BLANFORDI* ALCOCK, 1900 IN GULF
 OF KHAMBHAT, GUJARAT

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[Joshi, K., Patel, K. & Trivedi, J. 2022. On activity pattern of the mudflat inhabiting crab *Dotilla blanfordi* Alcock, 1900 in Gulf of Khambhat, Gujarat. Munis Entomology & Zoology, 17 (supplement): 1633-1640]

ABSTRACT: In animals, male and female individuals show variation in time allocation for different activities according to their habits and habitat. In the present study, the effect of gender and size on time allocation patterns for different activities in mudflats inhabiting crab *Dotilla blanfordi* (Alcock, 1900) has been studied. The present study was carried out at Dandi beach located in Navsari district of Gujarat state from June 2019 to February 2020. Crabs were selected randomly and their activities were video recorded for 5 minutes. After that, the crabs were captured and their size (Carapace width: CW) and sex were recorded. All the videos were watched and different activities were identified like: mud balling (feeding), standing, fighting, in burrow, walking, grooming and burrowing. Out of all the activities recorded, maximum time was allocated for mud balling (feeding) (62.68 %) while the least time was allocated for grooming (0.37 %). Females spent more time on feeding (73.61 %) as compared to males (54.45 %). Juvenile individuals (< 3.5 mm CW) were spending more time in burrows and burrowing as compared to adult individuals while adults were observed spending more time in mud balling, standing fighting, walking and grooming. The present study showed that the time allocation pattern varies significantly according to the gender and size of an individual. Few other factors like predation risk, reproductive maturation, breeding and non-breeding season and energy conservation also affect time allocation patterns for different activities which need to be investigated.

KEY WORDS: Behaviour, phenology, mud balling, time allocation, activity budget

Behaviour is a response by an organism against external or internal stimuli. Some general behaviours commonly observed in all the organisms include search for food, feeding, mating and reproduction, defence, grooming, locomotion and agonistic behaviours (Dunham, 1983). In animals, it has been observed that male and female individuals display varying activities and allocate time differently for different activities based on their requirements (Tina et al., 2019). In order to measure their activities, the animal can be tracked over a prolonged period to prepare an "activity budget". Activity budget can help in understanding the time investment of an individual organism for different activities like feeding, resting, sleeping, moving, etc. For instance, during the breeding season when the chances of reproductive success are higher, the animal will spend more time and effort in

FIRST REPORT OF MANTIS SHRIMP *ORATOSQUILLINA INTERRUPTA* KEMP, 1911 (CRUSTACEA: STOMATOPODA) FROM GUJARAT STATE, INDIA

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[Dudiya, D., Patel, K. & Trivedi, J. 2022. First report of mantis shrimp *Oratosquillina interrupta* Kemp, 1911 (Crustacea: Stomatopoda) from Gujarat state, India. *Munis Entomology & Zoology*, 17 (supplement): 1657-1661]

ABSTRACT: The present paper confirms the occurrence of the mantis shrimp *Oratosquillina interrupta* (Kemp, 1911) for the first time in Gujarat. In India the species have so far been recorded from Maharashtra, Goa, Tamil Nadu, Andhra Pradesh, West Bengal, Andaman and Nicobar Islands and now from Gujarat.

KEY WORDS: Gulf of Kachchh, new record, Squillidae, by-catch, west coast

The mantis shrimps are predatory malacostracan crustaceans of the order Stomatopoda (Ahyong, 2001, 2012) with a worldwide diversity of around 500 species belonging to 120 genera, 18 families and 7 superfamilies (Van Der Wal et al., 2017, 2019). In India, total of 72 species belonging to 35 genera, 10 families and 5 superfamilies have been reported from India with maximum species being recorded from the family Squillidae (43 species, 20 genera) (Trivedi et al., 2020). Mantis shrimp species of the family Squillidae Latreille, 1802 are commonly found in a wide range of habitats and are conspicuous inhabitants of coral reefs. Total 4 species of Squillidae viz, *Clorida bombayensis* (Chhapgar and Sane, 1967); *Erugosquilla hesperia* (Manning, 1968) *Harpiosquilla harpax* (de Haan, 1844) and *Miyakella nepa* (Latreille in Latreille, Le Peletier, Serville & Guérin, 1828) have been reported from Gujarat state (Trivedi et al., 2020). In the present study, we recorded one more species *Oratosquillina interrupta* (Kemp, 1911) belonging to family Squillidae for the first time from Gujarat.

MATERIALS AND METHODS

The specimens examined in the present study were collected from the muddy shore of Nana Layjha village (22°50'10"N, 69°13'28"E) located in the Gulf of Kachchh of Gujarat state, India. The fresh specimens were washed properly and photographs were captured. The sex of the specimens was identified and their total length (TL) was recorded using digital vernier callipers. The specimens were preserved in 90% alcohol and deposited in Zoological Reference Collection



Study on Shell Utilization Pattern of Two Sympatric Hermit Crab Species on the Rocky Intertidal Region of Veraval, Gujarat, India

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Abstract

The present study illustrates the shell utilization and resource partitioning of two sympatric hermit crab species *Clibanarius rhabdodactylus* and *Clibanarius ransoni* with reference to gastropod shell species (shell shape), shell size and shell availability. Specimens were collected from January to March 2021 and hermit crab weight and shield length were measured. The gender of occupant hermit crab was identified and categorised into male, non-ovigerous female and ovigerous female. Gastropod shells were identified and different morphological parameters like shell length, shell aperture length and width, shell volume and dry weight were measured. The population of *C. rhabdodactylus* and *C. ransoni* was female biased with male: female ratio being 1:1.93 and 1:1.25 respectively. *Clibanarius rhabdodactylus* and *C. ransoni* were occupying 29 species and 28 species of gastropod shells respectively among which > 75% occupied shells were comprised of *Cerithium caeruleum*, *Lunella coronata*, *Turbo bruneus*, *Tenguella granulate* and *Pollia undosa*. Both the *Clibanarius* species were showing a high overlap in their intertidal distribution as well as gastropod shell use pattern. *Cerithium caeruleum* was found to occur in high abundance as compared to other gastropod species in the study area which may also influence the shell utilization of hermit crab species. Males and non-ovigerous females of the hermit crab species utilized almost all shell species, while ovigerous females used only a few shell species. Significant relationship was observed between different morphological parameters of the occupant crab species and occupied shells. Shell partitioning was evident between hermit crab sexes as well as reproductive stages on the basis of occupied shells of different species, shapes, and sizes. The present study revealed shell occupation pattern of *C. rhabdodactylus* and *C. ransoni* is highly influenced by the diversity, morphology and availability of gastropod shells in the study area.

Keywords Sympatric species · Resource partitioning · Shell availability · Shell occupation · Rocky shore · Gujarat

Introduction

Hermit crabs have evolved to occupy empty shells or pseudo shells for the protection of their non-calcified pleon (Schejter and Mantelatto 2011; Schejter et al. 2017). They occupy

the shells of dead molluscs or by removing the live animal from the shell (Rutherford 1977; Elwood and Neil 1992). Furthermore, the occupied shell protects the crab from various biotic and abiotic factors including predation, competition, temperature, osmotic stress and wave action (Reese 1969; Bertness 1981a, 1982; Hahn 1998; Angel 2000). Studies have shown that shape, size, abundance and quality of gastropod shells affect the population size (Vance 1972), growth (Fotheringham 1976; Turra and Leite 2003), morphology (Blackstone 1985), fecundity (Childress 1972; Fotheringham 1976) and survivorship (Angel 2000; Lively 1988) of hermit crabs. Hermit crabs acquire empty shells from the habitat and require increasingly larger shells throughout their lifespan to maintain shelter and protection from predators keeping them in constant search of a suitable shell (Childress 1972; Bertness 1981a, b). As the hermit crabs constantly need new and favourable shells, the availability of the shells becomes a limiting factor for their distribution (Shih and

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Range extension of brachyuran crabs of the family Camptandriidae Stimpson, 1858 (Crustacea: Decapoda: Brachyura) in Indian waters

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Abstract. We report the presence of 3 species of brachyuran crabs, *Opusia indica* (Alcock, 1900), *Nasima dotilliformis* (Alcock, 1900) and *Leptochryseus kuwaitensis* (Jones & Clayton, 1983) (family Camptandriidae), for the first time from Indian waters. The species are so far reported from Iran, Iraq, Kuwait, UAE, Saudi Arabia and Pakistan. Records of these species in Indian waters extend their distribution range in the northern Indian Ocean.

Key words. Gujarat, India; Arabian Sea; new record.

Brachyuran crab species of the family Camptandriidae are common inhabitants of estuarine, mangrove-associated mudflat habitats and open mudflat habitats of the Indian Ocean and Western Pacific region (JONES & CLAYTON 1983). Approximately 40 species belonging to 22 genera are reported in the family Camptandriidae worldwide (NG et al. 2008, DE GRAVE et al. 2009, AHYONG 2014). Of these, only 2 species, *Camptandrium sexdentatum* Stimpson, 1858 and *Baruna socialis* Stebbing, 1904 are reported from Indian waters (KEMP 1915, HARMENTO & NG 1991, DEV ROY & DAS 2000, DEV ROY 2008, DEV ROY & NANDI 2008). The present study adds 3 more species, *Opusia indica* (Alcock, 1900), *Nasima dotilliformis* (Alcock, 1900) and *Leptochryseus kuwaitensis* (Jones & Clayton, 1983), to the list of Camptandriidae occurring in Indian waters.

This study was carried out as part of an ongoing study on the brachyuran crab fauna of Gujarat state, India. The specimens were collected from coastal areas of Lakhpat (23°50'01" N, 068°46'26" E) and Jakhau (23°13'26" N, 068°37'37" E) (Fig. 1) located on the coast of northern Arabian Sea in the Gulf of Kachchh, Gujarat, and consisting of mangrove mudflat habitats. Specimens were collected by hand during low tide. Specimens were washed properly to remove sediment and photographed in the field using a Canon 1000D with 18–55 mm lens. Specimens were preserved in 70% alcohol and deposited in the Zoology Museum of the Department of Zoology, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India. Specimen catalogue numbers are provided in the species accounts below. Maximum carapace width (CW) and length (CL) were measured for each speci-

men. The abbreviation Gl is used for male first left gonopod and coll. for specimen collector.

Family Camptandriidae Stimpson, 1858
Genus *Opusia* Ng, Rahayu & Naser, 2009

Opusia indica (Alcock, 1900) (Figs. 2, 3, 8–13)
Tylodiplax indica — ALCOCK (1900): 374; ALCOCK & ANDERSON (1895): pl. 64, fig. 2; NG et al. (2008): 234.
Opusia indica — NG et al. (2009): 6, fig. 1A, 2.

Material examined. 4 males and 2 females (ZL- AR-CR-82) (CL: 3.87–6.24; CW: 5.94–9.54); India, Gujarat, Gulf of Kachchh, Lakhpat (23°50'01" N, 068°46'26" E), open mudflat habitat, 27 March 2015, Coll. Jignesh Trivedi and Kauresh Vachhrajani.

Description. Carapace wider than long (Figs. 2, 8), dorsal surface with pits and folds with long plumose setae, 2 short transverse parallel grooves on either side of gastric region, anterolateral margin with row of granules extending halfway to posterior, ptergostomial region swollen beyond anterolateral margin; posterolateral margin strongly convex, rounded. Anterior straight with thick margin. Cornea small, eyestalk long, slender with plumose setae. Third maxilliped (Fig. 9)

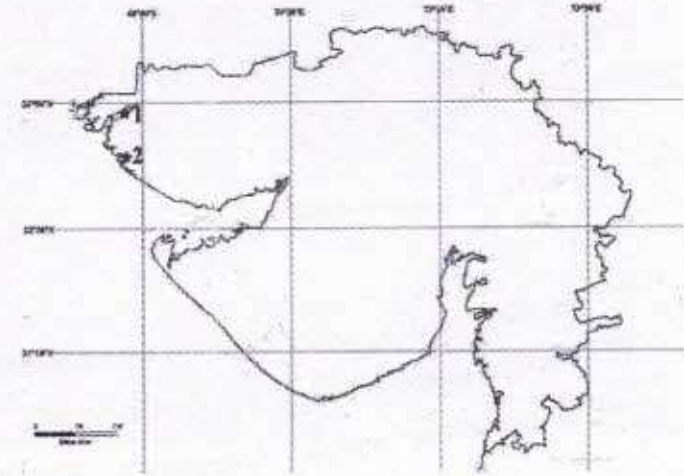


Figure 1. Map of specimen collection site. Gulf of Kachchh, Gujarat, India. 1: Lakhpat (23°50'04" N, 068°46'10" E). 2: Jakhau (23°13'26" N, 068°37'37" E).

FULL TEXT LINKS



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Biogenically proficient synthesis and characterization of silver nanoparticles employing marine procured fungi *Aspergillus brunneoviolaceus* along with their antibacterial and antioxidative potency

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Affiliations:

PMID: 32944816 DOI: 10.1007/s10529-020-03008-7

Abstract

Objectives: To assess the extracellular synthesis of silver nanoparticles using marine derived fungi *Aspergillus brunneoviolaceus* with their antibacterial and antioxidant activities.

Results: The biosynthesis of silver nanoparticles was estimated by the change in color from light yellow to dark brown within 36 h as the reaction progressed. UV-Visible spectroscopy exhibited its stability at 411 nm; ATR-FTIR spectroscopy depicted the functional group responsible for its production; X-Ray Diffraction denoted its crystalline FCC structure resembling the peaks in XRD pattern, corresponding to [111], [200], [220], [311] and [222] planes; TEM imaging revealed its spherical morphology with the particle size ranging from 0.72 to 15.21 nm and Tauc's plot analysis that disclosed its band gap energy as 2.44 eV that manifested the potential of AgNPs to be semiconductors. The characterization data henceforth, confirmed the efficient production of silver nanoparticles. The biosynthesized AgNPs expressed strong antibacterial activity against two Gram-positive and three Gram-negative bacteria. They also proved to possess higher antioxidative potentials by showing their potent radical scavenging activity against DPPH (2, 2-diphenyl-1-picrylhydrazyl).

Conclusions: The study unfolds the prospect for further utilization of this mycogenically synthesized AgNPs as antibacterial, antioxidative and anticancer agents.

Keywords: Antibacterial and antioxidant activity; *Aspergillus brunneoviolaceus*; Biosynthesis; Characterization; Silver nanoparticles.

Supplementary concepts

Aspergillus brunneoviolaceus

Related information

PubChem Compound (MeSH Keyword)

LinkOut - more resources

Full Text Sources:

Springer

Medical

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Miscellaneous

NCI CPTAC Assay Portal

Review**Iron chelating bacteria: a carrier for biofortification and plant growth promotion**Priyanka Patel¹, Shreyas Bhatt², Hardik Patel³, Meenu Saraf^{1*}¹*Department of Microbiology and Biotechnology, University School of Sciences, Gujarat University, Ahmedabad - 380 009*²*Department of Life Sciences, Hemchandracharya North Gujarat University, Patan - 384265*³*Government Dental College and Hospital, Civil Hospital Campus, Ahmedabad - 380 016.*

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Abstract

Biofortification is the process by which the nutritional quality of food crops is improved through agronomic practices, conventional plant breeding, or modern biotechnology to focus on malnourishment in developing countries. Under iron restricted environment certain bacteria (iron chelating bacteria) produced iron chelating molecules called as siderophore. This review gives an overview of Need for biofortification, Plant growth promoting rhizobacteria, Plant growth promoting consortia, importance of iron for human health, uptake of iron in plants, iron chelating (siderophore producing) bacteria as plant growth promoter, siderophore, generalized mechanism for siderophore-mediated iron transport in bacteria and the possible approaches to enhancing iron content in plants by implementing iron chelating bacteria as biotechnological carrier for increasing plant nutrition, yield and quality.

Keywords: Biofortification, Iron, Siderophore, PGPR

1 Introduction**1.1 Need for Biofortification**

Biofortification aims at either increase accumulation of micronutrients in edible plants or to increase their bioavailability and is considered a cost-effective strategy to focus on malnutrition in developing countries. Iron (Fe) is naturally occurring metalloid element, which is essential to human and other animal health in trace amounts. Fe is an essential micronutrient for most microorganisms, including plants and animals. It is an essential micronutrient for plants due to it plays a crucial role in transport of oxygen, oxidative metabolism, proliferation of cell and required in certain physiological processes like N₂ fixation, photosynthesis (Nair and Iyengar, 2009). Iron

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Review Article:

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ENZYMATIC OIL EXTRACTION PROCESSES FROM EDIBLE AND NON EDIBLE OIL SEEDS

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ABSTRACT:

The extraction of oil from edible and non-edible oilseeds by solvent extraction step by mechanical and chemical for industrial purpose. Normally, hexane is used as a solvent; this process have been operated commercially for a long time. In the past, due to use of hexane, there is chances of environmental pollution and low oil yield. So use of hexane was reduced. The present scenario to be changing. Interest in aqueous extraction processes has been becoming popular due to its environmental concern. An aqueous process is looked upon as ecofriendly technology for oil extraction. Other advantages of the aqueous process compared with solvent-based processes include: (1) Higher extraction of edible and non-edible oil and protein (2) Minimum damage of protein during extraction, and (3) Good process safety due to the minimum fire risk and explosion. Due to the solvent recovery step is elimination, aqueous extraction processes may be more cost effective. The limitations of this process are: (1) Oil extraction with minimum efficiency as reported in earlier studies and (2) Final treatment of the aqueous effluent. Enzymes are used for the improving oil yield in the aqueous processes. Specific enzymes have been tried on different oil seeds resulting in much higher oil extraction than the aqueous process. These hydrolyzing enzymes hydrolyze the

Shell utilization pattern by the hermit crab *Diogenes custos* (Fabricius, 1798) along Gulf of Kachchh, Gujarat, India

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Abstract


Present work aims to study the gastropod shell utilization pattern of hermit crab *Diogenes custos* in the intertidal zone of Gulf of Kachchh, Gujarat, India. Hermit crab specimens were collected randomly during the low tide timings using hand picking method in February 2019 and November 2019. Data on abundance of common gastropod species were also collected using a quadrat sampling method. Hermit crab wet weight (HW) and their shield length (SL) (represent the size of the hermit crabs) were measured. Gastropod shells were identified up to species level and different morphological characters such as shell dry weight (DW), shell length (SHL), shell volume (SHV), shell aperture length (SAL), and shell aperture width (SAW) were measured. Total 2000 individuals of *D. custos*, 1171 males (58.6%), 763 females (38.1%) and 66 ovigerous females (3.3%) occupying 49 species of gastropods were collected. *Pollia undosa* (21.9%) was highly occupied by *D. custos* followed by *Cantharus spiralis* (14.5%), *Tenguella granulata* (9.9%), *Chicoreus virgineus* (6.45%), *Cerithium caeruleum* (6.05%) and *Nassarius distortus* (6.05%). Regression analysis carried out between *D. custos* morphological characters and gastropod shell morphological characters showed a strong relationship which suggests that shell architecture plays an important role in shell utilization pattern of *Diogenes custos*. The abundance of *Pollia undosa* was very high in the intertidal zone as compared to other commonly occupied gastropods species which also suggests that gastropod shell availability in the habitat also has pronounced effect on shell utilization pattern of *D. custos*.

Keywords: *Diogenes custos*, Shell occupation, Gastropod diversity, Gulf of Kachchh, Gujarat

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Four New Records of Brachyuran Crabs (Crustacea: Decapoda: Brachyura) from India

Jigneshkumar Trivedi , Santanu Mitra, Pooja Patel, Swapnil Gosavi & Kauresh Vachhrajani

Thalassas: An International Journal of Marine Sciences **37**, 235–242 (2021)

303 Accesses | **1** Citations | [Metrics](#)

Abstract

The present study is a part of long term ongoing study on brachyuran crab diversity of India. The specimens were collected from intertidal zone as well as from the fisheries by-catch captured using commercial trawler. The specimens were identified up to species level using standard literature. From the collection, four species of brachyuran crabs, *Schizophrys pakistanensis* Tirmizi & Kazmi, 1995 (Majidae), *Macromedaeus voeltzkowi* (Lenz, 1905) (Xanthidae), *Pseudosesarma brehieri* Ng, 2018 (Sesarmidae) and *Ilyograpsus paludicola* (Rathbun, 1909) (Macrophthalmidae) are first time reported from India. The present study records significant expansion in the distribution range of these species. The diagnostic characteristics and remarks on the taxonomy and distribution of each species are given in this paper.

Article

Impact of seasonal variation on 'daidzein' accumulation in callus and in vivo parts of *Pueraria tuberosa* (Willd.) DCJune 2020 · *Medicinal Plants - International Journal of Phytomedicines and Related Industries* 12(2)DOI: [10.5958/0975-6892.2020.00031.3](https://doi.org/10.5958/0975-6892.2020.00031.3)Project: [In vitro propagation and conservation of economically important, over exploited as well as threatened/ endangered plant species for sustainable supply of planting materials and secondary metabolites](#)

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Abstract

Daidzein-natural isoflavones found in *Pueraria tuberosa* (Willd.) DC. (Fabaceae) which is a potent medicinal plant. It acts as signal carriers and responds to the pathogenic attacks and reduces pain during menopause, osteoporosis and also antidiabetic in nature. In the present work, in vitro callus development from tuber explants during both rainy and summer seasons was conducted. Further, a simple unambiguous and rapid high-performance thin-layer chromatography method was established for quantitative estimation of daidzein in callus and in vivo parts to assess the impact of seasonal change on valuable phytochemical accumulation. Maximum callusing (90 %) was obtained on MS medium fortified with a combination of 6 N-Benzylamino purine (2 mg/l) and 2,4-dichlorophenoxyacetic acid (2 mg/l) during the summer season from the tuber explant. During the HPTLC method validation, the linearity range obtained was 100-1000 ng/spot with a regression value (r) value of 0.99645. All the parts were found to contain a significant amount of daidzein. The maximum daidzein (2112.567±0.35 ng/g) content was obtained from a young tuber bark followed by callus (171.903±0.33 ng/g) during the summer season compared to rainy season parts and callus. Thus, it can be concluded that in vitro callus is an alternative source of daidzein without destroying the natural plant and the developed HPTLC method could be used for quality control analysis and recommended for daidzein quantification for different herbal formulation and drug preparation.

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Antibacterial and Larvicidal Activity of Biologically Synthesized Silver Nanoparticles from *Bambusa arundinaceae* Leaves Extract

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ABSTRACT

The increased morbidity and mortality due to the resistance developed in the pathogenic microorganism against antibiotic drugs and mosquito-borne diseases is an emerging issue in medical research. We need to find the new antimicrobial compound and effective biocontrol agent to reduced transmission of pathogenic infection. Due to diverse chemical and mechanical properties, silver nanoparticles produced by the green synthesis method are increasing demand for various pharmaceutical activities. In the present study, the aqueous extract of *Bambusa arundinaceae* leaves were used for the synthesis of silver nanoparticles. The synthesized (*Bambusa arundinaceae* derived silver nanoparticles) BA-AgNPs were characterized using UV-vis spectroscopy, FTIR, SEM and their antibacterial along with larvicidal potential was evaluated. Antioxidant capacity was measured using the DPPH method. SEM analysis revealed that BA-AgNPs were predominantly spheroidal shape with particle size distribution in a range of 20-80 nm. Lower IC₅₀ value (0.71 mg/ml) of biosynthesized AgNPs showed higher antioxidant activity compared to *B. arundinaceae* leaf extract (0.92 mg/ml) alone. BA-AgNPs were tested against mosquito larvae (*Aedes aegypti* and *Cx. quinquefasciatus*) and their mortality was examined. In larvicidal bioassay, biologically synthesized AgNPs were more toxic (LC₅₀ = 50.8 mg/L and 100.8 mg/L) than silver nitrate (LC₅₀ = 79.0 mg/L and 146.0 mg/L) to fourth instars larvae of *A. aegypti* and *Cx. quinquefasciatus* respectively. BA-AgNPs demonstrated the highest mortality in fourth instars larvae of *A. aegypti* then in *Cx. quinquefasciatus*. The biosynthesized BA-AgNPs showed a strong antimicrobial activity by causing inhibition of growth with a well diffusion assay. BA-AgNPs showed considerably higher antimicrobial activities against *Escherichia Coli* (*E.Coli*) when compared with both AgNO₃ and streptomycin alone. The results of this experiment suggest that biologically synthesized BA-AgNPs are a quite ideal candidate for the development of new antimicrobial drugs. The collective effect of BA-AgNPs with streptomycin was higher as compared to BA-AgNPs alone which indicates the synergistic effect of these components.

Key words: Antibacterial, Antioxidant, *Bambusa arundinaceae*, Larvicidal, Silver nanoparticles

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INTRODUCTION

The prevalence of bacterial resistance to conventional antibiotics has become one of the main health problems

around the globe and increasing the economic burden on the health sector. Pollution, mutation and altered environmental condition are possible factors increase the number of multi-drug resistant bacterial strains.^[1] *Aedes aegypti* acts as a vector of parasites that cause dengue fever, chikungunya, zika fever and other disease agents in human beings. Mosquitoes like *Culex* species (*Culex quinquefasciatus*) are a principal vector of bancroftian filariasis transmitted to humans.^[2] Synthetic insecticide has limited in used due to harmful effects on human

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Planning and Management of Water resources for North Gujarat

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Abstract - Water is a natural and scarce resource, livelihood, for food security and sustainable development depend on water [N.W.P.-2012].

The rapid rise in urban population, heavy demand of land for commercial and residential development and the heavy dependence on ground water led to over exploitation. Rainfall is the main source of ground water recharge, and the water table normally rises in response to rainfall in particular period. This relation has been changing because of the reduction in the number of water bodies which led to rapid decline of ground water level and drying up of shallow wells/bore wells in many parts of north Gujarat.

The security of our water future depends on how we utilize & save our water resources today. This will require concerted effort on the legal, policy, regulatory and institutional front for better managements and efficient usage of water. Accurate data and information systems are key to effective planning and management of water. Appropriate valuation of water uses will be necessary to design and promote demand management, recycling of wastewater, rainwater harvesting and also to deter the polluting of water bodies. Extensive awareness and education program need to be undertaken in parallel. A mass awareness program supplemented by appropriate technologies, policies, institutional arrangements, and stake-holders participation would increase water productivity, accurate economic growth and assure safe and secure water in the present and in future.

Index Terms - Rainwater harvesting, Ground water resources, Surface water resources, National water policy, Effective Planning and Management of water, Accurate data and information system, Livelihood, Food security, Sustainable development, ground water, Recharge of ground water.

INTRODUCTION

The Gujarat state can be divided in to four district units on the basis of water resources, endowment namely Kutch, North Gujarat, South & Central Gujarat, and

Saurashtra. North Gujarat the northern part of Indian state of Gujarat includes the districts of Gandhinagar, Banaskantha, Sabarkantha, Aravalli, Mchsana, Patan and Ahmedabad. In which Ahmedabad facing less difficulty of water problem and quite developed district so this district not include in this study.

Urbanization is one of the biggest challenges. Right now, there is about, one third population and expected more than half of Indian population will live in cities. As per census 2011, In Gujarat 62.6% of total population was living in rural area and 37.4% was in the urban areas. Decadal growth of urban population in various districts of North Gujarat are Banaskantha districts shows 50.05%, Gandhinagar districts shows 53.48%, Sabarkantha districts shows 61.25%, Mehsana districts shows 24.86%, Patan districts shows 17.87% decadal growth of urban populations.

In past two decades, the Gujarat state has lost about 27% of its ground water resources, the loss being 50% in North Gujarat, total water availability quota for North Gujarat is 6342 MCM, in which 2100 MCM is of surface water resources and 4242 MCM is of underground water resources. In many parts of North Gujarat, the extraction of ground water is more than the recharge, so the resources are stressed, and we are depleting both in quality and quantity, inefficiency in water use and irresponsibility in the management of water resources pose a serious threat to our water security and sustainability.

Rapid development of Ground water resources for varied usage has contributed to expansion of irrigated agriculture, overall economic development and in improving the quality of life. Ground water which is the source for rural domestic water requirements, urban water requirements and irrigation requirements is depleting fast in many areas due to its large-scale withdrawal for various sectors. In last 40 years development has taken place due to availability of physical infrastructure like electricity and funding



Comparisons of Advanced Computing Technique used in Cricket Game

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Abstract:

Cricket is a Gentle man's Game. It is really very difficult for any one (umpire) to take decision in real time because the speed and movement of ball. For human, to take decision in real time when the bowler like shoiab akhtar and brett lee bowling at the speed of 150 plus KMPH. Even though the bowler like shane warne turns (spin) the at an angle of almost 45 to 60 degree. In cricketing world everything is happening so fast it would be impossible for anyone to make decision in time. Hence, cricket has adopted few technologies to make game easier for the umpires. There are many technologies used nowadays in cricket game. But in my Paper I am going to discussed few of them.

With easiness of game one must also have to discussed cost effectiveness, use of technology to its maximum effectiveness and easy for the implementation. In this research paper we are going to discussed various advantages and disadvantage of the each technology used in the cricket game now days. The paper also focused on advanced image processing, stored and compressed image algorithm as well as hardware devices are used to record the real time images from the cricketing field.

Keywords: *Image Processing, advanced Computing Techniques, hot spot, hawk eye, snick-o-meter*

1. Introduction

The game of cricket has a realized history starting in the late sixteenth century. Having started in south-east England, it turned into the nation's national game in the eighteenth century and has grown internationally in the nineteenth and twentieth hundreds of years. Global matches have been played since 1844 and Test cricket started, reflectively perceived, in 1877. Cricket is the world's second most well known onlooker sport after affiliation football (soccer). Administration is by the International Cricket Council (ICC) which has more than one hundred nations and domains in enrollment albeit just twelve right now play Test cricket. With advent days there were many changes in the game occur. Right from history cricket played with red ball, white dresses and 5 days for the play that's known as Test match.

Then after one day comes with variations in the game finished in one day with full of excitement and romance. Later T20 came each side only 20 over to spare. The player also became so innovative in the shot selection and bowler also became wise to stop them. Throughout the years cricket has consolidated into the game a couple of the most recent innovative advances accessible. There have been a few dismissals of innovation, for example, the utilization of aluminum cricket bats, however for the most part the ICC have been appropriately mindful about making changes to the game that will affect the players and observers. Many technologies failed to fit in the game but few of them are so powerful that totally changes the game. In this paper following Technologies is going to discussed and compared.



A Study of Effectiveness of Collaborative Filter in Web Mining

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Abstract.

Everytime user surprised with visiting websites. How web comes to know the interest of any individual interest. How would it is possible for the web to remember all user likes and dislikes, buying patterns, interest in purchasing stuff. It's all because of techniques known as collaborative filters. Whenever user first visit to the web, ever website creating profile about the user. They maintained records in matrix form so, retrival can be very easily done. Collaborative filtering (CF) is a technique used by recommender systems. collaborative filtering is the process of filtering for information or patterns using techniques involving collaboration among multiple agents, viewpoints, data sources, etc. Applications of collaborative filtering typically involve very huge data records as the input. Collaborative filtering methods have been applied to many different kinds of data including: sensing and monitoring data, such as in mineral exploration, environmental sensing over large areas or multiple sensors; financial data, such as financial service institutions that integrate many financial sources; or in electronic commerce and web applications where the focus is on user data, etc. Though the software used for collaborative filter, there are pre requirements for it. user must have to take active participation, it is quite efficient way to capture input from user and algortihm that enables reads and analyze the input data. actually it is a collective efforts of human interaction with software to derive knowledge from the stored data record set.

Keywords: *Web mining, Web Content Mining, Data Mining, Data Cleansing*

Introduction

The growth of the Internet has made it much more difficult to effectively extract useful information from all the available online information. The overwhelming amount of data necessitates mechanisms for efficient information filtering. Collaborative filtering is one of the techniques used for dealing with this problem.

The motivation for collaborative filtering comes from the idea that people often poeple gets best recomendation from some other persons likes and dislikes. Human always learns from the other person experiences. Collaborative filtering encompasses techniques for matching people with similar interests and making recommendations on this basis.

Collaborative filtering algorithms often require (1) users' active participation, (2) an easy way to represent users' interests, and (3) algorithms that are able to match people with similar interests.

Typically, the workflow of a collaborative filtering system is:

1. A user expresses his or her preferences by rating items (e.g. books, movies or CDs) of the system. These ratings can be viewed as an approximate representation of the user's interest in the corresponding domain.

TEXT MINING: AN UNSTRUCTURED DATA MINING CONCEPT, USE, CHALLENGES AND FUTURE DIRECTION

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Abstract: Text mining is also known as text data mining or knowledge discovery process. There are actually structured and unstructured Data Mining Techniques. Structured Data Mining Techniques use the concept of relational database as input or first point of the knowledge discovery process. There is well defined structure and everything seems to be perfectly planned for the knowledge discovery. But Text mining has not structured source of input. The data arrives from various unstructured sources and there is no universal mechanism or formation, so mining process can be done in efficient way. In this paper, the focus is on the architecture, challenges and use and future direction of Text mining. Though, the data are not properly organized but if we can form architecture very important information can be derived and this will make useful in decision making or discovering the new knowledge. There is huge amount of information is stored in article, books and journals. Only proper algorithm is required to handle this information. The text mining serves the purpose of discovering the knowledge which is previously unknown.

IndexTerms - Web Mining, Data Mining, Web Content Mining, Web Usage Mining, Web Structured Mining and Text Mining.

I. INTRODUCTION

Text mining, also referred to as text data mining, similar to text analytics, is the process of deriving high-quality information from text. It involves "the discovery by computer of new, previously unknown information, by automatically extracting information from different written resources." Written resources may include websites, books, emails, reviews, and articles. High-quality information is typically obtained by devising patterns and trends by means such as statistical pattern learning. We can differ three different perspectives of text mining: information extraction, data mining, and a KDD (Knowledge Discovery in Databases) process. Text mining usually involves the process of structuring the input text (usually parsing, along with the addition of some derived linguistic features and the removal of others, and subsequent insertion into a database), deriving patterns within the structured data, and finally evaluation and interpretation of the output. High quality in text mining usually refers to some combination of relevance, novelty, and interest. Typical text mining tasks include text categorization, text clustering, concept/entity extraction, production of granular taxonomies, sentiment analysis, document summarization, and entity relation modeling (i.e., learning relations between named entities). Text analysis involves information retrieval, lexical analysis to study word frequency distributions, pattern recognition, tagging/annotation, information extraction, data mining techniques including link and association analysis, visualization, and predictive analytics. The overarching goal is, essentially, to turn text into data for analysis, via application of natural language processing (NLP), different types of algorithms and analytical methods. An important phase of this process is the interpretation of the gathered information. A typical application is to scan a set of documents written in a natural language and either model the document set for predictive classification purposes or populate a database or search index with the information extracted. The document is the basic element while starting with text mining. Here, we define a document as a unit of textual data, which normally exists in many types of collections. ✓

The term text analytics describes a set of linguistic, statistical, and machine learning techniques that model and structure the information content of textual sources for business intelligence, exploratory data analysis, research, or investigation. The term is roughly synonymous with text mining; also describe as "text analytics". The latter term is now used more frequently in business settings while "text mining" is used in some of the earliest application areas, dating to the 1980s, notably life-sciences research and government intelligence. The term text analytics also describes that application of text analytics to respond to business problems, whether independently or in conjunction with query and analysis of fielded, numerical data. It is a truism that 80 percent of business-relevant information originates in unstructured form, primarily text. These techniques and processes discover and present knowledge – facts, business rules, and relationships – that is otherwise locked in textual form, impenetrable to automated processing. Text mining computer programs are available from many commercial and open source companies and present names are Carrot2, GATE, SAS, MATLAB, RapidMiner and many more software for text mining these days available.

II. TEXT ANALYSIS PROCESS

THE STEPS FOR TAX ANALYSIS PROCESS ARE EXPLAINED AS BELOW:

1. DIMENSIONALITY REDUCTION IS IMPORTANT TECHNIQUE FOR PRE-PROCESSING DATA. TECHNIQUE IS USED TO IDENTIFY THE ROOT WORD FOR ACTUAL WORDS AND REDUCE THE SIZE OF THE TEXT DATA.
2. Information retrieval or identification of a corpus is a preparatory step: collecting or identifying a set of textual materials, on the Web or held in a file system, database, or content corpus manager, for analysis.
3. Although some text analytics systems apply exclusively advanced statistical methods, many others apply more extensive

OLAP ALGEBRAIC LAWS FOR IMPROVING OLAP EXPRESSION TREES

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ABSTRACT

OLAP algebra, In other words, we describe simple semantics representing a comprehensive Multi-dimensional OLAP algebra that can directly exploit the clean Object-Oriented conceptual model. In this paper, we describe a number of laws for our comprehensive OLAP algebra. To illustrate the motivation for this process, first recall that a query in traditional relational databases, written in SQL, is translated internally into an initial relational algebra expression that can be then transformed into equivalent, but more efficient ones by applying various relational algebraic rules. In order to perform better joins between the cube and dimension tables, we change the restriction of the selection operation so that it can be performed on the relevant cuboid/view alone. In summary, our comprehensive OLAP query algebra (operations and laws), grammar and metadata storage are essential components in the process of resolving OLAP queries written in native OOP languages.

Keyword: Algebraic Laws, MOLAP Algebra, Operation in MOLAP

Introduction

Object-Oriented OLAP queries are written at a very high level against the conceptual model, our OLAP query processor must do a lot of additional processing to supply missing details. Thus, an OLAP query is translated internally into an OLAP algebra expression that ultimately makes alternative forms of an OLAP query easier to create, explore, manipulate and optimize (e.g., push and pull operations, replace operations). Specifically, when an OLAP query is submitted to our OLAP DBMS, its query optimizer tries to find the most efficient equivalent OLAP algebra expression before evaluating it.

For example, the most common relational algebraic laws are (1) pushing the selection (σ) as far as possible, (2) combining selection (σ) with Cartesian product (\times) to produce joins (\bowtie), (3) introducing new projections (π) when necessary, etc. In Figure 1(a), we can see how the SQL is transformed into an initial tree of relational algebra operations. Figure 1(b) improves the initial expression by applying common relational algebraic rules in some meaningful way. Specifically, we split the two parts of the selection ($\text{starname} = \text{name}$) and ($\text{birthdate LIKE ' \%1960'$). The first condition involves attributes from both sides of the product, but they are equated, so the product and selection can be combined to produce an equijoin. The latter condition is pushed down the tree.



Assault plan with NFC: together with NFC tag into routine things

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Hemchandracharya North Gujarat University, Patan

Abstract:

Near Field Communication (NFC) has been fast growing technology since last few years. A tight integration of such technology with mobile phones has given a tremendous opportunity to the world. It is a close-range induction-based technology. In this paper I would like to explore practical approach which was taken up for attacking user data or more briefly said stealing data by conducting multiple attacks. More about this technology threats and what can be the possible outcome to stay away from threats. All these threats are based on active and passive communication.

1. Introduction

Disregarding the way that Personal Computer (PC) is for all intents and purposes indistinct to a Mobile phone in particular terms, and individuals regularly convey increasingly an individual thing like mobile phone reliably. Presently a day's Mobile phones are under physical surveillance since individuals generally believe that their mobile phones are an imperative bit of their way of life. Burglary and particular distant attacks using Bluetooth or WI-Fi correspondence innovation are somewhat ambushes that may exploit our mobile phone. We have some new thing NFC incorporated with mobile phone, will rises barely any more perils to our advanced cells.

2. Significance of security

Exactly when client uses an organization due to tension, the organization or adm inistration related use issues they would prefer not to look with. His/her essential and first methodology is to improve and greater execution as could be expected under the circumstances. So, to pick up organization we need usefulness and execution together [4].


The boundaries like specialized inadequacies and security related issues are possibly impact the proportion of administration utilization. There is a complexity in the two issues. Security issues are made with some improper demonstration of clients and with some in fact solid made devices, which encourages client to cause destruction. Be that as it may, there is no issue of security identified with specialized issues [5]. In the most recent decade, for the accompanying reasons security has turned into a critical issue:

- A wrongdoer, by imitating malicious exercises can acquire penny because from their perspective, money related earning chances are lot more.
- From the specialized perspective:
- Step by step web is extending in immense numbers, along these lines transgressor has more opportunities to do an off-base thing with no single client yet they may perform same assault procedure on various expected misused individuals.
- High advancement cost in data innovation zone and extending essential of new applications has put forth hard to embed wellbeing attempts in the new applications. Furthermore, it may takes parcel of endeavors to introduce security headway as opposed to organizing whatever left of the

Future Journal of Pharmaceutical Sciences

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Impact of silver nanoparticles as antibacterial agent derived from leaf and callus of *Celastrus paniculatus* Willd

[Anita Solanki](#), [Dipika Rathod](#), [Illa C. Patel](#) & [Jitendriya](#)[Panigrahi](#) [Future Journal of Pharmaceutical Sciences](#) **7**,

Article number: 60 (2021)

1120 Accesses | **6** Citations | [Metrics](#)

Abstract

Background

Celastrus paniculatus Willd. is a rich source of numerous active constituents such as celapanigin, celapagin, malkangunin, celapanin, zeylasteral, pristimerin, and zeylasterone which render medicinal properties to its various parts. Therefore, the present work provides a protocol for the synthesis of AgNPs from in vivo leaf and in vitro developed callus extract of *C. paniculatus* and both

Article

Effect of calcium chloride and gallic acid combination on the extension of postharvest life of *Lagenaria siceraria*, a vegetable with medicinal importance

January 2021 · *Medicinal Plants - International Journal of Phytomedicines and Related Industries* 13(1):110-119

DOI:10.5958/0975-6892.2021.00012.5

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Abstract

Lagenaria siceraria (Mol.) Standl. consists of all essential elements that are required for good and normal human health. Post harvest losses occur due to lack of proper packaging material, microbial spoilage, and improper handling during transport. Thus, this study deals with viability, sensory evaluation, antioxidant enzymatic activities of *L. siceraria* fruits by the treatment of a combination of calcium chloride and gallic acid (abbreviated as CG) for 21 days storage at room temperature. The solutions were prepared by the addition of CG in equal amount with different concentrations: 1:1 μM , 2:2 μM , 3:3 μM , and 4:4 μM . The untreated *L. siceraria* fruits survived for 14 days. However, all the coated *L. siceraria* fruits could sustain for 21 days, and the combination of 2:2 μM CG was superior in all aspects. The combination of calcium chloride and gallic acid showed beneficial effects by delaying the ripening process.

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Changes in antioxidant and biochemical activities in castor oil-coated *Capsicum annuum* L. during postharvest storage

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Jun 2018

Niyati Patel · Jitendriya Panigrahi · Mansi Patel · Saikat Gantait

Home > Faunistics > Biological Science > Wildlife

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Assessment of wildlife habitat in Taranga hill forest with reference to change in land use and land cover

June 2021

Project: [Habitat suitability and corridor analysis for sloth bear in Gujarat using remote sensing and Ecological modeling](#)

Authors:



Vyas Shrivangi
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Nishith A Dharaiya
Hemchandracharya North Gujarat University

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Abstract and Figures

Taranga Hill forest is a part of the Aravali mountain system and experienced by heavy biotic pressure. The forest once had diverse vegetation and faunal diversity now facing several issues like overgrazing, deforestation and human encroachment. In order to work the change in forest cover and wildlife habitat of Taranga hill forest, Remote sensing and Geographical information system (GIS) techniques were employed. Resourcesat-2LISSIII (2008) and Sentinel 2A (2018) remote sensing data were used in the study for change detection. The supervised classification technique was used, which is based on Maximum Likelihood Algorithm (MLA) and the habitat was studied through field observations. The results show significant change in land use in the major classes like wetlands, dense forest and open forest areas are decreased whereas; agriculture, settlement and barren land have increased in the last ten years. Proximity analysis and Normalized differencing vegetation index (NDVI) classification reveals that the remaining forest areas of Taranga may have a serious threat from urbanization, agricultural expansion and transport which can be the threat to the wildlife and biodiversity of the forest. The work also recommends for a long term exploration of habitat use by wildlife, threat analysis and biotic pressure on the forest on a seasonal basis so that long term management and conservation strategies can be devised for this small but very important wildlife habitat of north Gujarat.



Location map of
study area:...



A flowchart
illustrating the...



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Distribution and relative abundance of Indian Giant Flying Squirrel (*Petaurista philippensis*) in Gujarat, India

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Received: 8 July 2020 / Revised: 25 July 2020 / Accepted: 7 September 2020 / Published online: 21 October 2020. Ministry of Sciences, Research, and Technology, Arak University, Iran.

How to cite: Nisha S, Nishith D. (2021) Distribution and relative abundance of Indian Giant Flying Squirrel (*Petaurista philippensis*) in Gujarat, India. 5(1), 53-62. <https://doi.org/10.22120/jwb.2020.130618.1163>

Abstract

We assessed the distribution pattern and abundance of *Petaurista philippensis* in the state of Gujarat, India. It is the only species of flying squirrel found in the western states of India. The species was distributed on a large geographic area with confined populations in the eastern dry and moist deciduous forest stretch with tall trees within the state. During the study period, 33 times flying squirrels were encountered at 14 sites in 7 districts, concentrated mainly in protected areas. The overall encounter rate was 0.50 individuals/km among which, the central districts of Gujarat showed the highest while the north-east districts showed the lowest abundance of *P. philippensis*. It was found to be a tree-dwelling species, positively associated with old-growth forests with tall trees. The abundance rates were found to be associated with forest degradation and hunting practices. Illegal hunting practices persists in some areas of Gujarat, may affect the population number and trend. Apart from forest degradation and fragmentation, hunting for domestic consumption, ethnomedicinal uses, traditions, and human-made forest fires were the major potent threats of flying squirrels as found during the present study.

Keywords: Arboreal, encounter rate, protected areas, rodents, western India

Introduction

With about 2277 species in 481 genera under 33 families, Rodentia is the single largest group of mammals globally (Wilson & Reeder, 2005) with the broadest distribution throughout and occupies almost every habitat in any geographic area. Out of the 48 species (15 genera) of flying squirrels worldwide (Corbet & Hill, 1991, Thorington et al., 1996), India is known to have a diversity ranging between 9-12 species (Corbet & Hill, 1991, Thorington et al., 2012, Menon, 2014); mainly concentrated in the northeast and Himalayan regions. Indian Giant Flying Squirrel (IGFS) dominates all the species being widely distributed in the tropical and sub-tropical forests of south and Southeast Asia (Corbet & Hill, 1992, Nandini, 2000, Wilson & Reeder, 2005, Koli et

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Article

ENZYMATIC OIL EXTRACTION FROM PONGAMIA PINNATA (KARANJA) OIL SEED BY MICROCOCCUS LETUES

June 2020 · *Journal of Critical Reviews* 7(19):3349-3352

Authors:



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Shreyas Bhatt
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Optimization of an enzymatic process for coconut oil extraction

Article Full-text available

Jan 1990

V.A. Barrios · D.A. Olmos · R.A. Noyola · Agustin Lopez Munguia

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Effect of processing pH on the properties of peanut protein isolates and oil

Article

Jan 1973 · CEREAL CHEM

Optimization of Laccase Enzyme Production by *Amesia atrobrunnea* A2: A First Report

A.T. Thakkar, D.C. Pandya and S.A. Bhatt

Department of Life Sciences, Hemchandracharya North Gujarat University, Patan-384265, India.

<http://dx.doi.org/10.13005/bbra/2810>

(Received: 29 January 2020; accepted: 25 March 2020)

Lignin is one of the recalcitrant compounds largely present in enormous amount on earth. It is considered as major paper industries pollutant because of its brown color and hydrophobicity. Laccase is one of the major lignin degrading enzymes for solution of recent environmental problem. A study was carried out on fungi to establish laccase production potential for industrial and environmental application. The present research for laccase activity was reported by screening 16 isolates from rotted wood samples and agro waste collected from Patan, Gujarat. One of the isolated fungal species showing highest production of laccase enzyme activity was identified to be *Amesia atrobrunnea* A2. The objective of this work was to isolate laccase producing fungal isolate and optimize the production of laccases by *Amesia atrobrunnea* A2 in submerged fermentation. Among six variables (temperature, pH, carbon, nitrogen, inducer and cation sources), glucose as carbon source and veratryl alcohol as inducer were identified as good enhancer of laccase production.

Keywords: Agro waste, Biomass, Guaiacol, Lignin, Rotted wood.

Majorly cellulose, hemicelluloses and lignin are three components involved in structure of lignocellulosic material. In nature, cell wall has lignin as a biopolymer, a major and essential component of wood, imparting rigidity and protecting the easily degradable cellulose from attack by pathogens^{1,2}. Because of complication of structure and availability of nonhydrolysable bond, leads difficulty in breakdown of lignin compare to cellulose and hemicelluloses. Much of destruction of wood observed in nature is due to lignin biodegradation and it may have an important role in plant pathogenesis. Lignolytic microorganism and their enzymes have become important because they

may help to protect environment from pollution by paper pulp and various other industries^{3,4}.

Yoshida first described laccase in 1883 when he extracted it from the exudates of the Japanese lacquer tree, *Rhus vernicifera*. Laccase (1.10.3.2, p-diphenol: dioxygenoreductases) belongs to group of enzymes called the blue multi copper polyphenol oxidases (PPO), most widely distributed of all the large blue copper containing proteins. It shows its presence in a wide range of higher plants and fungi^{5,6,7,8,9}. Laccase with wide substrate utilization capacity helps to provide practical application for industrial purposes and/or bioremediation processes of polluted environmental

*Corresponding author E-mail:








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Article PDF Available

Development of Sustainable Biofortification Strategy in Phaseolus vulgaris Through Selenorhizobacteria Under Selenium Deficient Region

May 2020 · *Bioscience Biotechnology Research Communications* 13(1):1-9

Authors:

 **Priyanka Patel**  **Goral Trivedi**  **Shreyas Bhatt**  **Hardik B Patel**  **Meenu Saraf**

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Abstract and Figures

Plant Growth Promoting (PGP) selenorhizobacteria have the multi-capacity of colonizing the roots of plant and enhance the growth by various mechanisms. They are predicted eminent soil microbes for enhancing the plant growth. Study conducted with the aim to development the biofortification strategy in agriculture for increased selenium content in Phaseolus vulgaris plant through selenorhizobacteria bioinoculants under selenium deficient regions. Selenorhizobacteria were isolated from rhizospheric soil and characterized for their multi-trait plant growth promoting efficacy. Selected best three isolates MPJ2, MPJ8, MPJ10 of selenorhizobacteria were applied on seeds of Phaseolus vulgaris under pot study and after harvesting micronutrient present in Phaseolus vulgaris were determined by atomic absorption spectrophotometer. Among isolated selenorhizobacteria, MPJ10 was found to be the best to produce 99 µg/ml IAA producing bacteria. MPJ10 has been identified as Rhizobium selenitireducens on the basis of 16S rRNA sequencing. MPJ10 treated seeds of Phaseolus vulgaris showed increased seed germination capacity, longer root length, increased fresh weight of the plant. At the harvesting time (i.e. 75 Days after sowing) enhanced selenium content of 1.52 ppm has been recorded in the fruits of MPJ10 treated plant. This is found to be 4.3-fold and 2.1-fold higher from the control plant and 1 mM Na₂SeO₃ treated plant, respectively. Selenorhizobacteria had capacity to develop selenium biofortified plant under selenium deficient soils as a sustainable agriculture.

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Isolates isolated on Nutrient agar, Growth curve of different isolates, Selenium concentration in soil, Selenium content enhanced in fruits

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Synthesis, Characterization, Antibacterial and Anticancer Properties of Silver Nanoparticles Synthesized from Carica Papaya Peel Extract

T. John, K. Parmar, Shalleshkumar C. Kotval, J. Jadhav less · Published 2021 · Materials Science

In the present generation, there is a commercial demand for silver nanoparticles due to their widespread applications. In this study, silver nanoparticles were synthesized using Carica papaya peel extract as a reducing agent. The synthesized nanoparticles were characterized under UV-Visible spectrophotometer, FTIR, SEM, XRD and TEM. UV-Visible spectrophotometer was used to monitor the formation of silver nanoparticles. The TEM analysis shows that the silver nanoparticles have an average size of 50 nm. X-ray diffraction analysis showed that the particles were crystalline in nature. The antibacterial activity of silver nanoparticles was performed on various gram-positive and gram-negative bacteria. These silver nanoparticles showed a significant cytotoxic effect against both, MCF-7 and Hep2 cells. Collapse

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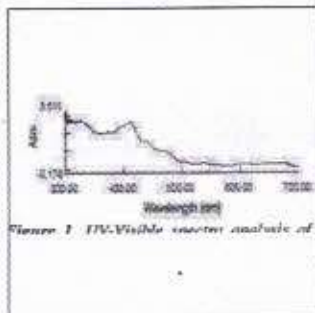


Figure 1

Crystallite Size (nm)	Crystallinity (%)	Disorder Index (D)
5.41	21.34	0.157
1.23	8.89	0.2138
1.76	6.17	0.2422
32.24	1.25	0.222
15.54	1.52	0.222
68.92	2.22	0.217
10.99	2.19	0.214
24	0.292	0.2427

Table 1

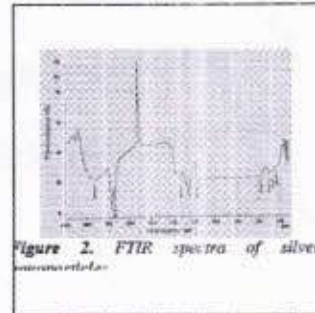


Figure 2

Crystallite Size (nm)	Crystallinity (%)	Disorder Index (D)
5.41	21.34	0.157
1.23	8.89	0.2138
1.76	6.17	0.2422
32.24	1.25	0.222
15.54	1.52	0.222
68.92	2.22	0.217
10.99	2.19	0.214
24	0.292	0.2427

Table 2

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A study of Sanskrit Language Proficiency of Students of Sanskrit Language

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Introduction

Sanskrit is known as the language of the gods. This language has existed in India since time immemorial. Most of the other languages of India are believed to have been derived from Sanskrit. In that sense, Sanskrit is the mother tongue of all the languages of India. Most of the ancient literature of India is written in Sanskrit language only. Sanskrit is the language of the mantras of Hinduism and Buddhism. Sanskrit is the only official language of the state of Uttarakhand. Even before the Iron Age, the ancient Vedic Sanskrit of Sanskrit was first used in India. Then the classical Sanskrit language began to be used. Many epics like Ramayana and Mahabharata have been written in classical Sanskrit language. In present research, the researcher studied the Sanskrit Language Proficiency of Students of Sanskrit faculty.

Keywords: Language Proficiency, Sanskrit language

1. Introduction

Sanskrit, the classical language of India, has long been renowned for its beauty, subtlety and complexity. It is the key to the civilisational treasures of Hinduism, Buddhism and Jainism, and provides direct access to a vast repository of literary, scientific and philosophical wisdom.

In this present study, the researcher constructed a Sanskrit Proficiency Test for the students of Sanskrit Language from Arts College and scores obtained in this test will determine the Sanskrit language proficiency of the students of Sanskrit faculty from Arts College.

2. Defination of Keyword

2.1 Language Proficiency

According to Kennel and Swain (1980),

“The ability of conversation is language proficiency which is analysed as, (1) Grammar proficiency, (2) Social lingual proficiency and (3) Strategic proficiency.

According to H. H. Stern (1983),

“Language proficiency is, intuitive mastery of language forms, Proficiency in presenting linguistic, cognitive and effective meanings of social, cultural meanings.”

According to Cummins (1980),

“Conscious and clear mastery of language characteristics means language proficiency.”

3. Variables of the study

3.1 Independent Variables

A.Area of College

- Semi Urban
- Urban

B.Gender

- Male

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Urban Sustainability with Government Missions - - JNNURM, AMRUT, SCM, SBM, HRIDAY and Comparative Analysis

Mayank Patel

Assistant Professor,

Institute of Architecture, Hem. North Gujarat University, PATAN.

ABSTRACT

Urban population has been increasing; more than half of world's population lives in urban areas. It is estimated to reach 72% of the total population in the world by 2050. From 3.6 billion in 2011 to 6.3 billion in 2050. Asian cities, including those in India, are and will be undergoing major transitions during the first half of the 21st century. According to the 2012 United Nations report on world urbanization prospects. It is expected that half of Asia's population will live in urban areas by 2020. By 2030, India will become 40% urbanized with about 590 million people living in urban areas [MGI, 2010]. This poses a concern as well as an opportunity to plan for sustainable development. It is true that despite the 74th constitutional amendment, the functional and financial status of the ULB's have not improved as desired. Given the low level of resources at the disposal of the ULB's, unbundling of certain basic urban services for private participation is needed. The urban development ministry has recently proposed an agenda for action for ULB's aimed at their better management. The 21-point agenda includes suggestions for citizen charter, tips for improving basic services, assistance under central sector schemes, management of urban areas, revision of building bye laws, use of IT, urban transport, financial system etc.

INTRODUCTION:-

Providing basic services (e.g. water supply, sewerage, urban transport) to households and build amenities in cities which will improve the quality of life for all, especially the poor and the disadvantaged is a national priority. The high powered expert committee [HPEC] during 2011. The committee estimated that RS. 39.2 lakh crore was required for creation of urban infrastructure, including RS. 17.3 lakh crore for urban roads and RS. 8 lakh crore for services, such as water supply, sewerage, solid waste management and storm water drains. Moreover, the requirement for operation and maintenance [O&M] was separately estimated to be RS. 19.9 lakh crore. Learning from the earlier mission have shown that infrastructure creation should have a direct impact on the real needs of people, such as providing taps and toilets connections to all households. This means that the focus should be on infrastructure creation that has a direct link to provision of better services to people and this was explicitly stated by the President of India in his speeches to the joint sessions of the parliament on 9 june, 2014 and 23 february, 2015. Both JnNURM and new missions [AMRUT, SCM, SBM-urban, HRIDAY] missions launched by Central Government with aims to improve basic services and infrastructure provisions in Indian cities and towns. New missions

TEXT MINING: AN UNSTRUCTURED DATA MINING CONCEPT, USE, CHALLENGES AND FUTURE DIRECTION

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¹Assistant Professor, ²Assistant Professor, ³Assistant Professor,
¹Department of Computer Science,

¹Hemchandracharya North Gujarat University, Patan, Gujarat, India.

Abstract: Text mining is also known as text data mining or knowledge discovery process. There are actually structured and unstructured Data Mining Techniques. Structured Data Mining Techniques use the concept of relational database as input or first point of the knowledge discovery process. There is well defined structure and everything seems to be perfectly planned for the knowledge discovery. But Text mining has not structured source of input. The data arrives from various unstructured sources and there is no universal mechanism or formation, so mining process can be done in efficient way. In this paper, the focus is on the architecture, challenges and use and future direction of Text mining. Though, the data are not properly organized but if we can form architecture very important information can be derived and this will make useful in decision making or discovering the new knowledge. There is huge amount of information is stored in article, books and journals. Only proper algorithm is required to handle this information. The text mining serves the purpose of discovering the knowledge which is previously unknown.

IndexTerms - Web Mining, Data Mining, Web Content Mining, Web Usage Mining, Web Structured Mining and Text Mining.

I. INTRODUCTION

Text mining, also referred to as text data mining, similar to text analytics, is the process of deriving high-quality information from text. It involves "the discovery by computer of new, previously unknown information, by automatically extracting information from different written resources." Written resources may include websites, books, emails, reviews, and articles. High-quality information is typically obtained by devising patterns and trends by means such as statistical pattern learning. We can differ three different perspectives of text mining: information extraction, data mining, and a KDD (Knowledge Discovery in Databases) process. Text mining usually involves the process of structuring the input text (usually parsing, along with the addition of some derived linguistic features and the removal of others, and subsequent insertion into a database), deriving patterns within the structured data, and finally evaluation and interpretation of the output. 'High quality' in text mining usually refers to some combination of relevance, novelty, and interest. Typical text mining tasks include text categorization, text clustering, concept/entity extraction, production of granular taxonomies, sentiment analysis, document summarization, and entity relation modeling (i.e., learning relations between named entities). Text analysis involves information retrieval, lexical analysis to study word frequency distributions, pattern recognition, tagging/annotation, information extraction, data mining techniques including link and association analysis, visualization, and predictive analytics. The overarching goal is, essentially, to turn text into data for analysis, via application of natural language processing (NLP), different types of algorithms and analytical methods. An important phase of this process is the interpretation of the gathered information. A typical application is to scan a set of documents written in a natural language and either model the document set for predictive classification purposes or populate a database or search index with the information extracted. The document is the basic element while starting with text mining. Here, we define a document as a unit of textual data, which normally exists in many types of collections.

The term text analytics describes a set of linguistic, statistical, and machine learning techniques that model and structure the information content of textual sources for business intelligence, exploratory data analysis, research, or investigation. The term is roughly synonymous with text mining; also describe as "text analytics". The latter term is now used more frequently in business settings while "text mining" is used in some of the earliest application areas, dating to the 1980s, notably life-sciences research and government intelligence. The term text analytics also describes that application of text analytics to respond to business problems, whether independently or in conjunction with query and analysis of fielded, numerical data. It is a truism that 80 percent of business-relevant information originates in unstructured form, primarily text. These techniques and processes discover and present knowledge – facts, business rules, and relationships – that is otherwise locked in textual form, impenetrable to automated processing. Text mining computer programs are available from many commercial and open source companies and sources. Few names are Carrot2, GATE, SAS, MATLAB, RapidMiner and many more software for text mining these days available.

II. TEXT ANALYSIS PROCESS

THE STEPS FOR TAX ANALYSIS PROCESS ARE EXPLAINED AS BELOW:

1. DIMENSIONALITY REDUCTION IS IMPORTANT TECHNIQUE FOR PRE-PROCESSING DATA. TECHNIQUE IS USED TO IDENTIFY THE ROOT WORD FOR ACTUAL WORDS AND REDUCE THE SIZE OF THE TEXT DATA.
2. Information retrieval or identification of a corpus is a preparatory step: collecting or identifying a set of textual materials, on the Web or held in a file system, database, or content corpus manager, for analysis.

OLAP ALGEBRAIC LAWS FOR IMPROVING OLAP EXPRESSION TREES

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ABSTRACT

OLAP algebra, In other words, we describe simple semantics representing a comprehensive Multi-dimensional OLAP algebra that can directly exploit the clean Object-Oriented conceptual model. In this paper, we describe a number of laws for our comprehensive OLAP algebra. To illustrate the motivation for this process, first recall that a query in traditional relational databases, written in SQL, is translated internally into an initial relational algebra expression that can be then transformed into equivalent, but more efficient ones by applying various relational algebraic rules. In order to perform better joins between the cube and dimension tables, we change the restriction of the selection operation so that it can be performed on the relevant cuboid/view alone. In summary, our comprehensive OLAP query algebra (operations and laws), grammar and metadata storage are essential components in the process of resolving OLAP queries written in native OOP languages.

Keyword: Algebraic Laws, MOLAP Algebra, Operation in MOLAP

Introduction

Object-Oriented OLAP queries are written at a very high level against the conceptual model, our OLAP query processor must do a lot of additional processing to supply missing details. Thus, an OLAP query is translated internally into an OLAP algebra expression that ultimately makes alternative forms of an OLAP query easier to create, explore, manipulate and optimize (e.g., push and pull operations, replace operations). Specifically, when an OLAP query is submitted to our OLAP DBMS, its query optimizer tries to find the most efficient equivalent OLAP algebra expression before evaluating it.

For example, the most common relational algebraic laws are (1) pushing the selection (σ) as far as possible, (2) combining selection (σ) with Cartesian product (\times) to produce joins (\bowtie), (3) introducing new projections (π) when necessary, etc. In Figure 1(a), we can see how the SQL is transformed into an initial tree of relational algebra operations. Figure 1(b) improves the initial expression by applying common relational algebraic rules in some meaningful way. Specifically, we split the two parts of the selection ($\text{starname} = \text{name}$) and ($\text{birthdate LIKE \%1960\%}$). The first condition involves attributes from both sides of the product, but they are equated, so the product and selection can be combined to produce an equijoin. The latter condition is pushed down the tree.



Assault plan with NFC: together with NFC tag into routine things

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Abstract:

Near Field Communication (NFC) has been fast growing technology since last few years. A tight integration of such technology with mobile phones has given a tremendous opportunity to the world. It is a close-range induction-based technology. In this paper I would like to explore practical approach which was taken up for attacking user data or more briefly said stealing data by conducting multiple attacks. More about this technology threats and what can be the possible outcome to stay away from threats. All these threats are based on active and passive communication.

1. Introduction

Disregarding the way that Personal Computer (PC) is for all intents and purposes indistinct to a Mobile phone in particular terms, and individuals regularly convey increasingly an individual thing like mobile phone reliably. Presently a day's Mobile phones are under physical surveillance since individuals generally believe that their mobile phones are an imperative bit of their way of life. Burglary and particular distant attacks using Bluetooth or WI-Fi correspondence innovation are somewhat ambushes that may exploit our mobile phone. We have some new thing NFC incorporated with mobile phone, will rises barely any more perils to our advanced cells.

2. Significance of security

Exactly when client uses an organization due to tension, the organization or administration related use issues they would prefer not to look with. His/her essential and first methodology is to improve and greater execution as could be expected under the circumstances. So, to pick up organization we need usefulness and execution together [4].

The boundaries like specialized inadequacies and security related issues are possibly impact the proportion of administration utilization. There is a complexity in the two issues. Security issues are made with some improper demonstration of clients and with some in fact solid made devices, which encourages client to cause destruction. Be that as it may, there is no issue of security identified with specialized issues [5]. In the most recent decade, for the accompanying reasons security has turned into a critical issue:

- A wrongdoer, by imitating malicious exercises can acquire penny because from their perspective, money related earning chances are lot more.
- From the specialized perspective:
- Step by step web is extending in immense numbers, along these lines transgressor has more opportunities to do an off-base thing with no single client yet they may perform same assault procedure on various expected misused individuals.
- High advancement cost in data innovation zone and extending essential of new applications has put forth hard to embed wellbeing attempts in the new applications. Furthermore, it may takes parcel of endeavors to introduce security headway as opposed to organizing whatever left of the

RARE EARTH METAL CHELATES OF SCHIFF BASE LIGAND: SYNTHESIS, CHARACTERIZATION, CATALYSIS AND ANTIMICROBIAL STUDY.

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ABSTRACT

The rare earth metal perchlorates of trivalent lanthanum, cerium and samarium were used for the synthesis of metal chelates. The Schiff base (5BA) ligand was synthesized from 5-bromo salicylaldehyde and 2-amino benzoic acid (anthranilic acid) in ethanol. The synthesized ligand plays a significant role in biological applications due to the presence of halogen atom in its chemical structure. The Schiff base ligand acts as a chelating agent and it is able to form six membered ring by coordinating with metal ion through the oxygen and nitrogen donor atoms corresponding to the functional groups -OH, -COOH and -C=N groups. The synthesized metal chelates have been characterized by elemental analysis, FTIR, TGA, electronic spectra, magnetic and molar conductance. Activation energy of metal chelates was evaluated using TGA data by Brodido method. The synthesized chelates were subjected to study of catalytic properties for various reactions. The catalytic study of all the chelates in organic synthesis reaction was carried out. The chemical kinetic reactions were also studied to check the effect of chelates on rate of reaction. All the chelates and Schiff base ligand were screened for antimicrobial study against gram positive (*B. subtilis*, *B. cereus*) and gram negative (*E. coli*, *P. aeruginosa*) bacterial species.

Key words: Rare earth metal chelates, catalysis, antimicrobial activity

Introduction

The lanthanide elements are also termed as rare earth metals. The lanthanide chelates are interesting due to their reactivity, coordination property and their variety of applications. Lanthanide chelates have been shown to be applicable in the fields of catalysts, pharmaceutical, agriculture and electroluminescence [1,2]. Some Gd (III) chelates have been used in MRI medical imaging [3]. German chemist Hugo Schiff introduced imine compounds in 1864 [4]. They are prepared through alcohol condensation method. These ligands have been utilized in metal chelate formations due to their ease of synthesis and variety of applications. Schiff bases and their metal chelates have been studied for their applications as antibacterial agents, antifungal agents, antitumor drugs, catalysts in coordination chemistry. Metal chelation is very important to enhance biological activity of Schiff base ligand where the coordination can occur between a variety of metal ions and a wide range of ligands. Our interest in the chemistry of Lanthanide chelates of Schiff base ligand with O and N donor atoms comes from their structural importance as well as their interesting biological activities. Several metal chelates have been shown



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RARE EARTH METAL COMPLEXES WITH SCHIFF BASE LIGAND: SYNTHESIS, CHARACTERIZATION AND BIOCHEMICAL EVALUATION

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ABSTRACT: The lanthanide ions are having the distinctive qualities like lanthanide contraction, magnetic properties, etc. The product of lanthanide ions with N-salicylaldehyde-anthranilic acid (NSAA) ligand to form coordination compounds is an important area of current research. N-salicylaldehyde-anthranilic acid (NSAA) has massive biological importance like anti-Alzheimer and antiulcer activity[1-3]. Synthesized complexes were characterized by IR spectroscopy, elemental analysis, TGA, mass spectrometry, electronic spectra, magnetic susceptibility, and molar conductance. On the basis of analytical data, the stoichiometry of metal to ligand in complexes is found as 1:2 combination of metal and Schiff base ligand. The bioactivity of the prepared complexes has been examined with antibacterial activity.

KEYWORDS: complexes of lanthanide ions, Schiff base, antibacterial activity, catalysis.

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1.INTRODUCTION

The chemistry of Schiff base is in an important zone of research with increasing interest due to their simple formation, versatility, the diverse range of medicinal application of their metal complexes e.g. anticancer, as anti-bactericidal agents, antiviral agent and other biological properties. Also, they find uses in polymers and dyes, agriculture [4-6]. A Schiff base is a nitrogen analogue of an aldehyde or ketone in which the C=O group is replaced by C=N-R group. It is normally formation by condensation of an aldehyde or ketone with primary amine [7-8]. The inner transition metals and transition metals are known to form Schiff base complexes [9]. The lanthanide elements recently found to possess a wide range of coordination numbers and geometries [10]. Rare earth's

SYNTHESIS, CHARACTERIZATION AND BIOCHEMICAL EVALUATION OF SOME RARE EARTH METAL COMPLEXES WITH SCHIFF BASE LIGAND

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Abstract-A series of three Ln(III) Schiff base complexes, Nd(III), Sm(III) and Gd(III) were synthesized using Schiff base of 2-[(2-Hydroxy benzylidene)amino]benzoic acid (NSAA) derived from salicylaldehyde and anthranilic acid. These complexes having general formula $[Ln(NSAA)_2(H_2O)_x] \cdot yH_2O$ were characterized by elemental analysis, conductivity measurements, UV-Vis, FT-IR, and Mass spectroscopic analysis. Catalytic studies and kinetic studies were also done for each complex. Activation energy has also been obtained from Thermogravimetric analysis. The spectral information disclosed that the substance acted as a neutral tridentate coordinating to the metal particle through ONO donor sequence. The Schiff base and its complexes were screened for their antibacterial activity.

Keywords: lanthanide Schiff base complexes, physical properties, biological activity, rare earth

I. INTRODUCTION

Lanthanides are fifteen components ordinarily spoken as rare-earth element components. Among the various materials comprising rare earth coordination compounds play an important role in cancer diagnosing and medical care, and the materials may be used as medication agents, as a result of the magnetic properties exhibited by lanthanides and their complexes. These compounds are usually utilized in the medical field as a distinction media for Biomedical Imaging. Samples of the 3 largest areas in biomedical imaging, namely MRI, optical imaging, and multi-modality imagining [1-3]. Biomedical imaging encompasses a good range of techniques and processes, making pictures of the human body for clinical function and also the study of medical sciences. The lanthanides can also be used as mediators in a broad variety of degenerative disease based on their antioxidant properties and their role as ROS (reactive oxygen species) scavenger. Lanthanide complexes show photo-induced DNA cleavage activity and photo-cytotoxicity for their applications in PDT (photodynamic therapy) [4]. Lanthanide catalysts have been repeatedly recommended for use in numerous organic reactions, including the hydrogenation of ketones to form secondary alcohols, the hydrogenation of olefins to form alkanes, the dehydrogenation of alcohols and butanes, and the formation of polyesters. Transition metals are well-known to create Schiff base complexes and Schiff bases have usually been used as chelating ligands within the field of coordination chemistry. Schiff bases coordinate to several rare earth systems, due to their glorious coordination nature to the grouping ions and therefore the ability to sensitize the properties of rare earth ions [5-6].

II. METHOD AND MATERIALS

Analytical grade chemicals were used for entire work. Salicylaldehyde, anthranilic acid, ethyl alcohol were used for the formation of ligands. 0.3M perchloric acid, 0.1M perchlorate were produced from 70% acid and metal (III) ions in aqueous solution. The C, H, and N analysis were carried out using a Thermo Finnigan FLASH EA 1112 Series CHN analyzer. The metal % was carried out using EDTA back titration method. Fourier-transform infrared spectroscopy (FT-IR) spectra were obtained in the range of 4000-400 cm^{-1} using KBr pellets on Shimadzu IR Affinity 1 S spectrophotometer. Magnetic susceptibility measurements were carried out from Gouy's method use $Hg[Co(NCS)_4]$ as a calibrant on Polytronic electromagnet HEM-100. Molar conductivity of the complexes measured in DMF solvent. Thermal stability of the complexes was recorded by using Perkin-Elmer Diamond Thermogravimetric/Differential Thermal Analyzer. The UV spectra were recorded on Shimadzu UV-1800 UV-VIS spectrophotometer (double beam) in the range of 200 nm to 800 nm using DMF solvent.

I. Synthesis of ligand (NSAA)

N-salicylaldehydeanthranilic acid was produced by adding 0.05 mol ethanolic solution of salicylaldehyde to a solution of 0.05 mol ethanolic solution anthranilic acid and stirring the mixture for 2hrs. the solution was concentrated and orange colour Schiff base of N-salicylaldehydeanthranilic acid generated. The precipitated Schiff base was filtered and recrystallized two times from alcohol, M.P. 205. °C



Original Research Article

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SYNTHESIS, CHARACTERIZATION, CATALYTIC AND ANTIBACTERIAL ACTIVITIES OF SOME TRANSITION METAL CHELATES WITH TRIDENTATE SCHIFF BASE LIGAND

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ABSTRACT: Transition metal chelates of cobalt(II), nickel(II) and copper(II) perchlorate with schiff base (TSCS) derived from condensation of thiosemicarbazide and salicylaldehyde were synthesized. The transition metal chelates have been structurally characterized by elemental analysis, UV visible reflectance spectra, IR, molar conductance, magnetic moment and thermal analysis. All the chelates were studied for catalytic activity. Activation energy was also evaluated from the TGA data by Broido method. The Schiff base ligand and their transition metal chelates also were screened for their antibacterial activity against bacterial species, *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Bacillus cereus* using Ciprofloxacin as a standard. The activity data show that the metal chelates to be more potent/antibacterial than the parent schiff base ligand against one or more microbial species.

KEYWORDS: Transition metal chelates, Schiff base, Thiosemicarbazide, Antibacterial activity.

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1. INTRODUCTION

Chelating agents which contain O, N and S donor atoms are of special interest to inorganic chemist because of these compounds show wide range of biological activity and have capability of bonding to metal ions in variety of ways. Schiff base which contains ONS donor atoms have widespread applications in many biological aspects and have been utilized in synthesis of biologically active metal chelates [1,2]. Transition metal chelates of schiff base are most studied due to their industrial, antitumour, antifungal, antibacterial, antiviral, antiamebic activity [3], carcinostatic and other biological applications [4,5]. Tridentate schiff base containing ONS donor atoms are well known

hypoxia and benthic P-fertilization of Ganga. Because the river is exposed to a large number of point sources along its 2525 km course, the present study emphasizes the need to unravel the mosaic of fragmented habitats marked by hypoxia and sediment-P release. Also, the study identifies DOD_{sw}-AP linkages as a marker to trace benthic habitat fragmentation in large rivers.

This study provides a systematic database on point source-driven bottom hypoxia and ecosystem feedbacks in the Ganga. Since hypoxia shifts community composition, ecosystem feedbacks and ecological thresholds¹⁹, DOD zones identified here indicate benthic habitat fragmentation with anomalous ecological conditions downstream point sources. If enough DO is not available, it may lead to fish kill as evidenced with the report of large number of dead fishes in the river at Kanno²⁰. In a recent field trial, we found that the plume of pollutants from the point sources exerts a strong influence up to 50 m reach²¹. This merits attention because the Ganga with large number of point sources of input encompasses habitats for several fish populations of economic importance²². Further, because local niche-based disturbances eliminate benthic diatoms^{23,24} that reoxygenate the river bottom, benthic habitat fragmentation-coupled diatom species loss will continue to deteriorate the condition further. The present study strongly suggests the need to consider point-source downstream river responses for action plans to safeguard riverine life and habitats.

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Yellow pan traps as an additional gadget for collecting sandhopper amphipods

Yellow pan traps (YPTs) or Moericke traps are known for their efficiency to catch a wide variety of insects, including herbivores and predators^{1,2}. These colour traps work on the principle that yellow colour attracts insects³. An isolated sampling event is described in this study, where sandhopper amphipods were collected in large numbers, in YPTs, originally set for collecting insects. Amphipods under order Amphipoda of subphylum

Crustacea are classified into four groups – palustral talitrids, beachfleas, sandhoppers and landhoppers⁴. Generally sleds, dredge, grabs, cores, sediment sieving, baited traps, light traps, pitfall traps and even handpicking methods are used for collection of amphipods from different habitats like deep seafloor, seaweed assemblage, mudflat sediment, beach soil, coral rubble and rotten leaf litter⁵. Collection employing YPTs has advantag-

es over other methods because it is simple, more time-efficient and not dependent on trained or skilled collectors^{6,7}.

The sampling was conducted on 29 November 2017, from 11 am to 3 pm, at Cheriam Island, Union Territory of Lakshadweep, situated in the Laccadive Sea, off the southwestern coast of India (10°06'99"N and 73°66'05"E) as part of inventorying the terrestrial fauna of Lakshadweep islands, by a team from

SCIENTIFIC CORRESPONDENCE

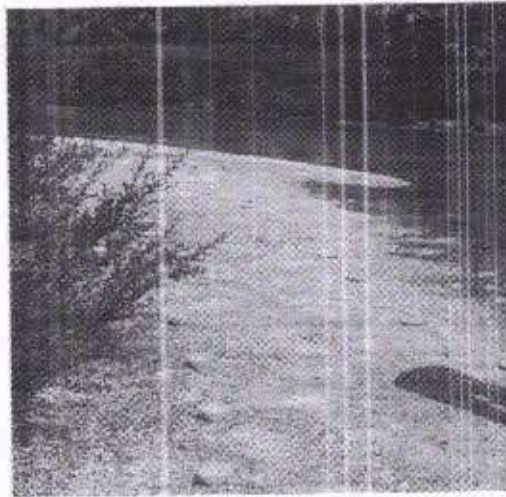


Figure 1. Sampling of terrestrial invertebrate fauna using yellow pan traps method.

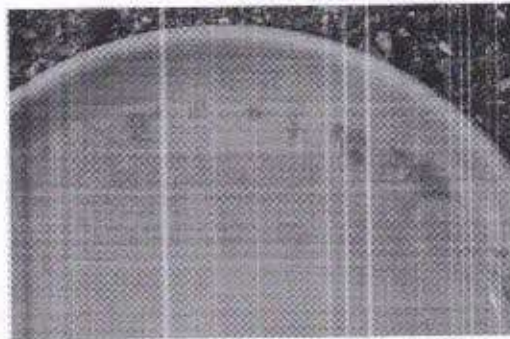


Figure 2. Collection of amphipods (*Talorchestia* sp.) in yellow pan traps.

Zoological Survey of India, Kolkata. Accordingly, 25 YPTs (a few were rectangular plastic bowls of 15 cm × 10 cm × 5 cm, and the rest were circular plates of 20 cm diameter and 3 cm depth) were placed in two rows (Figure 1), approximately 1 m apart, on the banks of a sea-fed, small inland water body near the beach at Cheriam. The front row was in proximity to the waters, while the other was more towards the shrubby vegetation on the bank. The traps were half filled with water, and a few drops of an odourless detergent were added in order to break the surface tension of water and drown the landing insects. The traps started collecting a good number of amphipods (Figure 2). Thus, 25 YPTs captured nearly 1000 amphipods in 4 h, indicating their high population density at the site. The amphipods jumped into the YPTs from their sand burrows and were actively swimming inside. They were then filtered and preserved in absolute alcohol. Other than amphipods, only a few ants were collected in the YPTs.

The collected amphipods, which were semiterrestrial and supratidal, were identified as an undescribed species of sandhoppers, under genus *Talorchestia* Dana, 1852 of the family Talitridae. These sandhoppers lived in shallow burrows on the sandy beaches and were nocturnal in habits⁴. Among the total 132 species of amphipods from marine intertidal zone of India, only 3 fall under genus *Talorchestia*⁸. A similar sampling event was reported from a subtropical rainforest on Mount Yonaha, Okinawa, Japan, in which several landhopper amphipods were collected in YPTs, the most dominant species being *Talitroides topitotum* of the same family Talitridae⁹. According to the present study, YPTs attracted not only the landhoppers, but sandhopper amphipods too. More experimental evidences are needed to explain how the YPTs are able to attract the amphipods. Whether they are attracted to the yellow colour as in the case of general insects⁹⁻¹¹, or is it due to any other factors, is worth studying.

In any faunal diversity studies, whether meant for community structure assessment, species inventory, to ascertain diversity patterns or environmental monitoring, the sampling protocol has to be ideal, so as to provide reliable representativeness of the target taxa or assemblage. It is also important to use standardized sampling protocols when developing large-scale monitoring programmes^{12,13}. YPTs are a standard and widely used collecting device for terrestrial insects. The present study in unison with the earlier published work on landhopper amphipods, confirms the effectiveness of YPTs in sampling terrestrial amphipods.

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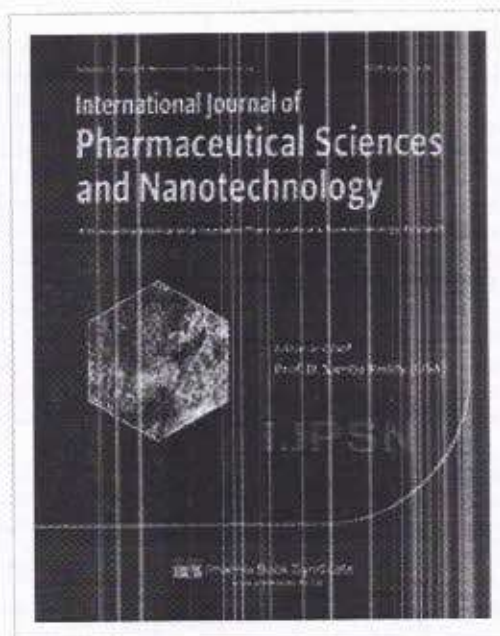
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Natural production and quantification of ellagic acid in multiple plant parts of three Terminalia spp.

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Abstract and Figures

Ellagic acid (EA) is a natural phenol antioxidant, found in multiple fruits. Chemically, it is a dilactone of hexahydroxydiphenic acid. Owing to its immensely beneficial anti-proliferative, antioxidant, and anticancerous activities, it needs to be quantified in natural resources. An effective densitometric high-performance liquid chromatography (HPTLC) method was established for the simultaneous quantification of ellagic acid from different plant parts of Terminalia arjuna, T. bellerica, and T. chebula. The method was validated for intra- and inter-day precision, reproducibility, and specificity. The intraday precision and interday precision was 1.5% and 1.2% relative standard deviation (RSD), respectively. The reproducibility of standard EA was precise and the seven lanes provided similar banding pattern. The linearity curve for the EA produced a correlation coefficient (r) value of 0.98992, with regression equation $Y=6330.441+935.150*X$, and with a standard deviation value of 4.59%. For chromatogram development, toluene: ethyl acetate: formic acid (5: 5: 2.5) was optimized as mobile phase. With the exception of fruits of T. bellerica, all the plant parts of all three species contain a significant amount of EA; the highest EA content being (0.733 $\mu\text{g} / \mu\text{g}$ dry weight) found in the roots of T. bellerica. In this study, the proposed HPTLC method for simultaneous quantification of EA was conducted in a simple, sensitive, specific, and precise manner that can be recommended for routine quality control and quantification of EA in plant materials.



Detection of flavonoids in le... Comparative TLC Amount of ellagic acid ($\mu\text{g}/\mu\text{g}$ dry...

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Use of Internet by engineering students

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Abstract:

This paper reveals that use of internet among engineering students. In this study helps to identify the purpose of using social networking tools, satisfaction level, frequency of using internet and problem faced user in frequency of using internet.

Keywords: *Internet, Students*

1. Introduction

Information and Communication Technology (ICT) has been making such an impact on different sectors of human activity that the present period has come to be called as information age. The internet is an arrangement of connected computers, which lets the computer users all over the globe exchange data. Internet is rapidly becoming a vital part of everyone in the society. Internet is rapidly becoming a vital part of everyone in the society.

Internet facility in India has grown tremendously over the years. The use of internet is rapidly increasing owing to its efficiency & capability in providing right information to the right person at the right time. It works around the clock & connects every corner of the world. Internet has become an unavoidable necessarily for every institution of higher learning (Salma and Dominic, 2009).

2. Objectives of the Study

The study generally aims to analyze the Internet use by the students of I. d. engineering college. Specific objectives are:

1. To study the use of internet by students.
2. To know the purpose of using the Internet.
3. To know satisfaction level with internet.
4. To find out the problems faced by the students using the Internet.

3. Methodology

A survey, using a questionnaire, among the students of the I. d. engineering, was conducted to study the use of the Internet and to reveal the impact of the Internet. Out of the total 70 surveyed, 65 questionnaires were received back; the investigator could collect questionnaires from only 65 out of 70 students among whom the questionnaires were distributed.

4. Findings and Recommendations

Age wise distribution of respondents



Use of Social Networking Tools among the Students

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Abstract:

This paper reveals that use of social networking tools among engineering students. In this study helps to identify the most popular social networking tools, which purpose of using social networking tools, satisfaction level, frequency of using social networking sites and problem faced user in frequency of using social networking tools.

Keywords: *Social Networking Tools, Students*

1. Introduction

Social media is rapidly becoming a vital part of everyone in the society. Social media is rapidly becoming a vital part of everyone in the society. Public make use of social media to communicate, read, comment, share, like, and create content. Social Networking tools have been instrumental in contracting the world more than other innovative improvements. Social networking websites like Facebook, MySpace, Youtube, Twitter, and WhatsApp are winding up increasingly prominent and has progressed toward becoming an integral part of regular day to day existence for an expanding number of individuals. In view of their highlights, youngsters are pulled in towards these Social Networking tools. Modem, broadband, remote and satellite a synchronous email, texting, and transport through interactive media, students have grown up socialized into a world formed by the web and display local and idle instincts and understandings of web innovation obscure to past generations.

2. Objectives

1. To identify most popular Social networking tools among the respondents.
2. To know the purpose of using social networking tools.
3. To know satisfaction level of use of social networking tools.
4. To study the problems faced by users.

3. Methodology

A total number of 70 questionnaires were distributed among the students. They were personally requested to fill up the questionnaire and the filled-in-questionnaire was collected by the investigator from the students of I. d. engineering college. The investigator could collect questionnaires from only 65 out of 70 students among whom the questionnaires were distributed.

4. Data Analysis and Interpretation

Table: 1. Age wise distribution of respondents

Age	Respondents	Percentage
19-21	21	32.31
22-25	35	53.85
Above 25	09	13.84
Total	65	100

USAGE OF DATA MINING METHODS FOR IMPROVISATION OF EDUCATION

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Abstract : Data mining (DM) is the process to discover different patterns, co-relations and anomalies among large datasets to estimate future outcomes. While usage of tools and techniques of data mining to extract knowledge automatically from huge database generated by or related to student's learning and educating activities from educational environment is called Educational data mining (EDM). EDM is very useful in education system particularly when examining students' learning performances. It analyzes education related data to design models to improve student' learning experiences and enhance effectiveness of institution. Hence, EDM can aid educational institutions to offer high quality education for its learners. This research paper focuses on data mining techniques which can be used to improve education.

Keywords: Educational Data Mining (EDM); Data Mining (DM); Prediction; Clustering; Classification;

I. INTRODUCTION

Educational data analysis is not new idea as it was performed by many researchers time by time using traditional analysis methods. But recent advances in computer technology in education including high processing computers and the ability to process fine-grained data from huge datasets, have attracted many researchers to use these technologies to increase interest in designing techniques to analyze the large amounts of data generated in educational environment. Data mining approaches are used widely to mine educational data. The figure 1 illustrates the process of mining educational data.

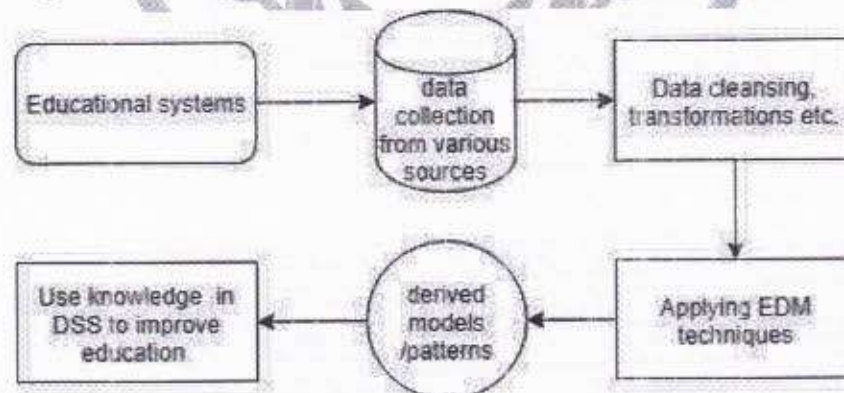


Figure 1 Process flow of data mining in education

As we are data rich, data from different sources (homogenous / heterogenous) of education either online or offline are collected and data cleansing techniques are applied to clean noisy or missing data. Data transformation is also applied to convert all the data into uniform. Once dataset is ready for data mining, different data mining techniques are applied to extract knowledge from it and this knowledge is used by analysts in decision support system(DSS) for improving education.



CONTEMPORARY RECORDS MANAGEMENT IN GUJARAT HEALTH DEPARTMENT: MEN TO MACHINE

Hotel Management

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Sharma**

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ABSTRACT

As we all that know what is the situation of record management. In Gujarat the only best Hospital Management and Healthcare Management Information System is existing in Gujarat Health department which is facility based only in Public Healthcare Sector in India. But unfortunately there are very less number of Indian states who really utilized optimum financial resources through NRHM scheme in best way. Only Gujarat Government in health department made it possible. Now we all will observe that Gujarat Government has brought huge amount of money resources and tried to implement the records Quality Management in Government Healthcare System.

KEYWORDS

INTRODUCTION OF NATIONAL RURAL HEALTH MISSION

The Govt. of India has understood the significance of Wellbeing and in the advancement of the nation. Remembering this view, the Govt. had propelled the National Provincial wellbeing Mission (NRHM) in 2005. Its underlying time allotment was 2005-12. The primary point was to enhance the essential structure and conveyance of Medicinal services benefits particularly in rustic parts of the nation. Extraordinary concentration and thought has been given to states with weakness pointers/foundation. This Mission has a reasonable vision of enhancing the wellbeing through the enhancement in huge wellbeing Pointers.

Composition of SHM & SHS

At the nationalized stage, the NHM has a Mission Steering Group (MSG) directed by the Union Minister for Health & Family Welfare and an Empowered Programme Committee (EPC) led by the Union Secretary for Health & FW. The EPC will execute the Mission in the complete direction of the MSG.

At the State level, the Mission would work under the whole leadership of the State Health Mission headed by the Chief Minister of the State. The tasks under the Mission would be performed through the State Health & Family Welfare Society. The formations of the Mission and Society and their connections are pointed out in the following sections in chart 1.

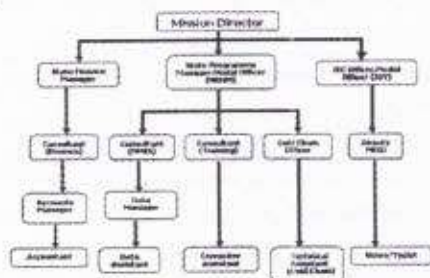


Chart: 1 Hierarchy of SPMU-NRHM at State Level

Source: <http://nrhm.ranachal.gov.in/SPMU.html>

Hospital Management Information System, 21st Century in Gujarat

On the establishment of controlling hypothesis, distinctive states like Maharashtra, Delhi, and Gujarat and so on have built up their different particular IT based answer for make increasingly proficient healing facility the board. Here the point of the analyst to contemplate the Gujarat model of sorting out healing facility data and investigated the effect of this model on the ordinary execution of area clinics in Gujarat. Further the difficulties which looked by this new customized framework. The Health and family welfare Branch of the Legislature of Gujarat propelled the Doctor's facility the executives Data Framework (HMIS) in 2006, toward the path to show signs of improvement the conveyance of value wellbeing administrations in Gujarat.

Project Current Status:

Total Doctor's facility associated 6 noteworthy Hospital Management Information System (Medicinal School), 24 Minor Hospital Management Information System

- HMIS module utilization in the state 71.33%
- OPD Enrollment more than 146.08 lakhs
- IPD Enrollment more than 17.77 lakhs
- Plan to broaden this in 2 Dental Universities and 2 Mental Doctor's facilities

Brief overview of HMIS

Condition prior to Project:

For the healing facility directors it was convoluted or we can say that they didn't get the data of every division, asset booking, online patient clinical information, and patient's statistic subtleties online to a specific degree. A great deal of time and labor was squandered for gathering the accessible data.

Before this venture, the administration got the data from all healing facility toward the month's end which was the measurements of a month ago and for the following month. The central issue that heads confront was that it was hard to think about the execution of the healing center, number of conveyances occurred, number of births and passings and in addition the episode of a pandemic on its time inside the month.

Major Concerns:

The real Concerns/issues worried in getting HMIS venture to current stage were as per the following:

- Conquer Starting Therapeutic Staff showdown
- Aware and prepared to all concerned Restorative Staff
- Master Information Gathering
- Having a segment astute structure for inconvenience free support
- Flexibilities in necessities
- Wide Spread Territory
- Making certain availability of compulsory framework involving PC equipment and network for all Hospital Management Information System
- Data duplication to Focal Server

Requirements (Components & Technology) For HMIS

HMIS is developed on Microsoft NET technology with SQL server 2005 as the data store. The HMIS solution is three tier circulated structural design available over internet. Crystal reports & SQL reporting services are used for reporting functions.

Hardware Essentials:

- Xeon Based Database server
- Xeon Based Application server

Software Essentials:

- Microsoft SQL Server 2005
- Microsoft Windows 2003 Enterprise server
- Microsoft NET Framework

To Study & Evaluate the Medical Record Department of Dharpur Medical College (GMERS), Patan-Gujarat: An In Depth Case Study

Dr. Sushman Sharma

Assistant Professor, Department of Hospital
Management, H.N.G. University,
Patan

Abstract

As we all know the situation and circumstances in "Public Healthcare Delivery System in India" in current scenario. What was the situation of healthcare system from the point of all kind of management? So in this paper we would like study and evaluate the MRD of a Government Medical College which is situated at Patan, Gujarat. Further we would be dealing with problems and current management system of Hospital Administration where how and in which way through modern techniques MRD system is being managed. This is the critical study of existing workload, infrastructure, functioning of the Medical Record Department of Dharpur Medical College, Patan Gujarat. This study would lead to the Medical Record Department system of procurement of medical & surgical patient's files & records etc. This study will also explore load of Medico Legal Cases (MLC) of Dharpur Medical College, Patan

Introduction

Dharpur Medical College has been started in November 2011. This Medical College is the first medical college in the area of North Gujarat. As per talk with Medical Superintendent four hundred crore has been sanctioned to make this medical college & hospital fully functional. This is a self-finance Medical college. It covers the areas of Banaskantha, Sabarkantha, Patan&Mehsana Districts. It is situated just six km away from the city & district capital of Patan. It is on the road to Unjha, the spice city of India. It has a newly built building for Medical College as well as residential quarters for the employees of the medical college. The recognition by Medical Council of India is due. The employees of the medical college are working to attain the standards laid by the MCI, New Delhi.

Contents

AIM

To study & evaluate the Medical Record Department of Dharpur Medical College, Patan

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Production, Optimization and Purification of Cellulase enzyme from Bacteria and Fungi

March 2020 *International Journal of Scientific and Engineering Research* 3(2):691-697Project: [Production, Optimization and Purification of Cellulase enzyme from Bacteria and Fungi](#)

Authors:

**Avani G Goswami**
Hemchandracharya North Gujarat University**Himanshu S Bariya****Vivekpuri Goswami**
Government Engineering College Patan[Download full-text PDF](#)[Read full-text](#)[Download citation](#)[Copy link](#)

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Abstract and Figures

In this study, cellulase producing bacteria and fungi were screened on the CMC agar plate. Cellulase producer produces a clear transparent zone into the CMC agar plate. Different parameters such as carbon source, nitrogen source, time and pH are used for maximum cellulase production in the liquid medium. Then Optimized condition was obtained for bacteria pH 9 after 72 hours of incubation at 37°C and for fungi pH 8 after 120 hours of incubation at 28°C. Then partially purified enzyme by ammonium sulphate precipitation method and Molecular weight determination by Native-PAGE.



(A) before dye addition (B) After dye addition. Clear zone on CCRA plate. Ammonium sulphate... Colony Characteristics:

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RESEARCH ARTICLE




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Production, Optimization and Purification of Cellulase enzyme from Bacteria and Fungi


Avani G Goswami^A, Dr. Himanshu S Bariya^B, Vivekpuri G Goswami^C

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Brazil

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First record of Brachyuran crab *Rhinolambrus lippus* (Lanchester, 1901) (Crustacea: Decapoda: Parthenopidae) from India

Jigneshkumar N. Trivedi

S. H. Tan

Abstract

The present paper reports the occurrence of the rare parthenopid species *Rhinolambrus lippus* (Lanchester, 1901) for the first time from India. The species is so far reported from Malaysia, Djibouti and Madagascar.

Keywords:

Brachyura; new record; Gulf of Mannar; geographic distribution; Indo-Pacific region

The taxonomy of the family Parthenopidae has changed a lot over the years with many genera reclassified under new subfamilies (Ng *et al.*, 2008). Tan (2004) undertook a study on the revision of Parthenopidae and revised the taxonomy of the subfamilies including subfamily Parthenopinae (Tan and Ng, 2007). Tan and Ng (2007) listed 32 genera under Parthenopinae, by elevating many subgenera (*sensu* Flipse, 1930) to genera including the subgenus *Rhinolambrus* A. Milne-Edwards, 1878. *Rhinolambrus* differs from other genera in the presence of a 'neck' like structure at the gastrobranchial notch which is part of the longitudinal elongation of the epistome (Tan *et al.*, 1999). *Rhinolambrus* currently contains 13 species (Ng *et al.*, 2008) distributed in the Indo-Pacific region out of which 6 species: *R. contrarius* (Herbst, 1804), *R. cybelis* (Alcock, 1895), *R. lamelliger* (White, 1847), *R. longispinus* (Miers, 1879), *R. pelagicus* (Rüppell, 1830), and *R. turriger* (White, 1847) are reported from India (Trivedi *et al.*, 2018). The present study reports the occurrence of a seventh species *Rhinolambrus lippus* (Lanchester, 1901) for the first time from India. The affinities of this species with other closely related species is discussed in the report.

One male specimen of *R. lippus* was collected from the fisheries by-catch that was discarded from the fishing vessels at Pamban fishing port, Tamil Nadu State, India. The specimen was washed properly to remove debris and photographed. It was then preserved in 10% formalin

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Impact of seasonal variation on 'daidzein' accumulation in callus and in parts of *Pueraria tuberosa* (Willd.) DC

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Online published on 10 August, 2020.

Abstract

Daidzein-natural isoflavones found in *Pueraria tuberosa* (Willd.) DC. (Fabaceae) which is a potent medicinal plant. It acts as sign and responds to the pathogenic attacks and reduces pain during menopause, osteoporosis and also antidiabetic in nature. In the work, *in vitro* callus development from tuber explants during both rainy and summer seasons was conducted. Further, a simple unambiguous and rapid high-performance thin-layer chromatography method was established for quantitative estimation of daidzein in callus and *in vivo* parts to assess the impact of seasonal change on valuable phytochemical accumulation. Maximum callusing (1 callus) obtained on MS medium fortified with a combination of ⁵N-Benzylamino purine (2 mg/l) and 2,4-dichlorophenoxyacetic acid (2 mg/l) during the summer season from the tuber explant. During the HPTLC method validation, the linearity range obtained was 100–1000 ng/g. The regression value (r) value of 0.99845. All the parts were found to contain a significant amount of daidzein. The maximum daidzein (2112.567±0.35 ng/g) content was obtained from a young tuber bark followed by callus (171.903±0.33 ng/g) during the summer compared to rainy season parts and callus. Thus, it can be concluded that *in vitro* callus is an alternative source of daidzein with destroying the natural plant and the developed HPTLC method could be used for quality control analysis and recommended for quantification for different herbal formulation and drug preparation.

Keywords

Callus, Daidzein, HPTLC, Isoflavonoids, Indian Kudzu.

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Alcolyra, a new genus of leucosiid crab (Crustacea: Decapoda: Brachyura) from India

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Abstract

The identity of *Philyra alcocki* Kemp, 1915 (Leucosiidae), a species described from Chilika Lake, India is clarified. The redescription of lectotype male and examination of fresh material collected from Chilika Lake, Odisha state of India revealed that *P. alcocki* is significantly different morphologically from members of *Philyra* sensu stricto and other allied genera in possessing two tuberculated rows on the branchial region of carapace, and a well-developed tubercle on male thoracic sternite 5 on either side of the sternopleonal cavity. Therefore, a new genus *Alcolyra* n. gen. is established herewith for the species.

Key words: Leucosiidae, systematics, new genus, Chilika Lake, India

Introduction

Galil (2009) partially revised the taxonomy of *Philyra* Leach, 1817 (Leucosiidae) and separated the genus into two broad groups of genera on the basis of the morphology of the male pleon. Members of one group of genera (*Philyra* s. str., *Afrophila* Galil, 2009, *Atlantolocia* Galil, 2009, *Ryphila* Galil, 2009) have the first two male pleonal somites mobile, while those in the second group (*Atlantophila* Galil, 2009, *Lyphira* Galil, 2009, *Pyrhila* Galil, 2009, *Hiplyra* Galil, 2009) only have the first somite free while the second somite is fused with the subsequent ones (Galil 2009; Ng 2021). Galil (2009), however, left 27 species untreated as she did not have material of them and left them under *Philyra* sensu lato. Ng (2021) subsequently revised the taxonomy of two Southeast Asian taxa, *P. fuliginosa* Targioni Tozzetti, 1877, and *P. olivacea* Rathbun, 1909, synonymising the two species, and establishing a new genus, *Ovilyra* Ng, 2021, for *P. fuliginosa*. *Ovilyra* belonged to Galil's (2009) first group of genera.

Philyra alcocki Kemp, 1915 is one of the untreated species in Galil's (2009) revision. In his remarks of the species, Kemp (1915), observed that it was close to *P. olivacea* Targioni-Tozzetti, 1877 and *P. fuliginosa* Rathbun, 1909, but Ng (2021: 370–371), commented that *P. alcocki* cannot be placed in *Ovilyra* as there were differences in the carapace, male thoracic sternum and male pleon. The examination of the types as well as of fresh specimens collected from the type locality revealed that while *P. alcocki* belongs to Galil's (2009) first group, i.e., species with the first two male pleonal somites free; the presence of a well-developed tubercle on male thoracic sternite 5, on either side of the sternopleonal cavity, however, is diagnostic. As such, a new genus, *Alcolyra* n. gen., is here established for *Philyra alcocki* Kemp, 1915.

Material and methods

The specimens examined in the present study are deposited in Zoological Survey of India (ZSI), Kolkata, India

A Review Paper on: Buildings Using Step-Back, Step-Back Set-Back, and Set-Back Seismic Analysis

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Abstract— Earthquake is the shaking of the earth's surface, and it is one of nature's most destructive and unexpected phenomena. Plate tectonics movement, volcanic eruptions, or man-made explosions cause earthquakes, which last for a brief time, usually less than a minute. Aftershocks accompany larger earthquakes; this earthquake was the most violent and deadly, killing many people and destroying many important properties. Since the 1934 Nepal-Bihar earthquake, it has been a disaster-causing earthquake in India. These densely inhabited hilly areas, including remote settlements perched on hilly areas, experienced catastrophic property damage and many innocent lives were lost. This paper uses the seismic coefficient approach in ETABS v16 to try to explain the behaviour of hillside buildings. Three types of buildings are studied: step-back (SBB), step-back set-back (SBSB), and set-back (SB) buildings with three to five stories. The seismic susceptibility associated with their dynamic response qualities is investigated and contrasted. To fully comprehend the analysis result and configure the suitability of each structure, the comparison is presented in the form of charts. SBB is proven to be more lethal than other types of structures, and the usage of shear walls and bracing is found to be effective in improving building seismic performance.

Keywords: Sloping Ground, Static & Dynamic Behavior, Set Back and Step-Back Building, Regularities, Irregularities of Building

I. INTRODUCTION

The behaviour of buildings during earthquakes is influenced by a number of unknown elements. The current research examines and compares the seismic vulnerability of three building configurations, namely SBB, SBSB, and SB buildings, by comparing dynamic response properties such as fundamental time period, base reaction, base shear, displacement, and forces induced such as shear force, bending moment, and torsional effect on buildings.

SBB buildings have both regular and short columns of the same height down the slope, but SBSB buildings have all columns of varied heights. SB structures are structures that are similar to those built on flat ground and have regular-sized columns.

In Fig. 1 the plan which is made on AutoCAD is given. On which our project is based and we are going to analyze and design this structure by Etabs.

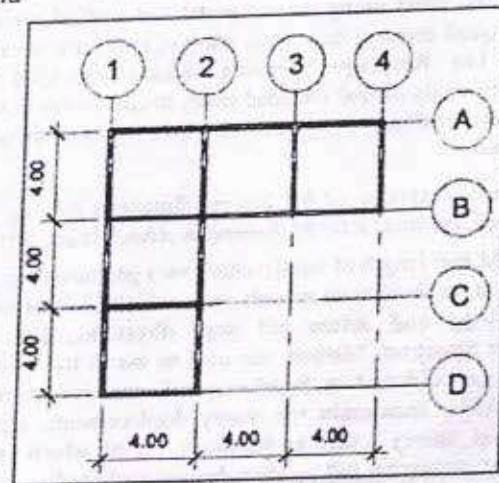


Fig. 1: Plan

II. LITERATURE REVIEW

A. Seismic Response of Irregular Building on Sloping Ground. Authors: Anjeet Singh Chauhan (2021)

The behaviour of structures during earthquakes is determined by their mass and stiffness distribution in both horizontal and vertical planes. Buildings built in steep areas are vulnerable to major earthquakes. Under seismic loads, investigate the structural performance of multi-storey step back RC buildings positioned on 20°, 30°, 40°, and 45° slopes.

B. Seismic Analysis of Multi-storeyed Building on Sloping Ground with Ground, Middle and Top Soft Storey Tanuja V Keneror 2020

The study is carried out using the response spectrum analysis method for a combination of four different slopes and different building configurations, and various parameters are tested against various limitations and findings derived from various construction scenarios. Investigate how shear walls can help soft storey RC buildings on perate better on sloping terrain

C. Effect of slope angle variation on the structures resting on hilly region considering soil-structure interaction Authors: Rahul Ghosh 2019

Examine the impact of varying slope angles on structures sitting on sloping terrain, taking into account both fixed and flexible foundation structures (SSI). The analysis is carried out using the equivalent static force technique (ESFM), the response spectrum method (RSM), the time history method (THM), the nonlinear static method (NLSM), and the nonlinear time history method (NTHM) (NLTHM). With and without SSI consideration, the criticality related with

Article

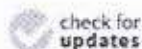
Investigating Co-occurrence among Look-alike Species: The Case of Three Bears in Northeast India

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Abstract: At the most basic level, the assessment of a species' status involves knowing where it occurs. Determining the presence of rare species is difficult, and can be further confounded by the presence of a more common look-alike species. We investigated one of the few places in the world where three species of bears have been reported to co-occur at a fine scale: Balpakram National Park, Meghalaya, India. Asiatic black bears (*Ursus thibetanus*) are fairly common, and we sought to determine whether sun bears (*Helarctos malayanus*) and/or sloth bears (*Melursus ursinus*) also resided there. The local Garo language has words for three types of bears, and some local people reported the continued presence of a small type of bear, possibly the sun bear, but the probable extirpation of sloth bears. Because these bears look somewhat alike, local people and government forest officers could not provide convincing accounts of the presence of more than one species. We measured claw marks on climbed trees, a method used to differentiate sun bears from Asiatic black bears where both are known to occur; however, this method turned out to be unreliable for detecting sun bears where their presence was unknown because sun bear-sized marks are not distinguishable from juvenile black bears. We recommend targeted camera trapping near recent purported sightings of the other two bear species.

Keywords: local ecological knowledge; sign survey; rare species; detecting species presence; species misidentification; species coexistence; *Ursus thibetanus*; *Helarctos malayanus*; *Melursus ursinus*



Citation: Garshelis, D.L.; Dharaiya, N.; Sharp, T.R.; Pigeon, K.E. Investigating Co-occurrence among Look-alike Species: The Case of Three Bears in Northeast India. *Diversity* **2022**, *14*, 717. <https://doi.org/10.3390/d14090717>

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1. Introduction

Bears (Ursidae) are a small family, with only eight species, which range across four continents and the Arctic. Europe and South America are each inhabited by a single extant bear species, whereas multiple species exist in North America and Asia, and in some of places there is wide overlap of two species. However, there is just one place in this global distribution where historically three bear species may have overlapped on a broad scale. Northeast India (hereafter NE India) marks the eastern extremity of the range of sloth bears (*Melursus ursinus*), the western extremity of the range of sun bears (*Helarctos malayanus*), and is near the center of the range of Asiatic black bears (*Ursus thibetanus*; hereafter black bear) (Figure 1). This region thus represents a unique area in terms of bear ecology and conservation.

NE India may possess a distinctive suite of resources that can sustain all three species. In comparison, there are no historical or even fossil records of sun bears in peninsular India, or of sloth bears crossing into present-day Myanmar. The conditions outside of NE India must be different enough to limit the geographic range of these two bears. Several recent studies of bear ecology were conducted in NE India [1–4], but none investigated the limiting ecological factors or even ecological differences among species. Steinmetz et al. [5]



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First camera-trap record of Rusty-spotted Cat *Prionailurus rubiginosus* (I. Geoffroy Saint- Hilaire, 1831) from Balaram-Ambaji wildlife sanctuary, Gujarat, India

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ABSTRACT

The present study is a part of an ongoing study on sloth bear ecology in the North Gujarat region. A rusty-spotted cat is believed to be the smallest cat from the family Felidae native to India, Nepal, and Sri Lanka. During the camera trap survey of bear movement, a rusty-spotted cat was captured in the camera trap, which was deployed close to a water body at the Bedapani region of Balaram-Ambaji wildlife sanctuary, North Gujarat. Rusty-spotted cat has been reported from central Gujarat, south Gujarat, and Gir forests. This camera trap photograph is the first photographic report of the presence of a Rusty-spotted cat in the Balaram-Ambaji wildlife sanctuary adjoining to the Aravalis of Rajasthan state. This record is providing the presence of a very shy nocturnal cat in the study area which can be helpful for further studies on its distribution and range extension.

Key words: Camera trap, mammals, small cat, western Aravalis, North Gujarat.

INTRODUCTION

Mammals have occupied a global distribution from pole to pole and from the tip of the mountain to the deep sea. According to Wilson and Reeder (2005), a total of 5,416 mammalian species are recorded worldwide. Among them, 427 are found in India; comprising 48 families and 14 orders (Sharma et al. 2014). A total of 15 cat species are listed in the family Felidae from India. The rusty-spotted cat is the world's smallest cat restricted to India, Nepal, and Sri Lanka. Dry-deciduous habitat with dense vegetation and the rocky area is identified as the most preferred habitat for this species (Nayak et al. 2017). It is listed as a Schedule I species under the Indian wildlife protection act (1972) and classified as Near-threatened according to the IUCN Redlist[®] assessment of threatened species (Mukherjee et al. 2016). In India, this cat is

documented from Rajasthan, Uttar Pradesh, Jammu & Kashmir, Tamil Nadu, Madhya Pradesh, Odisha, Andhra Pradesh, Karnataka, Kerala, Maharashtra, Uttaranchal, and Telangana (Aditya & Ganesh 2016; Nayak et al. 2017; Sharma et al. 2014). While in Gujarat, it is recorded from Gir from Saurashtra in 1988 (the first record from Gujarat), Vansda from South Gujarat and Kutch, while no record is found from Balaram-Ambaji wildlife sanctuary in north Gujarat. Balaram-Ambaji Wildlife Sanctuary is the largest protected area in the North Gujarat region. It was declared as a wildlife sanctuary on August 7, 1989, in order to protect the pristine forest of the Aravali Mountain system and propagation of wildlife (Singh 2001).

MATERIALS AND METHODS



Contents lists available at ScienceDirect

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Review of field methods for monitoring Asian bears

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DNA hair trapping
DNA scat sampling
Expert opinion
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ABSTRACT

Efficient and effective monitoring methods are required to assess population status and gauge efficacy of conservation actions for threatened species. Here we review the spectrum of field methods useful for monitoring distribution, occupancy, abundance, and population trend for the five species of Asian terrestrial bears. Methods reviewed include expert opinion, local knowledge, bear sign, visual observations, camera traps, DNA-based methods (hair and scat derived), and radio telemetry. We examine the application of each method in terms of realizing specific

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Role of GST (Goods and Services Tax) on Dairy Industries in India

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Abstract

Indian dairy industries have witnessed considerable changes since the introduction of 'Operation Flood' Programme in the year 1970 by national Dairy Development Board. At present dairying is one of the most important means of providing livelihood and nutritional security to the rural masses. According to The "Indian Dairy Industry Database 2018-2023" report, India has emerged as one of the world's biggest producers of milk, with the total milk production rising from 122 Million Metric Tons in 2010 to 171 Million Metric Tons in 2017. Taxes are one main source of revenues of the government. Governments make use of taxation as a tool to generate revenue, discourage undesirable behavior, reduce inequality, and distribute resources and to protect local industries. Before the introduction of GST in India, many challenges were prevailed in Indian taxes system like cascading impact, multiplicity of taxes at the centre and state levels, multiplicity of tax rates. In order to remove above challenges Government of India introduced GST in India from 1 July 2017. Goods and Services Tax (GST) are currently on dairy products is set between 5% to 18% (May, 2017) This makes it one of the simplest forms of revenue generating tax to government. This paper is about role and impact GST on Dairy industries

Key words: Dairy Industries, Dairy product Goods and Services Tax (GST) GST Revenues

Introduction

The dairy industries has become boon for dairy farmers. It play a vital role in the development of traditionally weak, the small landholders, landless labourers and women. It has become main source of yearly income for farmer, rural people or tribal people. It is estimated that up to 60-65 percent of the income of this group (marginal and small-scale farmers) now comes from dairying. Over the period, dairying has also acquired the contours of a fully-fledged industry in the country and has positively improved the life of those engaged in this business, directly or indirectly, bringing significant socioeconomic changes.. Millions of rural smallholder milk producers dominate India's dairy industry, contributing 62 percent of total milk produced in the country. The milch animals are fed on crop residues and milch animal dung is used as manure for crops. Livestock plays a vital role in the economy; animal husbandry is the most important economic activity in rural areas. The dairy sector today provides 80 million farm households with the triple benefits of nutritive food, supplementary income and productive employment

FACTORS AFFECTING THE BUYER'S ONLINE SHOPPING DECISION: AN EMPIRICAL ANALYSIS

Riddhi Agrawal¹, Siddhi Agrawal²

This paper is trying to identify the factors affecting the online shopping decisions of the buyers. The factors may be in form of buyer's desire from the specific shopping sites. Generally the variables like preference and choice, availability of resources, location, comfort of website, purchase options, payment options, security while performing online transactions and many more were measured on five point Likert scale. Four different factor were extracted. The main objective of the study is to know the influencing factors for online shopping for the people of North Gujarat. The study examines whether any single factor affect shopping. Through this study researchers attempt to know consumer's online buying perception and whether it is affected by some specific factors.

Key Words: Online Shopping, Buying Perception, North Gujarat.

INTRODUCTION

Online shopping is performed under the influence of many factors. There are many factors like preference, choice, rate (price), discounting, variety of option, comparison between the options, etc. that affect buying decisions during online shopping. This study is undertaken to know the online buying perception that is affected by some specific factors. The study is conducted in North Gujarat region. In a North Gujarat region of India, buyers are doing online shopping generally with the past experience and influenced by online buying performed by their relatives and friends. The study took an individual's opinion about the online shopping to explore factor affecting this online act. It also tried to know about the safety precautions of buyers, their payment methods, choice upon particular website, reliability of the transaction regarding fraud, etc. The study also focused to know about the policy of e-commerce companies for the online transactions, customer services and about the return policy.

REVIEW OF LITERATURE

Bhagat (2015) studied that factors influencing purchase and non-purchase behaviour in online shopping. Due to retail shopping mindset of purchasing, person attracts towards the non-purchasing behavior. Another factor of non-purchasing is logistic. Other purchase factors were same price, promotional scheme, etc. The study said that if companies plan to develop an online market then they should try to provide the comfort of offline retail shopping. Liu (2004) has spotted dropout purchaser for the first time in research. People are having a common tendency of buying online by first checking for all available options, then comparing prices and then after applying promotional codes or offer, they make purchase. Thus, online shopping websites need to compete with offline retailers by keeping people tendencies in mind.

According to Shergill et al. (2005) buyers of New Zealand are having different buying perception where mainly four factors are affecting. First factor is 'Website reliability/

An Attitude Towards Online Buying of Veggies & Grocery: A Survey of North Gujarat

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ABSTRACT

Paper is presented to show the use of E-Commerce site for the day to day purchase of grocery and vegetables. In India we usually buy fresh products and we don't have tendency to store specially for green veggies. We buy these products from open market and local vendors. Often it is also found that hawkers are demanding for more money as they provide vegetables at door step. It often take too much time in bargaining process and for working families we don't have that much time so buying pattern is slowly shifting toward online shopping from the traditional shopping it has already started in big cities of India and now entering to the other part. This study shows overall picture of North Gujarat Region.

Keywords: Veggies, Grocery, online Shopping.

INTRODUCTION

Present study shows the buying pattern of buyers of North Gujarat. It is to clear in the first phase that most of the users has used E-Commerce. But most of the E Commerce sites of the present study are not providing their services in this region and the data are based upon their past use may be they have used it outside this region.

Of course, it is always convenient to buy over fingertips and the products which don't have much option to choose it is quite easy to buy. As we move to vegetable market there are many option to buy veggies are available but often we face the trouble due to rates, measures, mixing with old stock even we face issue like traffic, badly lit area where the hawkers are stand. It's a picture like perfect competition market buyers are free to buy but in a same way seller are also free to fix their own price. Within few minute our ear here many voices many schemes our eyes are searching for the quality goods but where quality is good price is not and where price is good we compromise the quality. Similarly our local Baniya we call them Kiranawala are also doing the same practice they offer us loose goods more so that they can earn their handsome profit margin.

To overcome this situation now new generation has shifted to the online market. Here we buy the fresh veggies and fruits of our choice need not to manage with the preference of Kiranawala. Present study is focusing upon the choice and preference of people of North Gujarat. What they believe about the online shopping of veggies and grocery.

Popular site: India's top rated grocery and veggies sites are selected as per Alexa rating 2018 and Money Connexion.com

1. Big Basket (Alexa Rank in India: 288)

Big Basket is the number one online grocery store in India. It has over 14,000 products and 1000 brands in its catalogue.

2. Local Banya (Alexa Rank in India: 1509)

Second in our countdown list is Local Banya.

3. ZapNow (Alexa Rank in India: 1572)

ZapNow is also a great online grocery store for shopping. The best part of ZapNow is it allows cash on delivery options for its customers.

E-Way for Medical Utility: A Study for North Gujarat Region

Dr. Siddhi Agrawal*

Dr. Riddhi Agrawal**

Abstract: Health is first happiness & for this managing health is in our hand. In our busy life we don't have time to even pay attention toward our self and resulting we caught with many kind of illness like BP, Sugar, Cholesterol and many more. This study is to focus on the awareness of digital market for specially Medical Utilities. To know the opinion & the experience with the sites few questions were asked. It is found that medical is matter of reliance and generally we believe in doctor's guidance and purchase medicine from the doctor's suggested chemist. But all the time it is not possible to reach to the said store so here E-Commerce can become a good source for our desired medical supply. As an interesting outcome it is found that local pharmacists & chemist are providing the same service as E-Commerce & hence ratio of Local purchase is more with the personal relation as compare to the virtual store.

Key Words: Medical Utility, Chemist, Pharmacist, E-Commerce

Introduction: "Medical" this word is enough to get attention of someone. Illness is becoming normal day by day. We hardly find a house without medical box. To turn illness in wellness more or less we all use medicines in one or another way. This study will discuss about the use of E-Commerce sites for purchase of medical utilities it may be medicine, medical wearable, medical consultation or home service for any lab test samples etc. this services are used by those who are undergo with routine medication. Here we assume that any age group of people utilize this services online due to the lack of availability, lack of time, lack of persons or ability to do personal care. One beautiful advertisement is broadcasting on television now days which shows girls marriage, and after the marriage girl order her parents medicine online, as from far distance it is not possible to do personal care so this may be the alternative option.

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Synthesis and biochemically methods of some lanthanide complexes with Kynurenic acid

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Abstract:- The compound of lanthanide ions with complexing or chelating biologically important kynurenic acid ligand to form coordination compound is an important area of current research. Less explored biologically important kynurenic acid ligand is allowed to react with solution of lanthanides perchlorates and attempt has been made to synthesize solid kynurenic acid complexes. These complexes are subjected to U.V visible spectroscopy, IR spectroscopy, TGA analysis, Mass Spectroscopy, Elemental analysis and antimicrobial activity of these compounds has been evaluated by standard methods and attempts have been made to correlate structural characteristic with properties of these complexes.

Keyword:- Spectroscopic characterization, lanthanide complexes, TGA analysis, mass spectroscopy, antimicrobial activity, elemental analysis

Date of Submission: 28-02-2022

Date of Acceptance: 10-03-2022

I. Introduction:-

The great amount of research work has been done on metal complexes. These constitute ordinary complexes, complexes and mixed ligand complexes[2]. There are large number of chelating and complexing agents known. The donor atoms which undergo combination with metals are restricted to the non metallic elements of group V and VI, of these N, O, and S are the common examples. During coordination, bond formation occurs between the metal ion and the ligand. In the formation of complexes one of these atoms, normally the ligand or the atom functions as an electron pair donor (Lewis base) and metal ion as electron pair acceptor (Lewis acid).

The formation of complexes also depends on the relative position of the groups which are present in organic compounds or drug. When a group like -COOH, -OH, or -SO₃H is suitably placed with groups like -NH₂, -OH, =S, >C=O, =N- the latter are found to coordinate with metal ion which is linked through a primary valency.[2]

II. Method And Materials:

Analytical grade chemicals were used throughout the course of experimental work. Spectroscopic grade solvents were employed for recording the spectra. Conductivity water was used throughout the work. Conductivity water was redistilled over alkaline potassium permanganate. The pH of this water was found to be ~ 6.9. This water was used for preparing solutions of metal perchlorates and reagents. Nd (III) perchlorate, Sm (III) perchlorate and Gd(III) perchlorate in DMSO solvent were prepared. The compound kynurenic acid was used as a ligand. It was obtained from Sigma and its purity was checked by noting its melting point and spectra. All metal carbonates used were also A.R. grade.[2]

Preparation of complexes:-

The formation of complexes was carried out by mixing 50 ml 0.2M metal perchlorate in DMSO solution and 75 ml 0.2M ligand in DMSO solution. The mole ratio of ligand and metal was (1:1)[1]

The reaction mixture was refluxed for 2.5 to 3.0 hours at 95⁰ C temperature. After 3.0 hours the reaction mixture was cooled. There was no immediate precipitation. The pH of the above solution was then raised up to 6.5 using 0.1M sodium hydroxide solution which resulted in the precipitation of the semi solid sticky material. Then, this solid product was dissolved in methanol to remove stickiness. The complex thus obtained was washed well with double distilled water to remove unreacted metal and ligand. All the complexes were dried in oven at 40⁰ C to 50⁰ C.[1]

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૧. સારાંશ:-

આજના આધુનિક યુગમાં શિક્ષણ પ્રત્યે ઓનલાઇન શિક્ષણને સકારાત્મક અને નકારાત્મક બાબતોનો રેકોર્ડિંગ અને સમજણ સંસ્થાને પાઠના વધુ કાર્યક્રમ વિતરણ માટે નવી રચના બનાવવામાં ખૂબ જ મદદ કરે છે મોટાભાગની શિક્ષણ પદ્ધતિઓની જેમ ઓનલાઇન શિક્ષણ તેના પોતાના સકારાત્મક અને નકારાત્મક પાસાંઓ નો સમૂહ તરીકે જોવા મળે છે અને વિદ્યાર્થીઓ માટે શીખવા ની પદ્ધતિ ઉપલબ્ધ કરાવી શકે છે. ઓનલાઇન શિક્ષણના ઘણા બધા ફાયદાઓ હોવા છતાં પણ કેટલીક મર્યાદાઓ રહેલી છે. ઓનલાઇન શિક્ષણ તેની કાર્યક્ષમતા સમય અને સ્થળ, સમતા, વિદ્યાર્થીઓને પસંદગી માટેની સ્પષ્ટતા શીખવા ની શેરીઓમાં વિવિધતા વગેરે જેવી જરૂરિયાતો ઉપલબ્ધ કરી શિક્ષણ રૂપી વાર્તામાં બનાવે છે. નોકરી પ્રાપ્ત કરવા માટે તમારે જ્ઞાન પ્રાપ્ત કરવા માટે અધ્યાયને શીખવાની અવગણના ન કરવી જોઈએ. ઓનલાઇન વાતાવરણ સતત બદલાઈ રહ્યું છે તે શીખવાની એક મોટી તક નું પ્રતિનિધિત્વ કરે છે. ઘણી બધી ઉપલબ્ધ કોમ્યુનિકેશન ચેનલોનો ઉપયોગ કરીને શીખવાની અને માહિતી સરખી રીતે વહેંચવાની કિલ્લટ કરવાની વ્યક્તિની શૈલીને શ્રેષ્ઠતા પૂરી પાડે છે. અધ્યયનને ઘણી વખત કાર્યકારી અને વ્યક્તિગત જીવનનો સામાન્ય ભાગ માનવામાં આવે છે. ઈ-લર્નિંગ ઘણા ફાયદાઓ પણ જોવા મળે છે. વેબ આધારિત શિક્ષણ પ્રણાલી જોવા મળે છે. આજના યુગમાં મોબાઇલ એક સામાન્ય બાબત બની ગઈ છે. વિશ્વમાં મોબાઇલ લર્નિંગ ખૂબ જ પ્રચલિત થયું છે. આ ડિજિટલ માધ્યમ દ્વારા વિશ્વના સતત બદલાતા પરિવર્તન નું પરિણામ છે. ડિજિટલ યુગનો પ્રારંભ થઈ ગયો છે મોબાઇલ લર્નિંગ નામ ઘણા બધા ફાયદાઓ હોવા છતાં તેની કેટલીક મર્યાદાઓ પણ થયેલી છે. ફાયદાઓ જેટલા યોગ્ય હોય એમજ ગેરફાયદાઓ પણ અસર કરતા હોય છે. ડિસ્ટન્સ એજ્યુકેશન ડિજિટલ માધ્યમ દ્વારા સફળતાપૂર્વક પ્રાપ્ત કરી શકાય છે. ડિસ્ટન્સ એજ્યુકેશન સંસ્થુ શિક્ષક માટે અનુકૂળ અને મજબૂત પ્રેરણા સમાન છે. આપણા દેશમાં ઈ-લર્નિંગ ટેબલેટ અને ડિઝાઇન ડિજિટલ ટેકનોલોજી ની લોકપ્રિયતા ખૂબ જ વધી છે. ભારતમાં લર્નિંગ માર્કેટ 2016માં 247 મિલિયન હતું જે 2021 થી લગભગ 1.2 billion વધવાની ધારણા જોવા મળે છે. આ રીતે પરંપરાગત શિક્ષણ અને ઓનલાઇન શિક્ષણ એમાં ઘણું બધું તફાવત જોવા મળે છે. માધ્યમ ગમે ત્યારે ગમે તે સમયે કોઈપણ કાર્ય કરતા હોવા છતાં પોતાની અનુકૂળતા પ્રમાણે અધ્યેતા પોતાની ગતિએ શીખી શકે છે. ઘણી વખત ઓનલાઇન શિક્ષણમાં તેના અભ્યાસક્રમો અને તેના પર ખર્ચ કરવામાં આવતા સમય અને નાણાં ને બચાવે છે. મોટાભાગના વ્યવસાયો અભ્યાસક્રમો વ્યવસાય નેટવર્કિંગ વિદેશી અનુભવ અને શિક્ષણ દરેક બાબતે ઓનલાઇન શિક્ષણ પ્રાપ્ત કરવું અને ઘણી વખત તેના ગેરફાયદાઓ પણ શિક્ષણને ખૂબ જ પડકારરૂપ અસર કરતા હોય છે

૨. ઓનલાઇન શિક્ષણ ના ફાયદાઓ

વિશ્વમાં તેમજ આપણા દેશમાં શૈક્ષણિક સંસ્થાઓ વિદ્યાર્થીઓને શિક્ષિત કરવાની પ્રક્રિયા ચાલુ રાખવા માટે ઓનલાઇન પ્લેટફોર્મ તરફ જોઈએ તો આ સંસ્થાઓ જઈ રહી છે. પરિવર્તનના મૂળમાં ઓનલાઇન લર્નિંગ સામાન્ય શિક્ષણની પરિવર્તિત વિભાવના છે. ડિજિટલ લર્નિંગ દુનિયામાં વિદ્યાર્થીઓ અને શાળાઓ માટે જરૂરી સ્ત્રોત તરીકે ઉભરી આવે છે. ઘણી બધી શૈક્ષણિક સંસ્થાઓ માટે ઓનલાઇન માધ્યમ ઓનલાઇન શિક્ષણ એ સંપૂર્ણપણે નવું છે જે. તેના અપનાવો અને ઉપયોગ ખૂબ જ જરૂરી આજના યુગમાં બની ગયું છે.

Marginal Improvement in the Women Empowerment in India

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ABSTRACT

The phenomena of women empowerment has been undergone a marginal transitions relate to welfare orientation to approach of equity, since the previous five decades. It is mirrored in the both external and internal qualities; external comprise health , education, mobility, awareness , participation in decision making, status in the family, and level of material security whereas internal comprises self confidence and self awareness. India has an evolution in the stigma of society and now a day family system and role of the women are the mark of the flexibility and adaptability phase of the society. Social modernization brought the series of social changes and it leads awakening of consciousness of the women. Various dimensions of the women empowerment supported by the literatures are mentioned in this study i.e. financial autonomy, household decision making power, freedom of movement, acceptance of unequal role of gender, access to education, political participation, exposure to media. It is indeed a fact that major folks of the women have faced persistent disempowerment since numbers of the decades. But of the later, women consciousness, awakening and social modernization led women to redefine their position from a dependent, subordinate and an only child bearing habitual women to modern empowered women. In this research paper, numbers of significant indicators are narrated to show the marginal improvement in the women empowerment based on Human Development Report 2021-22.

Keywords: Women Empowerment, Society, Improvement.

INTRODUCTION

In the vocabulary of literature of gender, the phrase of women empowerment is a new phrase. This phrase comprises two comprehensive senses i.e. general and specific. In the ambit of general sense, it denotes to make capable by providing the women accessibility to all kinds of freedom and opportunities. On the other hand, specific denotes to uplift the position of women in the society (Lone & Zargar, 2017). The phenomena of women empowerment has been undergone an upsurge transitions relate to welfare orientation to approach of equity, since the previous five decades (Nayak & Mahanta, 2011). Empowerment is understood as a control over the conditions of their own lives, ideology, and resources. Eventually it results in development of intrinsic capability and louder self confidence, and it reflects individual's consciousness that able to overcome the barrier (Anon & Tomar, 2021). It is mirrored in the both external and internal qualities; external comprise health , education, mobility, awareness , participation in decision



High-performance thin-layer chromatography chemical fingerprinting: a modern technique for comparative assessment of a multivariate chromatogram analysis of *Padina boergesenii*

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Abstract

Gujarat's coastline holds immense storage of valuable marine macroalgae. *Padina boergesenii* is normally familiar as leafy rolled-blade algae pleasingly studied for its medicinal effects. This alga is therapeutically worthwhile owing to the existence of essential phytoconstituents in it. The purpose of this evaluation was to understand the various steps of methods setup like extraction methods, mobile phase and reagent work on high-performance thin-layer chromatography chemical fingerprinting for marine algae. The qualitative examination of ethanolic and methanolic extracts of algae revealed the presence of a number of bioactive compounds. Toluene–ethyl acetate (9.3:0.7, V/V) was employed as the best mobile phase in terms of separation of the band. The pre- and post-derivatizing images at different detection modes confirm the number of bioactive compounds anthraquinone, coumarin, essential oil, saponin, etc. This research concluded that ethanolic and methanolic extract prepared through the Soxhlet method showed a rich source of bioactive compound, which consequently improved its biological activity and this type of activity facilitates numerous pharmaceutical industries.

Keywords Marine algae · Phytoconstituents · High-performance thin-layer chromatography (HPTLC) · Chromatograms

1 Introduction

Nowadays, consumer demand for naturally based products that improve health and reduce sickness has gradually increased significantly [1]. As a consequence of this need, there has been a surge in interest in the potential source of natural food, pharmaceutical and cosmetic items [2, 3]. Marine algae survive in a very unstable and varying ecosystem like high-stress conditions (water and salt), and ultraviolet radiation as a consequence, marine algae evolved intricate processes to help them adjust to this environmental condition [4, 5]. This type of situation encourages the synthesis of the novel bioactive compounds [6], which are responsible for unique therapeutic potential [5]. In this context, the marine environment has proven to be one of the most fascinating

and diverse sources of natural components, with many of them exhibiting structural or chemical characteristics not accessible in the terrestrial environment [7].

Dictyotales, fucales and laminariales are the three main groups discovered globally, and the species from these three orders are widely employed for phytoconstituents. Additionally, about 1140 bioactive compounds were investigated from brown algae [8]. Brown seaweed contains a variety of bioactive compounds including polyphenol, phytosterol and phlorotannin [9]. Furthermore, several researchers have investigated the vast potential of algae as a source of secondary metabolites; macroalgae have been proposed as a new and limitless source of new dietary supplements [10]. *Padina boergesenii* belongs to the Dictyotaceae family [11], abundantly growing on the rocky coastal site of Gujarat. Earlier it has been reported as having an antioxidant [12], chemopreventive [13], hepatoprotective [14] and herbivory effect [15].

High-performance thin-layer chromatography (HPTLC) is often considered planar chromatography; it exists as a contemporary method that outperforms traditional thin-layer chromatography (TLC) in terms of accuracy and separation ability. In contrast to different analytical procedures,

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ORIGINAL ARTICLE

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Biogenic synthesis of silver nanoparticles mediated by the consortium comprising the marine fungal filtrates of *Penicillium oxalicum* and *Fusarium hainanense* along with their antimicrobial, antioxidant, larvicidal and anticancer potency

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Abstract

Aim: To biosynthesize silver nanoparticles (AgNPs) using fungal isolates [DS-2 (*Penicillium oxalicum*) and DW-8 (*Fusarium hainanense*)] as well as their mixed cell-free filtrate (CFF) acting as a consortium (DSW-28) and their bio-potentials.

Methods and Results: The fungi (DS-2 and DW-8) were harvested and CFF was prepared. CFF of each fungus and their mixture were reacted with silver nitrate solution under dark conditions for the synthesis of AgNPs. The UV-Visible spectra determined the surface plasmon resonance at 438, 441 and 437 nm for the AgNPs synthesized by DS-2, DW-8 and DSW-28, respectively. The band gap energy was found between 2.21 and 2.24 eV which depicted their ability to act as a semiconductor. The TEM imaging revealed the spherical shape and small size of AgNPs. The XRD pattern exhibited the crystalline structure corresponding to their peaks. The FTIR spectra indicate the presence of different functional groups present on the surface of AgNPs. The broad-spectrum antimicrobial activity was exhibited by AgNPs. The AgNPs also act as an effective antioxidant by depicting their radical scavenging activity against DPPH. Moreover, the AgNPs also inhibited the growth of fourth instar larvae of *Aedes aegypti* and *Culex quinquefasciatus* more efficiently in a dose-dependent method. The biosynthesized AgNPs from DSW-28 showed a significant anticancer activity against MCF-7 cells.

Conclusion: The silver nanoparticles synthesized by the CFF of two different fungi act synergistically in a consortium leading towards the production of silver nanoparticles with smaller size and higher bioactivity.

Significance and Impact of the Study: The impressive bioactivity of the silver nanoparticles synthesized by the mixture of CFF of various fungi acting as a consortium recommends their prospective use in agriculture as well as in biomedical as an antimicrobial, antioxidant, larvicidal and anticancer agents in future.

KEYWORDS

anticancer activity, antioxidant activity, consortium, *Fusarium hainanense*, larvicidal activity, *Penicillium oxalicum*



Biogenesis and characterization of proficient silver nanoparticles employing marine procured fungi *Hamigera pallida* and assessment of their antioxidative, antimicrobial and anticancer potency

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Abstract

Objective To assess the anticancer potential of biosynthesized silver nanoparticles using marine derived fungi *Hamigera pallida* with their antibacterial and antioxidant activities.

Results The biosynthesis of silver nanoparticles (AgNPs) was assessed by the change in color from bright yellow to dark brown. UV-Visible spectroscopy revealed its stability at 429 nm; ATR-FTIR spectroscopy revealed the functional group responsible for its production; X-Ray Diffraction revealed its crystalline FCC structure resembling the peaks in the XRD pattern, corresponding to (110), (111), (200), and (311) planes; TEM imaging revealed its spherical morphology with an average particle size of 5.85 ± 0.84 nm ranging from 3.69 to 16.11 nm and Tauc's plot analysis revealed a band gap energy

of 2.22 eV, revealing aptitude of AgNPs as a semi-conductors. The subsequent characterization results revealed the effective synthesis of silver nanoparticles. The biosynthesized AgNPs were found to have significant antimicrobial effect against three Gram-positive and three Gram-negative bacteria. They also demonstrated higher antioxidative potential by demonstrating strong radical scavenging activity against DPPH (2, 2-diphenyl-1-picrylhydrazyl). AgNPs showed highest anticancer activity ($62.69 \pm 1.73\%$) against human breast cancer (MCF-7) cell line at $100 \mu\text{g/mL}$ with the IC_{50} value of $66.07 \pm 2.17 \mu\text{g/mL}$.

Conclusions This study revealed the prospect for further utilization of AgNPs by Cell free filtrate of *Hamigera pallida* as an antibacterial, antioxidative and anticancer agents.

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On the identity of *Myopilumnus andamanicus* Deb, 1989 (Crustacea: Decapoda: Brachyura: Pilumnidae) from India

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Abstract

The identity of the poorly known pilumnid crab *Myopilumnus andamanicus* Deb, 1989 originally described from Neil Island, South Andaman Islands, India, is clarified. A re-examination of the holotype female shows that Deb's taxon is actually a species of *Lophoplax* Tesch, 1918. *Myopilumnus* is synonymized with *Lophoplax*. *Lophoplax andamanica* n. comb. is redescribed and compared with congeners. This is the first record of *Lophoplax* from the Indian Ocean.

Key words: *Myopilumnus*, *Lophoplax*, Neil Island, Indian Ocean, mangrove, taxonomy, diagnosis

Introduction

Deb (1989) described a new genus and a new species of pilumnid crab, *Myopilumnus andamanicus*, on the basis of a single female collected from a mangrove at Neil Island in the South Andaman Island group, India. Trivedi *et al.* (2018: 60), in their synopsis of the Indian fauna, listed the species as: "*Pseudocryptocoeloma andamanicus* (Deb, 1989) (This species had been classified in *Myopilumnus* Deb, 1989); cf. Ng *et al.* (2008)". The reference to Ng *et al.* (2008) was erroneous; the new genus and new species was not treated in their *Systema Brachyurorum* paper, and the synonymy of *Myopilumnus* Deb, 1989 with *Pseudocryptocoeloma* Ward, 1936, and the transfer of *M. andamanicus* to *Pseudocryptocoeloma*, was actually made in unpublished notes by these authors for a future edition of their publication. The synonymy was made on the basis of the rather schematic figure of the carapace of *M. andamanicus* by Deb (1989: fig. 1A) which was subovate with very low and rounded anterolateral teeth, closely resembling *P. parvus* Ward, 1936, and *P. symmetricus* Edmondson, 1951 (cf. Ward 1936; Edmondson 1951; Maenosono 2019), with the arrangement of the prominent areolets on the dorsal carapace surface similar to the condition observed in *P. symmetricus* (cf. Edmondson 1951; Maenosono 2019).


The holotype female (and the only known specimen) of *Myopilumnus andamanicus* was recently reexamined. Deb's original figure of the species is not accurate. *Myopilumnus* is actually congeneric with *Lophoplax* Tesch, 1918, although Deb's (1989) species is valid. In this article, we give a full redescription of Deb's (1989) species and reassign it to *Lophoplax*.

Material and methods

Specimens examined are deposited in the Zoological Survey of India in Kolkata, India (ZSI); and the Zoological Reference Collection of the Lee Kong Chian Natural History Museum, National University of Singapore (ZRC). The

Redescription of *Philyra sexangula* Alcock, 1896 (Decapoda, Brachyura, Leucosiidae), with description of a new genus and species from the northern Indian Ocean

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ABSTRACT

The identity of *Philyra sexangula* Alcock, 1896 (Leucosiidae), an inhabitant of mangrove habitats, is clarified. The redescription of the lectotype male and examination of fresh material collected from Pichavaram mangrove forest located in Tamil Nadu State of India revealed that *P. sexangula* shows significant morphological differences from the generic characters of *Philyra sensu stricto*. Therefore, a new genus *Bellayra* gen. nov., is established herewith for the species. In addition, one new species, *Bellayra persicum* gen. nov., sp. nov., is described based on a syntype male of *P. sexangula* collected from the Persian Gulf. Furthermore, *Philyra taekoa* Takeda, 1972 and *Philyra nishihirai* Takeda and Nakasone, 1991, described from Japan are also transferred to *Bellayra* gen. nov.

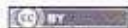
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India, Leucosiidae, mangroves, Persian Gulf, Systematics.

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ORIGINAL ARTICLE

2-(5-Chlorobenzothiazol-2-ylimino)thiazolidin-4-one derivatives as an antimicrobial agent



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KEYWORDS

Knoevenagel condensation reaction;
Antibacterial activity;
Antifungal activity;
Antimycobacterial activity;
1-Phenyl-3-(*p*-substituted phenyl)-1*H*-pyrazole-4-carbaldehyde

Abstract A series of 2-(5-chlorobenzothiazol-2-ylimino)-5-((3-(*p*-substituted phenyl)-1-phenyl-1*H*-pyrazol-4-yl)methylene)thiazolidin-4-ones (**3a–h**) were prepared from 2-(5-chlorobenzothiazol-2-ylimino)thiazolidin-4-one (**1**) and 1-phenyl-3-(*p*-substituted phenyl)-1*H*-pyrazole-4-carbaldehyde (**2a–h**). All compounds were characterized using elemental analytical (C, H, and N) and spectral (FT-IR, ¹H NMR, ¹³C NMR and GC-MS) data. These compounds were screened for their antibacterial, antifungal and antimycobacterial activities. Antimicrobial activity was evaluated against the bacterial strains e.g., *Escherichia coli* (MTCC 443), *Pseudomonas aeruginosa* (MTCC 1688), *Staphylococcus aureus* (MTCC 96), *Streptococcus pyogenes* (MTCC 442), H37Rv strain of *Mycobacterium tuberculosis*, and the antifungal activity was observed against strains e.g., *Candida albicans* (MTCC 227), *Aspergillus niger* (MTCC 282) and *Aspergillus clavatus* (MTCC 1323). All the synthesized compounds were found to possess moderate to excellent activity against selected strains. © 2012 Production and hosting by Elsevier B.V. on behalf of King Saud University. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/3.0/>).

1. Introduction

The widespread use of antifungal and antibacterial drugs and the fast development of pathogen resistance to most of the known antibiotics is becoming a serious problem (Chu et al., 1996). So, it has become quite difficult to eradicate these microbial infections (Patterson, 2005). Heterocyclic compounds are reported to be effective against many of these pathogens up to some extent. A heterocyclic compound is

one which possesses a cyclic structure with at least two different kinds of hetero atoms in the ring and the most common hetero atoms are nitrogen, oxygen, and sulfur. Heterocyclic compounds are very widely distributed in nature and are essential to life as they play a very important role in the metabolism of many living cells, e.g., amino acids, vitamins, DNA base (purines and pyrimidines) (Achson, 2009).

Benzothiazole moieties are known to be weak base heterocyclic compounds, having diverse biological activities and are of great scientific interest nowadays. They are widely studied in the areas of bioorganic and medicinal chemistry with many applications in drug discoveries. Drugs containing benzothiazole moiety are reported to possess numerable biological activities such as antimicrobial (Gupta et al., 2009; Kumbhare and Ingle, 2009; Lacova et al., 1989; Rajeeva et al., 2009; Maharan et al., 2007), anticancer (Linhong et al., 2006; Kamal et al., 2006; Kini et al., 2007; Stanton et al., 2008), anthelmintic

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EXTRACTABLE MICROBIAL BIOMASS –C AND N IN SEMI ARID SOIL OF PATAN, GUJARAT, INDIA

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ABSTRACT:

Microbial biomass C and N concentration were measured in four directions of Patan city with two depths. Physical and chemical parameters measured and compared effects of fumigated and non-fumigated soil on organic C and N extractable, were examined in a contrasting range of soils. It can be concluded that the microbial biomass is more strongly affected by soil properties.

Universal ImpactFactor 0.9285:2012;
1.2210:2013Index Copernicus

ICV 2011: 5.09

ICV 2012: 6.42

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EFFECT OF SIEVING ON MICROBIAL BIOMASS-C AND N IN SOIL OF PATAN, GUJARAT, INDIA

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ABSTRACT:

Large soil particle favors environment to the microbial biomass to carry out their activities of soil particles tend to moisture that helps microbial activity. As Compactness increase with large clay fraction due to smearing effect that results in lowered activity if microbial biomass. Present study also give the picture of biomass effect by C:N ration with environmental condition and also by sieving of sample.

Fourth World Literature and Subramani's Stories: A Study of Two Short Stories, *Tell me Where the Train Goes* and *Sattu*

Hetal S. Patel

Abstract
This paper examines two selected short stories of Subramani as representative texts from the category of fourth world literature depicting the condition of the marginalized Fiji-Indians. Literature written by Fiji-Indians constitutes an integral part of fourth world literature, characterized by the language of dispossession, dispossession, disenfranchisement and displacement.

Introduction: The Setting

While discussing the stories of Subramani as specimen of fourth world literature, it is important to reconstruct in brief the history of the Fiji-Indian community as belonging to the marginalized category. Most of the ancestors of Fiji Indians were recruited by agents of colonial government in the 19th and early 20th centuries to work as labourers on plantations, predominantly sugar plantations. It is important to remember that sugar was one of the most profitable commodities for the European colonizers as it was addictive and they earned handsome profits by exporting it throughout the world. But unfortunately sugar needed hot and humid climate to grow which was not available in Europe whereas the climate of Fiji, Suriname, West-Indies and India were amply suited for the crop. The colonial sugar companies needed manual labourers who could do the break-neck work on sugar plantations. For this, the huge British Empire, with its impoverished populations belonging to the lower and marginal castes provided enough opportunities. Commencing 1833,

land-less labourers and manual workers belonging to the peripheral communities were hired as indentured labourers to work in sugar cane plantations of West Indies, South Africa and later Fiji. All of them had to sign agreements stating that they would compulsorily stay there for five years before they could go back to India. This agreement was mispronounced by the illiterate labourers as 'girmiti'; the labourers came to be known as 'girmityas'.

Most of the recruits were then transported to the Calcutta port from where they were taken to different parts of the British Empire to work as coolies. Right through their journey, they had to pass through harrowing experiences. Many died during the course of the journey. Once they reached their destinations, they were made to reside in coolie-barracks which were narrow and low hovels in which a number of persons stayed without much privacy. Moreover, most of the coolies were males with a few females. Co-habitation and rape by overseers was not an uncommon phenomenon. As the noted historian Brij V. Lal has mentioned in his book *Girmitya*:

The Indian public had for a long time been aware of the sorry plight of the Indian labourers overseas, but it was the news of the molestation and abuse of Indian women on the plantations that outraged them most. The campaigns in India to stop the degradation of Indian women in the colonies 'received wider public support than any other movement in Indian history, more even than the movement for independence (2004: 129).

Sometimes, a woman would give birth to children about whose paternity they themselves were not sure. It is somewhat like what happened in countries like Argentina and Chile where the Spanish colonizers killed off the male population and took the women as their mistresses as a result of which the whole continent lost its mother tongue and now speaks Spanish. Even many native women of South America were not sure about the paternity of their children.

Another important aspect is that most of these Girmiti labourers belonged to the lower ladder of the society, with only a sprinkling from the middle and upper castes. But because of a level field for the virtual slave kinds of work, castes and hierarchies mattered not at all. The seeds of loss of castes were planted in the ships. The colonial machinery had, under its ruthless and unyielding wheels, grinded their identities to multiple pieces. Probably no other fourth world community suffers from this complete breakdown of identity and its own inability to retrieve its identity for the sake of consolation.



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Research Article

ONE POT SYNTHESIS OF 2-((4-METHYLPYPERAZIN-1-YL(PHENYL)METHYL)BENZENE-1,3-DIOL DERIVATIVES AND THEIR IN VITRO ANTIMICROBIAL ACTIVITY

Nikita Umrigar¹, Ketan C. Parmar^{*1}, Bhavesh M. Patel¹ and J. J. Vora²¹Department of Chemistry, Sir P. T. Sarvajanik College of Science, Surat-395007, Gujarat, India²Department of Chemistry, Hemchandracharya North Gujarat University, Patan, Gujarat, IndiaDOI: <http://dx.doi.org/10.24327/ijrsr.2017.0809.0834>

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ABSTRACT

The one pot reaction between 2-naphthol, aryl aldehydes and ammonia or amines yields aminobenzyl naphthols in process known as Betti reaction. This procedure can be interpreted as extension of the Mannich condensation with formaldehyde replaced by aromatic aldehydes, secondary amine by ammonia and the C-H acid by an electron-rich aromatic compound such as 2-naphthol. Betti base derivatives of 2-((4-methylpiperazin-1-yl(phenyl)methyl)benzene-1,3-diol were prepared through reactions of resorcinol, aromatic aldehydes and amines in ratio 1:2:1 in presence of fluoride at room temperature. The structures of the all synthesized compounds were confirmed by IR, ¹H-NMR, and Mass spectral studies. All the synthesized compounds were screened for antibacterial and antifungal activity.

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INTRODUCTION

At the beginning of the 20th century, Mario Betti discovered the three-component reaction of 2-naphthol, aryl aldehydes and ammonia or amines for the synthesis of aminobenzyl naphthols[1]. Now, this process has been known as the Betti reaction and the aminonaphthol product known as a Bettibase[2]. The phenolic hydroxyl and amino groups in Betti bases can be used in synthetic building blocks. Aminonaphthols have several interesting biological applications, such as antibacterial, hypotensive, and bradycardiac activities[3-5]. Optically active Betti bases can be used as ligands to chelate with organometallic reagents in different reactions to provide highly efficient asymmetric reaction[6-7]. In recent years, several more convenient and green procedures for Betti reactions have also been successfully developed[8-15]. The efforts were done to synthesize the Betti's base derivatives in organic solvent such as EtOH and MeOH at room temperature or thermally under solvent less condition[16]. In continuation of our ongoing effort to develop new environmentally benign multicomponent reactions, herein we report the three-component reaction of resorcinol, cyclic amines and aromatic aldehyde[17-18].

MATERIAL AND METHODS

Synthesis of 2-((4-methylpiperazin-1-yl(phenyl)methyl)benzene-1,3-diol: (V₂)

A mixture of n-methyl piperazine (5.08gm, 0.05M), Benzaldehyde (5.30gm, 0.05M) and Resorcinol (5.50gm, 0.05M) was dissolved in 10mL of 95% ethanol in one pot and was magnetically stirred at room temperature in presence of fluoride (2% weight with respect to all reactants) (Scheme 1). The reaction mixture was stirred for 10-15min. The completion of the reaction was monitored by TLC by using mixture of Acetone and methanol as mobile phase. After completion, the reaction mixture was poured into crushed ice. The crude product and catalyst were collected on a Buchner funnel by filtration. The crude product was purified by recrystallization from hot ethanol to get the pure product. Yield, (76%), M.P: 208°C (C₁₈H₂₂N₂O₂; Calculated: C, 72.46; H, 7.43; O, 10.72; N, 9.39; Found: C, 72.40; H, 7.41; O, 10.70; N, 9.35). The compounds 2-((4-methylpiperazin-1-yl(phenyl)methyl)benzene-1,3-diol (V₁₋₁₀) were obtained by preparation method (Scheme 1)

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Genomics Data

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Data in Brief

Whole genome sequencing and annotation of halophilic *Salinicoccus* sp. BAB 3246 isolated from the coastal region of GujaratVishal Mevada^{a,*}, Shradhdha Patel^b, Jignesh Pandya^b, Himani Joshi^b, Rajesh Patel^b^a Shri Sarvajani Science College, Sarvajani Campus, Mehsana, India^b Department of Life Sciences, Hem. North Gujarat University, Patan, India

A B S T R A C T

Salinicoccus sp. BAB 3246 is a halophilic bacterium isolated from a marine water sample collected from the coastal region of Gujarat, India, from a surface water stream. Based on 16sRNA sequencing, the organism was identified as *Salinicoccus* sp. BAB 3246 (Genebank ID: KF889285). The present work was performed to determine the whole genome sequence of the organism using Ion Torrent PGM platform followed by assembly using the CLC genomics workbench and genome annotation using RAST, BASys and MaGe. The complete genome sequence was 713,204 bp identified by with second largest size for *Salinicoccus* sp. reported in the NCBI genome database. A total of 652 degradative pathways were identified by KEGG map analysis. Comparative genomic analysis revealed *Salinicoccus* sp. BAB 3246 as most highly related to *Salinicoccus halodurans* H3B36. Data mining identified stress response genes and operator pathway for degradation of various environmental pollutants. Annotation data and analysis indicate potential use in pollution control in industrial influent and saline environment.

Specifications

Organism/cell line/tissue	<i>Salinicoccus</i> sp. BAB 3246
Sex	Not applicable
Sequencer or array type	Ion Torrent PGM platform
Data format	Fasta complete genome
Experimental factors	Marine water sample
Experimental features	Shotgun whole genome sequencing followed by genome annotation using RAST, BASys and MaGe.
Sample source location	Gujarat, India (21.672439 N 72.275925 E)
Data submission	BioProject: PRJNA342322 RAST: genome ID 1437774.4 - <i>Salinicoccus</i> sp. BAB-3246

2. Introduction

The genus *Salinicoccus*, belonging to family *Staphylococcaceae* was first proposed by Ventosa et al., (1990) and is defined as moderately halophilic, aerobic, Gram-positive, non-motile, non-sporulating, and heterotrophic cocci [1]. The genomic DNA G + C content of the species in this genus lies within the range of 46–51 mol%. Most species in genus *Salinicoccus* including *Salinicoccus albus*, *Salinicoccus carnianeri*, *Salinicoccus roseus*, *Salinicoccus halodurans*, *Salinicoccus huteus* have been found in salty environments, such as fermented foods, solar salterns, salt mines, salt lakes, and saline soils [1–7]. Alongside, genus *Salinicoccus* is also reported for production of Amylase, Protease, Gelatinase like enzymes in hyper saline environments [8].

The members of the *Salinicoccus* genus are abundant in the marine environments suggesting that they play important roles in marine ecosystems, such as the degradation of aromatic compounds and the biogeochemical cycles of carbon and sulfur [5]. *S. roseus* has been reported to exhibit high salinity and high lactate resistance [9]. *Salinicocci* have much importance in biotechnology applications such as serine-metabolism strategies to adapt to lactate stress [10]. In order to understand the genetic variability and industrial applications of those genes, genome sequencing and annotation of strain *Salinicoccus* sp. BAB 3246 was executed. The prime interest was to identify presence of

1. Direct link to deposited data

BioProject: <https://www.ncbi.nlm.nih.gov/bioproject/PRJNA342322>.

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Association of dental and skeletal fluorosis with calcium intake and serum vitamin D concentration in adolescents from a region endemic for fluorosis

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ABSTRACT

Context: Fluorosis is controlled by the duration of fluoride exposure and calcium and Vitamin D nutrition status. **Aim:** To examine (a) prevalence of dental and skeletal fluorosis in adolescents from upper, middle, and lower socioeconomic strata (SES) and (b) association of fluorosis with calcium intake and Vitamin D status. **Settings and Design:** A cross-sectional study conducted in 10–13.9 years apparently healthy adolescents ($n = 90$), from different SES of Patan (Gujarat, India). **Materials and Methods:** Dental fluorosis was graded as mild, moderate, and severe. Radiographs of the right hand and wrist were examined and graded. Serum 25 hydroxyvitamin D₃ (25OHD) and parathyroid hormone concentrations were measured. Diet was recorded (24 h recall) and calcium intake was computed (C-diet V-2.1, 2013, Xenios Technologies Pvt. Ltd). **Statistical Analysis:** Generalized linear model was used to analyze relationships between fluorosis, SES, serum 25OHD concentration, and calcium intake. **Results:** Fluorosis was predominant in lower SES (17% had both dental and radiological features whereas 73% had dental fluorosis); no skeletal deformities were observed. Mean 25OHD concentrations and dietary calcium were 26.3 ± 4.9 , 23.4 ± 4.7 , and 18.6 ± 4 ng/ml and 441.2 ± 227.6 , 484.3 ± 160.9 , and 749.2 ± 245.4 mg/day, respectively, for lower, middle, and upper SES ($P < 0.05$). Fluorosis and SES showed a significant association (exponential $\beta = 2.5$, $P = 0.01$) as compared to upper SES, middle SES adolescents were at 1.3 times while lower SES adolescents were at 2.5 times higher risk. Serum 25OHD concentrations ($P = 0.937$) and dietary calcium intake ($P = 0.825$) did not show a significant association with fluorosis. **Conclusion:** Fluorosis was more common in lower SES adolescents, probably due to the lack of access to bottled water. Relatively adequate calcium intake and serum 25OHD concentrations may have increased the efficiency of dietary calcium absorption, thus preventing severe fluorosis.

Key words: 25 hydroxyvitamin D₃, adolescents, calcium, dental fluorosis, skeletal fluorosis

INTRODUCTION

High fluoride concentrations in ground water (above

1.5 mg/L) may pose health problems; in India, high fluoride levels are found in certain geographical regions. Patan (Northern Gujarat, western India) is one of the affected districts where fluoride concentrations in water are beyond the permissible limit (>1.5 mg/L), and hence the area is endemic for fluorosis.^[1] Fluoride has been detected

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Interrelationship between serum 25-hydroxyvitamin D₃ concentration and lipid profiles in premenopausal Indian women

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ABSTRACT

Context: Vitamin D deficiency is prevalent worldwide, and observational studies have associated it with an atherogenic lipid profile. **Aim:** To determine the interrelationship between Vitamin D and lipid profile in apparently healthy premenopausal Indian women, considering confounding factors such as lifestyle that independently influence lipids. **Setting and Design:** Cross-sectional study. **Subjects and Methods:** One hundred and twenty healthy premenopausal women (20–45 year) were recruited from Gujarat, India. Data were collected on anthropometry, physical activity, sunlight exposure, and diet. Fasting blood samples were collected for the measurement of serum 25-hydroxyvitamin D₃ (25(OH)D), parathyroid hormone, and lipid profile. **Statistical Analysis:** Pearson's correlation coefficient was used to derive correlation between serum 25(OH)D concentrations and serum lipids. **Results:** Ninety-three percent women showed Vitamin D deficiency (serum 25(OH)D < 20 ng/ml). Serum 25(OH)D concentrations showed significant inverse correlation with total cholesterol (TC) ($r = -0.202$, $P = 0.027$), triglycerides (TG) ($r = -0.284$, $P = 0.002$), and low-density lipoprotein-cholesterol (LDL-C) ($r = -0.184$, $P = 0.044$) and positive correlation with high-density lipoprotein-cholesterol (HDL-C) ($r = 0.250$, $P = 0.006$). On dichotomizing the population according to median 25(OH)D concentration (11.1 ng/dl), no significant differences were observed between the groups for anthropometry, sunlight exposure, and lifestyle. Serum lipid profiles were significantly different, above median serum 25(OH)D concentration group showed favorable serum lipids (TC: 179.3 ± 30 vs. 191.8 ± 31.7 mg/dl; TG: 140 ± 39.1 vs. 165.5 ± 53.4 mg/dl; LDL-C: 100 ± 30.2 vs. 112 ± 32 mg/dl; HDL-C: 53 ± 14 vs. 47.6 ± 9.3 mg/dl) ($P < 0.05$). **Conclusions:** This study demonstrates that association of 25(OH)D concentrations with lipid profile even after considering lifestyle factors which independently influence lipids. Intervention trials would be required to prove this association to be causation.

Key words: Cholesterol, lifestyle factors, lipoprotein, triglycerides, Vitamin D

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INTRODUCTION

Vitamin D is a fat-soluble vitamin and a prohormone which has two isoforms, ergocalciferol (Vitamin D₂) available from

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Analytical Study of Association Rule Mining Methods in Data Mining

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ABSTRACT

In data processing, the foremost common and effective technique is to spot frequent pattern victimization association rule mining. There are such a large amount of algorithms that provides simple and effective method of association rule mining, however still some analysis is required which might improve potency of association rule mining. As we have a tendency to operate with immense historical information (homogeneous or heterogeneous), it is important to spot frequent patterns quickly and accurately. Here during this analytical paper, we have been tried to incorporate survey of analysis systematically towards association rule mining from last many years to till date from totally different researchers. It's true that one paper isn't enough for complete analysis of all smart researches, however it'll facilitate in future to urge right direction towards association rule mining analysis for fascinating, effective and correct analysis.

Keywords: Itemset, Frequent Patterns, Algorithm, Minimum Support, Confidence, Association Rules

I. INTRODUCTION

In recent years, one of the attractive and important topic of research is data mining. There is a keen eye on research in this area from the experts of computer science, IT industry, scientific analysis, business application, medical, education and in our society because of large historical data. Data mining is usually known as knowledge discovery in database (KDD). KDD is one of the important process of extracting raw data to get fruitful knowledge which can be useful in DSS.

There are so many techniques in data mining, but one of the most interesting techniques is association rules mining.

Over the last seventeen years it has been developed at a very dynamic rate. Association Rule Mining is still in a stage of exploration and development.

II. LITERATURE SURVEY

Introduction of Association Rule Mining was done in [1]. As per researcher Agrawal, the formal statement is "Let itemset $I = \{I_1, I_2, \dots, I_n\}$ can be a set of n binary attributes namely items. Let $T = \{T_1, T_2, \dots, T_n\}$ can be a set of transactions which forms the database (D). Each transaction in "T" has a unique transaction ID and contains a subset of the items in 'I'. One association rule is defined as an implication of the form $X \rightarrow Y$ where $X, Y \subseteq I$ and $X \cap Y = \emptyset$. The sets of items (for short itemsets) X and Y are called antecedent (LHS) and consequent (RHS) of the rule. ". The algorithm, described in [1], for searching association rules was referred the AIS Algorithm.

Research from Agrawal was the initiation of association rule mining algorithm and later on this topic became popular. Many researchers have undergone the research. From traditional association rule mining, markable research was made on mining

Review: Future Scope in Mathematical Modelling of Pulse Combustor Suggested by Kilicarslan

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Abstract: Mathematical mechanical field produces versatile applications in very creative way. During past years of experience large range of mathematics applied in different field of mechanics for sustainable output. There are various modifications in combustor for the generation of oscillatory fluid motions or sound wave. Can different parameters solved by mathematics? Those are the focusing parameters in this review paper. We focus how first process of mechanical combustor is noisy? It can reduce in what amount of percentage. Is there any effect in vibrations and acoustics?

Keywords: pulse combustor, kilicarslan

I. INTRODUCTION

The principal of pulse combustor is depending on the base of coupling between intermittent known as zero width waves and resonant known as acoustics with the combustor process this objective is defined in such a way that the output of intermittent having a huge amount of transformation of energy to the acoustical oscillations [The acoustical oscillations are periodic functions $\sin(\omega t + T_0)$ or $\cos(\omega t + T_0)$ where ω =angular moment, t =resultant time and T_0 =Periodic time in the density of the visibility of pulse combustor]. The process for driven oscillations while combustion is known as combustion-driven oscillations is generally connected with instability of steady combustion process. This process is very risky but it gives higher heat transfer rate. Instability in combustion produces pressure waves-and by which combustor may damage in future.

II. SIMPLE WORKING OF PULSE COMBUSTION WORKING

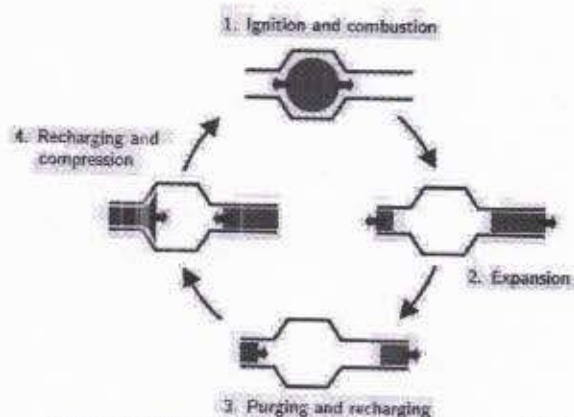


Figure 1: Schematic diagram of gas combustor [5]

Above image [5] describe the working function of pulse combustor. In first stage of cycle mixture in the combustion chamber become burn or ignites, this processed region will becomes expands for driving the mixture in burn formation into the tailpipe (to the right) with the aerodynamic valve.

Second stage, gives the responsive output of first stage. When almost all the mixture is in gas formation, the gases expands and cover the area of tail pipe and the aerodynamic

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IMPACT OF WATER QUALITY ON MACROFAUNA ABUNDANCE IN MANGROVE ECOSYSTEM OF GULF OF KACHCHH

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Abstract: Mangrove ecosystem of Gulf of Kachchh is unique for its semi-arid climate with extremely low rainfall, high variability in seasonal temperature and high rate of evaporation and high sediment and water salinity with tidal amplitude. Mangrove ecosystem serves and plays a vital role for the coastal fauna, such as birds and macroinvertebrates. It constitutes a complex ecosystem that offers opportunities for free living, climbing, burrowing organisms and plays a significant role for the increasing nutrient load in the soil and water by detritus matters. The present study deals with the investigation of birds and macrofauna abundance in mangroves with reference to the water quality in one of the important mangrove creeks at Jakhau. A total of 65 bird species, 27 macroinvertebrate species have been recorded responding to the water quality at Jakhau mangroves. The study has indicated that the water quality shows significant impact on the faunal abundance; several parameters like temperature, DO, PO₄, N are negatively correlated, while such elements as pH, SO₄, BOD, Ca, Mg are positively correlated with the faunal abundance and activities. The study reveals that macrofauna, like birds and benthic invertebrates, can be used as key indicators to know the status and quality of coastal ecosystems.

Keywords: Gulf of Kachchh, macrofauna, mangrove ecosystem, water quality

Introduction:

Mangrove areas are ecologically important coastal environments and act as a buffer zone between the marine and terrestrial ecosystems, characterized by high variation of physicochemical, morphological and

hydrological conditions (Carter 1988; Ysebaert et al. 2002). Mangrove ecosystems have a considerable amount of organic compounds and hence are known as a biologically rich ecosystem with a variety of living organisms attracting other life forms for various purposes. The mangrove habitat plays a host role to a moderate number of bird species around the globe. Hundreds of bird species migrate to the mangrove forest for feeding, roosting, nesting and breeding (Florida Fish and Wildlife Commission 2003). The shallow waters and exposed mudflats of the mangroves make this habitat ideal for probing shoreline birds such as plovers and sandpipers. Long-legged wading birds utilize these as well as the deeper waters along mangrove-lined waterways.

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Study of Bacterial Diversity of Mangroves Rhizosphere

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Open Access

Abstract

Microbial diversity has been an important facet of scientific research, since microbes promise a plethora of biomolecules which are otherwise not found in nature. Microbes are subjected to high level of competition for survival in the environment, and hence develop mechanisms of defense. The biomolecules produced by these microbes as part of their defense or survival mechanism, are of importance for human and animal drugs and many other industrial and environmental applications. The marine counterparts of these terrestrial microbes have yet higher potential, since the marine environment has higher biotic and abiotic stresses, leading to new molecule discovery. In the current study, a bacterial diversity study of the culturable bacteria of the mangrove rhizosphere of *Avicennia marina* has been undertaken, to understand the flora diversity. Mangroves are unique ecosystems which are under a combination of marine and terrestrial influence. Mangroves are seaward, inland and also found in creek areas. This diversity in their habitat, leads them to produce variable root exudates, which support the growth of different types of organisms. This study has revealed that certain species are dominant in these ecosystems irrespective of the biotic and abiotic stresses, whereas certain species appear only at neutral pH. The study will help select organisms for further biomolecule discovery programs, based on their environment of isolation and other growth parameters.

Keywords

Rhizosphere, Mangroves, Bacteria, Microbial Diversity, 16S rRNA Sequencing

1. Introduction

Mangroves are unique coastal plants which have originated due to the tectonic land shifts because of which ter-

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Optimization of Fermentation Processes for Higher Poly Galacturonase Production from Various Soil Bacteria

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Review: Future Scope of Mathematical Modelling of Pulse Combustor Suggested by Ahrens Et Al.

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Abstract—various types of mathematical modeling give us different parameters in which model or technique is exclusive of some of one. In Kilicarslan model it reduces larger quantity of noise with unwavering output but at same time mean noise and self noise quantity having disturbances [2]. This paper is discussing about how Ahrens et al model is different and useful in combustor accept Kilicarslan. What are the unique parameters in Ahrens which is useful in pulse combustor?

Keywords—*Kilicarslan Model, Ahrens et al Model*

I. INTRODUCTION

As Author mentioned in his paper [2] Kilicarslan model is suitable for pulse combustor. But Ahrens model is more comfortable while assume the reaction zone is to be independent with cool zone that is covered by the reactants and a hot zone that is covered by the process of pulse combustor. Combustion having a thin flame sheet that separating the both cool zone and hot zone for producing more accuracy. Now, the heat releases in model only by the

is separate zone and sequentially performance while in this model performance is parallel and similar and simultaneous in both the zones without separation. Below figure shows a schematic diagram of pulse combustor, with model parameters and sign conventions.





Research Article

ONE POT SYNTHESIS OF 2-((4-METHYLPIPERAZIN-1-YL(PHENYL)METHYL)BENZENE-1,3-DIOL DERIVATIVES AND THEIR IN VITRO ANTIMICROBIAL ACTIVITY

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Piperazine, Resorcinol, Betti bases

ABSTRACT

The one pot reaction between 2-naphthol, aryl aldehydes and ammonia or amines yields aminobenzyl naphthols in process known as Betti reaction. This procedure can be interpreted as extension of the mannich condensation with formaldehyde replaced by aromatic aldehydes, secondary amine by ammonia and the C - H acid by an electron-rich aromatic compound such as 2-naphthol. Betti base derivatives of 2-((4-methylpiperazin-1-yl(phenyl)methyl)benzene-1,3-diol were prepared through reactions of resorcinol, aromatic aldehydes and amines in ratio 1:2:1 in presence of fluorite at room temperature. The structures of the all synthesized compounds were confirmed by IR, ¹H-NMR, and Mass spectral studies. All the synthesized compounds were screened for antibacterial and antifungal activity.

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INTRODUCTION

At the beginning of the 20th century, Mario Betti discovered the three-component reaction of 2-naphthol, aryl aldehydes and ammonia or amines for the synthesis of aminobenzyl naphthols [1]. Now, this process has been known as the Betti reaction and the aminonaphthol product known as a Bettibase [2]. The phenolic hydroxyl and amino groups in Betti bases can be used in synthetic building blocks. Aminonaphthols have several interesting biological applications, such as antibacterial, hypotensive, and bradycardiac activities [3-5]. Optically active Betti bases can be used as ligands to chelate with organometallic reagents in different reactions to provide highly efficient asymmetric reaction [6-7]. In recent years, several more convenient and green procedures for Betti reactions have also been successfully developed [8-15]. The efforts were done to synthesize the Betti's base derivatives in organic solvent such as EtOH and MeOH at room temperature or thermally under solvent less condition [16]. In continuation of our ongoing effort to develop new environmentally benign multicomponent reactions, herein we report the three-component reaction of resorcinol, cyclic amines and aromatic aldehyde [17-18].

MATERIAL AND METHODS

Synthesis of 2-((4-methylpiperazin-1-yl(phenyl)methyl)benzene-1,3-diol: (V₂)

A mixture of n-methyl piperazine (5.08gm, 0.05M), Benzaldehyde (5.30gm, 0.05M) and Resorcinol (5.50gm, 0.05M) was dissolved in 10mL of 95% ethanol in one pot and was magnetically stirred at room temperature in presence of fluorite (2% weight with respect to all reactants) (Scheme 1). The reaction mixture was stirred for 10-15min. The completion of the reaction was monitored by TLC by using mixture of Acetone and methanol as mobile phase. After completion, the reaction mixture was poured into crushed ice. The crude product and catalyst were collected on a Buchner funnel by filtration. The crude product was purified by recrystallization from hot ethanol to get the pure product. Yield, (76%), M.P: 208°C (C₁₈H₂₂N₂O₂; Calculated: C, 72.46; H, 7.43; O, 10.72; N, 9.39; Found: C, 72.40; H, 7.41; O, 10.70; N, 9.35). The compounds 2-((4-methylpiperazin-1-yl(phenyl)methyl)benzene-1,3-diol (V₁₋₁₀) were obtained by preparation method (Scheme 1)

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EXTRACTABLE MICROBIAL BIOMASS –C AND N IN SEMI ARID SOIL OF PATAN, GUJARAT, INDIA 334

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ABSTRACT:

Microbial biomass C and N concentration were measured in four directions of Patan city with two depths. Physical and chemical parameters measured and compared effects of fumigated and non-fumigated soil on organic C and N extractable, were examined in a contrasting range of soils. It can be concluded that the microbial biomass is more strongly affected by soil properties.

KEY WORD: Soil fraction, Fumigation, Soil properties.

INTRODUCTION:

Microbial Biomass is a labile fraction of organic matter. This includes bacteria, Fungi, actinomycetes, algae and protozoa. These longitudes about 3% of total organic matter in soil. The turnover of carbon and nitrogen through microbial biomass determines the nutrient availability to the living world. Thus microbial biomass acts as an important source and sink of plant available nutrients. Constituent microorganisms of microbial biomass individually contribute to the fertility of soil and therefore these are considered to be indispensable component.

MATERIAL AND METHODS:

LOCATION OF SITES:

Soil samples were collected from four directions of Patan city, location in North Gujarat region between 23.52N latitudes and 72.1E longitudes. Patan comes under semi-arid climate zone.

Analytical study of open source WAF for web application protection

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ABSTRACT

Application protection is a valuable security layer to protect against a number of application layer security threats which is usually not protected by a typical network layer intrusion detection system. The hackers will attack the Web Application using the methods like SQL injection attacks, Cross Site Scripting attacks, Buffer Overflow attacks, Cookie poisoning, Forceful browsing, Directory traversal attacks and some known and unknown attacks. This paper describe the an analytical study of open source web application firewall for web application protection and also present comparative study of existing open source web application firewall to protect web application from various web attacks like SQL injection attacks, Cross Site Scripting attacks, Buffer Overflow attacks, Cookie poisoning, Forceful browsing, Directory traversal attacks and some known and unknown attacks.

Keywords- Web application, open source web application firewall, and web attacks.

1. INTRODUCTION

The aim of this work is to study of Web Application Firewall that can help securing a web application. A Web Application firewall is an important building block in the network. It is a form of firewall which controls access to an service or application. It operates by monitoring and potentially blocking the input, output, or system service calls i.e. in simple words traffic, which do not meet the policy of the firewall. The application firewall is typically built to control all network traffic on any OSI layer up to the application layer. It is able to control applications or services specifically, unlike a stateful network firewall which is in general unable to control network traffic regarding a specific application without additional software.

Nowadays web applications have become ubiquitous. As the number of web applications increases the amount of traffic on the internet is also growing up. This results in the increasing threat of web applications being attacked. They continue to be a prime vector of attack for criminals, and this trend shows no sign of abating; attackers increasingly launch attacks like cross-site scripting, SQL injection and many other techniques aimed at the application layer. Web application vulnerabilities can have many things including poor input validation, insecure session management, improperly configured system settings and flaws in operating systems and web server software.

Certainly writing secure code is the most effective method for minimizing web application vulnerabilities. However, writing secure code is much easier said than done and involves several key issues.

First of all, many organizations do not have the staff or budget required to do full code reviews in order to catch errors. Second, pressure to deliver web applications quickly can cause errors and encourage less secure development practices. Third, while products used to analyze web applications are getting better, there is still a large portion of the job that must be done manually and is susceptible to human error. Securing an organization's web infrastructure takes a defense in depth approach and must include input from various areas of IT. The paper contains different open source web application firewall literature which has been surveyed and existing open source web application firewalls are studied and also comparative study of open source web application firewall to protect web application from various web attacks.

Secure Web Application: Preventing Application Injections

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ABSTRACT

In the recent years, web applications are the number one source of vulnerabilities targeted by Hackers. Although traditionally companies have used intrusion detection and prevention systems which monitor the network in general, there is now a widespread use of Web Application Firewalls as a security solution that monitors and protects only web applications. A web application is a software application that is accessed over the Internet using HyperText Transfer Protocol (HTTP). In a typical web application a client, such as a browser, interacts with a web server by exchanging a series of messages that are made up of HTTP requests and responses. An attacker often exploits vulnerabilities that exist in a web application to launch attacks. The focus of this research paper is to study and analyze the application level attacks for secure web application. Application level attacks covered Cross Site Scripting attack, SQL injection attack, Command Injection Attack and Cookie Poisoning attack.

Keywords - Web application, Cross Site Scripting attack, SQL injection attack, Command Injection Attack and Cookie Poisoning attack.

I. INTRODUCTION

Nowadays web applications have become ubiquitous. As the number of web applications increases the amount of traffic on the internet is also growing up. This results in the increasing threat of web applications being attacked. They continue to be a prime vector of attack for criminals, and this trend shows no sign of abating; attackers increasingly launch attacks like cross-site scripting, SQL injection and many other techniques aimed at the application layer. Web application vulnerabilities can have many things including poor input validation, insecure session management, improperly configured system settings and flaws in operating systems and web server software.

Certainly writing secure code is the most effective method for minimizing web application vulnerabilities. However, writing secure code is much easier said than done and involves several key issues.

Security has been the critically important part of majority of web applications. The web applications access the web server which in turn accesses the

database servers. Thus proper security has to be implemented at every step during the access mechanism. Analysis carried out by Common Vulnerabilities and Exposures (CVE) [1] reports that majority of today's security loop holes are found in web applications.

Application level attacks known attacks include Cross Site Scripting attack, SQL injection attack, Command Injection and Cookie Poisoning etc, whose main aim is to tamper or deface web applications or impersonate as a real legitimate user. Web applications provide users with client server functionality by accessing a series of web pages. These web pages often contain dynamic interactive web content and script code which gets executed in the user browser. Thus web applications are continuously subjected to attacks [2][3][4] such as cross-site scripting, cookie stealing, session hijacking, browser hijacking, and the most recent being self-propagating worms in Web-email and social networking sites. In fact most of the research conducted shows that web application attacks are the most common problems on the internet today.[5]

Original Research Article

Spectrophotometric method development and validation for estimation of rutin in some herbal formulation

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Abstract

Three simple, rapid, accurate precise and economic spectrophotometric methods (A, B and C) have been developed for estimation of rutin in several herbal formulations. Method A and B are based on the complexation of rutin with cobalt (II) nitrate and nickel (II) chloride to give colored complexes. The absorption maxima, λ_{max} , are at 359.70 nm for method A, 347.85 nm for method B and 340.90 nm for method C respectively. Beer's law was obeyed in the concentration range of 0.004-0.04 mg mL⁻¹ for all methods. Developed methods are validated as per ICH guidelines and could be successfully adopted for the routine estimation of rutin.

Key Words: Herbal formulations, ICH guidelines, rutin, spectrophotometric.

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INTRODUCTION

Rutin (3,3',4',5,7-pentahydroxy flavones-3-rutinoside) (Fig. 1), which was also named vitamin P, eldrin, melin, sophorin, and violaquercitrin, is a typical glycoside of the natural flavonoids widely distributed in plants¹. Rutin is slightly soluble in water and has a higher solubility in organic solvent such as methanol². Rutin, a flavonoid glycoside, found in vegetables, fruits, tea and herbs³. Moreover, rutin possess different protective effects including antioxidant, anti-cancer and anti-inflammatory properties². Also, rutin has a protective effect against doxorubicin-induced memory deficits and has neuroprotective effects^{4,5}. In addition, it has a protective function in ischemic organs including the heart and brain⁶. Several methods have been developed for the determination of rutin in different plant extracts; these

include HPLC^{7,8}, capillary electrophoresis⁹⁻¹¹ and spectrophotometry¹²⁻¹⁴. Recently, HPTLC has been applied for the determination of flavonoids¹⁵⁻¹⁸. The present work deals with the development of three simple and sensitive spectrophotometric methods for the quantitative estimation of rutin in herbal formulations. To our knowledge, there is no pharmacopeial method or any validated method that quantifies rutin in its herbal formulation. The objective of this study is to develop simple spectrophotometric method for quantification of rutin in its formulations and compare its quality with what is available in the local and international market. These methods are validated according to the international standards^{19,20}. The developed analytical method will be applied in quantification of rutin in its final herbal dosage form.

Mathematical Analysis And Simulation of Kilcarslan Model In Pulse Combustor

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Abstract—Combustion chamber indirectly controls volume and energy fluctuates while pulse covers its one cycle. Output of pulse combustor is depends on the time taken by the system and also a quarter cycle (That decides the rate of change of volume (V) and energy (Q) w.r.t. time). How cycle becomes accurate that is decided by the mixture of the material and sustainable spark and ignition. If it is imbalanced then tailpipe decreases the flow and maintaining pressure density. But older model of Kilcarslan follows law of conservation with assumption of taking lesser parameter of energy. It assumes some of the heat and volume are constant as well as the ratio of input and output that equals one. But it cannot include noise effect and material effect in model. Hypothes will not satisfy many of the conditions like, "No material is ideal, what is the percentage ratio of loss and exactly in which time?" "Combustor produces noise so is noise effect on the accuracy of cycle?"

In this paper, Author tries to solve this hypothesis mathematically and try to change some of the equation in Kilcarslan.

Keywords—Older model of Kilcarslan (O.M.K.), Role of volume/pressure, Role of Heat, Modified Model of Kilcarslan (M.M.K.), Pulse Combustor

I. INTRODUCTION

Theoretical model gives knowledge about the assumption of how it will perform in real world. Pulse combustor performs based on the pulsating frequency. Pulsating frequency means frequency having no width while generate or analyze and between two pulse no any reactions produces.

O.M.K. use tailpipe length, diameter combustion chamber and variable supply pressure where control volume is defined by combustion chamber and then defines its energy balancing. Let we assume for control volume process is mixture entering in combustion chamber process with air fuel with ratio r and generates volume which will handled by tailpipe. At the end of one cycle it will generate effective cycle where initially assumed ideal condition (No noise and material loss). [5], [6]

$$P = \rho RT$$

Where, P=Pressure, ρ =energy density, R=Rate of change it is constant ideally, T=Temperature. And γ is the ratio of the constant pressure v/s constant volume.

$$\gamma = Cp/Cv$$

Heat is depend on the Cp and T, that is $H=CpT$.

Kilcarslan assumes that, Overall ratio of constant is depends on the constant value of pressure and volume. This process takes quarter cycle of steady flow and depends on the combustion chamber and supply pressure difference. Tailpipe tries to handle the pressure difference and try to make it constant [3].

$$Cp/R = Cv/R = 1/(1-\gamma)$$

But, Hypothes includes material and noise.

$$Cm/R \text{ (No heat loss)} + n/R = (1/(1-\gamma)) + \text{noise} + \text{Material Constant} \dots \text{(Author 1)}$$

Practically Cm/R and n/R changed and decided,

$$d/dt (Cm/R) + d/dt (n/R) + (1/(1-\gamma))$$

II. ROLE OF PRESSURE AND HEAT

A. Energy

The acceptance and repudiate of total energy depends on heat systems enthalpy and change in mass. If gases goes to ideal and mixture is perfect. Then equation of energy should be like this (Below equations are part of Modified Kilcarslan Model):

$$\frac{dE_{cc}}{dx} = \dot{Q} + h_r \dot{m}_r + h_e \dot{m}_e + h_{m1} \dot{m}_{m1} + \text{noise}$$

Total Ecc= Energy of Chamber, Q= Rate of Heat Release

m_r , m_e and m_{m1} in out mass fluctuations, h_r , h_e and h_{m1} are enthalpies and x= time.

$$\dot{Q} = \dot{m}_r (\Delta H_{f1} / (1 + \gamma)) = \dot{m}_r (h_e - h_r + \text{noise} + h_m)$$

ΔH_{f1} =Heat of combustion per unit mass of fuel.

Here, excluding parameters remaining constant. And based on above equations author tries to derive the reactions in frequency while operate in span.

B. Mass change per cycle

As we seen, rate of change of heat in tailpipe is depend on mass as well as damped oscillation. Where, Mass change in air material and gas generates separately. Change in mass depends on quarter part of cycle also. When cycle is in first two stages flapper valves fully opened and for remaining two



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FERROFLUID LUBRICATION OF A LONGITUDINALLY ROUGH ROTATING CIRCULAR STEP BEARING

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ABSTRACT

This investigation tries to examine the effect of magnetic fluid lubrication on the behaviour of a longitudinally rough rotating circular step bearing resorting to the stochastic model of Christensen and Tonder. The magnetic fluid flow model given by Neuringer Rosensweig is used here. The pressure distribution is obtained by solving the Reynolds type equation associated with the bearing system. Then the load carrying capacity is calculated. The graphical results presented here establish that the magnetic fluid lubrication offers significant help to the longitudinal roughness pattern to enhance the performance of the bearing system. This assistance of magnetic fluid became more favorable when the plates rotate in opposite direction.

KEYWORDS

Step bearing, roughness, ferrofluid, rotation, load carrying capacity

NOMENCLATURE

r Radial coordinate

r_o Outer radius

r_i Inner radius

$R = \frac{r}{r_o}$

$k = \frac{r_i}{r_o} = \text{Radii ratio}$

h Lubricant film thickness

\dot{h} Squeeze film velocity

μ_0 permeability of the free space

$\bar{\mu}$ Magnetic susceptibility

μ Absolute viscosity of the lubricant

$\mu^* = \frac{h^2 \mu_0 \bar{\mu}}{\mu h} = \text{Dimensionless magnetization parameter}$

p Lubricant pressure

P Non-dimensional pressure

P_s Dimensionless supply pressure

ρ Density of lubricant

S Non-dimensional rotational inertia

Ω_u Angular velocity of upper plate

Ω_l Angular velocity of lower plate

$\Omega_r = \Omega_u - \Omega_l$

$\Omega_d = \Omega_l / \Omega_u = \text{Rotation ratio}$

w Load carrying capacity

W Dimensionless load carrying capacity

Research Article

A Study of Hydromagnetic Longitudinal Rough Circular Step Bearing

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This article discusses the effect of longitudinal roughness on the performance of hydromagnetic squeeze film in circular step bearing. To characterize the random roughness of the bearing surfaces the stochastic model of Christensen and Tonder has been employed. The stochastically averaged Reynolds' type equation is solved using suitable boundary conditions to obtain the pressure distribution and then the load bearing capacity is computed. The results are presented in graphical form. The graphical results presented here establish that the hydromagnetic lubrication offers significant help to the longitudinal roughness pattern to enhance the performance of the bearing system. Of course, conductivities of the plates, standard deviation, and the supply pressure contribute towards reducing the negative effect induced by variance (+ve) and skewness (+ve).

1. Introduction

It is documented that gears, braking units, hydraulic dampers, skeletal bearings, and synovial joints make use of squeeze film mechanism. Generally an electrically conducting fluid with high thermal and electrical conductivity is applied as a lubricant for squeeze film to work under such extreme circumstances. Also, a use of external magnetic field then advances the performance of lubrication.

The performance of an oil lubricated circular step bearing is analyzed by Majumdar [1]; this study underlines the importance of radii ratio. Lin [2] discussed the couple stress effect on the performance of an externally pressurized circular step bearing. It was established that the couple stress fluid modified the performance of the bearing system. Deheri et al. [3] reformed and developed the study of Majumdar [1] to use the magnetization effect by considering a magnetic fluid as the lubricant, the flow being regulated by Neuringer–Rosensweig's model [4].

It is well known that the effect of surface roughness is quite important in different types of bearing systems. Most


of the discussions have considered the stochastic averaging method of Christensen and Tonder [5–7] who presented a stochastic model to evaluate the effect of rough surfaces. (Ting [8], Prakash and Tiwari [9], Prajapati [10], and Andharia et al. [11]).

The hydromagnetic squeeze films between two conducting rough circular plates are studied by Vadher et al. [12]. It was investigated that the negative effect of roughness got minimized up to some extent by applying magnetization. Patel and Deheri [13] evaluated the performance of ferrofluid squeeze film in rotating curved circular plates by using Shliomis model. Here, the outcomes of this article suggested that Shliomis model based ferrofluid lubrication was relatively better than the model of Neuringer–Rosensweig [4]. Patel et al. [14] extended the study of Deheri et al. [3] to study the effect of transverse surface roughness. It was indicated that the bearing performance was adversely affected by the roughness of the bearing surfaces. But the situation was found to be a little enhanced in case of variance (-ve) was considered. A modified lubrication equation for hydromagnetic

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Study of Longitudinal Roughness on Hydromagnetic Squeeze Film Between Conducting Rotating Circular Plates

Jatinkumar V. Adeshara, M. B. Prajapati, G. M. Deheri & R. M. Patel 

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Abstract

This investigation addresses the problem of squeeze film with electrical conduction between longitudinally rough surfaces and electrical lubricant in the existence of a transverse magnetic field for rotating circular plates. The surfaces are taken to be longitudinally rough in nature. In view of Christensen and Tonder's stochastic averaging method, the arbitrary irregularity of the bearing surfaces is modeled by a stochastic arbitrary inconstant with non-zero variance, skewness, and mean. The

Performance of hydromagnetic squeeze film in longitudinally rough conducting truncated conical plates

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Abstract-An attempt was made to study and analyze a hydromagnetic squeeze film's behavior between longitudinally rough conical truncated plates. A transverse magnetic field is applied. The associated equation of Reynolds is solved by investigating the behavior of performance characteristics with appropriate boundary conditions. The results show that the bearing system performance is improved vis - à - vis a bearing system that works with a conventional lubricant. The results show that longitudinal roughness in comparison with transverse roughness is more helpful. This article reveals that the negative effect induced by standard deviation can be overcome completely by the positive effect of magnetization parameter and conductivities by choosing suitable aspect ratio and semi-vertical angle in the case negative skewed roughness.

Index Terms- Truncated Conical plates, squeeze film, longitudinal roughness, conductivity, load bearing capacity.

1. INTRODUCTION

A number of theoretical and experimental analyzes on the hydromagnetic lubrication of plane metal bearings (Elco-Huges [8], Kuzma [11], Kuzma et al. [12], Dodge et al [7]). Shukla [18] dealt with the hydromagnetic squeeze film bearing for conducting lubricants between non conducting non-porous surfaces in the presence of a transverse magnetic field. Shukla -Prasad [19]. The performance of a hydromagnetic squeeze film between non - porous surfaces was discussed and the effect of surface conductivity on the performance of the bearing system was studied. Sinha -Gupta [20] investigated the hydromagnetic effect of annular plates on porous squeeze films. Patel - Hingu[14] investigated this effect of squeezing films between circular disks. Patel-Gupta [13] used Morgan Cameron approximation and simplified this analysis to carry out hydromagnetic squeeze films between parallel plates with different geometric shapes. For squeeze films between porous plates, Prakash-Vij [17] investigated the load carrying capacity and time height relationship. In this article, several geometries were incorporated, such as circular, annular, elliptical, rectangular, conical and truncated conical plates. The performance of a hydromagnetic squeeze film between two porous conical plates was considered by Prajapati[16]. The study of magnetic fluid - based squeeze film behavior between porous conical plates was presented by Patel Deheri[15]. It was concluded here that the magnetic fluid and the

cone's semi - vertical angle played key roles to enhance the bearing system performance.

Tzeng and Saibel[23] documented the random character of the roughness and presented stochastic concepts and managed to analyze a two - dimensional inclined slider bearing with one - dimensional roughness in the transverse direction to the sliding direction. Many researchers studied the effect of surface roughness (Davies[6], Tonder[22], Christensen- Tonder[3,4,5], Berthe - Godet[2] established and modified the Tzeng and Saibel approach[23] and proposed a comprehensive general analysis for both transverse and longitudinal roughness of the surface. The approach of Christensen and Tonder was the basis for the study of the effect of surface roughness in a number of investigations (Ting [21], Guha[9], Gupta and Deheri[10], Andharia, Gupta and Deheri[11]).

Vadher et al [24] have recently studied and analyzed the hydromagnetic squeeze film behavior between conducting porous transversely rough triangular plates and it has been established that the negative effect of porosity and roughness could be neutralized to some extent by the positive effect of hydromagnetization in the case of negative skewed roughness.

The longitudinal roughness pattern was subjected to investigation in Andharia and Deheri [25, 26, 27]. Transverse roughness pattern in the presence of a magnetic fluid has been the matter of investigation in Lin et. al. [28].



An effective validated method for HPTLC-fingerprinting of alkaloids and glycosides from multiple plant parts of three *Terminalia* spp.

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Our study developed a HPTLC fingerprint profile of alkaloids and glycosides obtained from the methanol extracts of four different plant parts of *Terminalia arjuna*, *T. bellerica* and *T. chebula*, trees with cardio-protective values. The multiple qualitative phytochemical analyses of water, acetone, petroleum ether and methanol extracts from all the plant parts of *Terminalia* spp. detected the presence of alkaloids and glycosides, wherein the methanol extracts exhibited the presence of maximum alkaloids and glycosides. The chromatographic analysis of methanol extracts was carried out on silica gel 60F₂₅₄ HPTLC aluminium sheets with CAMAG Linomat 5 applicator. The plates were developed using ethyl acetate:toluene:formic acid (10:10:1; v/v/v) mobile phase. Alkaloids and glycosides were detected at 254 nm, 366 nm and 540 nm (after derivatization). These developed fingerprints would eventually be of great benefit in identifying or differentiating the alkaloids and glycosides in the form of marker compounds in the three *Terminalia* spp. mentioned.

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Original Articles

Association of body fat with stress levels and dietary intakes in Indian women

Pinal A. Patel , Prerna P. Patel, Shashi A. Chiplonkar, Ashish D. Patel & Anuradha V. Khadilkar

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ABSTRACT

A cross-sectional study of 605 women (aged 18–50 years) conducted from January 2013 to June 2014 in Gujarat, India assessed stress, dietary intakes and body fat percentage (PBF), and the inter-relationship of PBF with stress, dietary fat, and carbohydrates. The population was categorized according to PBF cutoffs for Asians. A generalized linear regression model adjusted for age was performed to assess the

relationship of stress, fat, and carbohydrate intakes with PBF. PBF had a significant positive association with stress level ($n = .02$) and carbohydrate intake ($n = .008$): fat

***Elasmopus sivaprakasami* sp. nov., a new species of amphipod (Senticaudata, Maeridae) from Gujarat State, India**

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Keywords: Amphibia, Amphipoda, *Elasmopus*, taxonomy, new species, marine, India

Abstract

A new species of amphipod, *Elasmopus sivaprakasami* sp. nov., is described from India. It is found to be conspecific with material described from southern India nearly fifty years previously, but attributed at that time to a species described from Japan.

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ABSTRACT

Newly Synthesized Copper (II) Complexes with 2-(benzo[d]thiazol-2-ylthio)-N-(2-hydroxybenzylidene) acetohydrazide (BTHBA) and 2-((1,3-diphenyl-1H-pyrazol-4-yl)methylene) hydrazinecarbothioamide (DPPMHC) and their DNA binding and Antioxidant Activities

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ABSTRACT

The novel Cu(II) metal complexes synthesized from two heterocyclic Schiff base ligands 2-(benzo[d]thiazol-2-ylthio)-N-(2-hydroxybenzylidene)acetohydrazide (BTHBA) and 2-((1,3-diphenyl-1H-pyrazol-4-yl)methylene) hydrazinecarbothioamide (DPPMHC) have been described. Schiff base ligands and metal complexes are characterized by various spectroscopic techniques. The FTIR and UV-Vis analysis confirmed the Cu and ligand bonding where a decrease in UV absorbance for complexes compared with pure copper acetate showed the transitions. The conductance values are low but showing their electrolytic nature. DNA binding testing the complexes have shown good binding nature which reveals their anticancer nature. Complexes have also shown their antioxidant nature against DPPH which shows their medicinal importance.

Keywords : Metal, Ligand, DNA binding, Antioxidant.

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Isolation, Characterization and Activity of Amidase Producing *Paenibacillus Polymexa* from Semi Arid Soils

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Abstract: Soil samples from different locations were collected and the amidase producing organisms were isolated by enrichment culture method in soil extract medium using acetamide as sole source of C and N and incubating at 37°C. A total of 29 bacterial isolates were obtained. Eight strains showed amidase production. The highest amidase producing strain (HSS22) was revealed as *Paenibacillus polymexa*. Acetamide containing mineral salt media when supplemented with Sodium citrate for *P. polymexa* resulted in higher growth of bacteria but addition of NaCl did not show remarkable effect on bacterial growth, this indicated that amides could be efficiently utilized as N source. Isolate *P. polymexa* was found to show highest amidase activity (19.34 U/ml) among the nine amidase producing isolates. The pH tolerance, temperature and amidase production capabilities of *P. Polymexa* were compared. It was found that *P. polymexa* was able to grow at temperature of 37°C, the pH 8.0, whereas another six isolates showed amidase activity in the pH range of (6.0-9.0) and temperature (30°C) thus *P. polymexa* was selected for subsequent studies. The results for enzyme activity under the performance of different physiochemical conditions and purification as well as molecular weights are recorded and discussed.

Keywords: Amidase, Soil Samples, Bacteria, Physiochemical condition, Purification.

I. INTRODUCTION

An amidase (EC 3.5.1.4), acylamidases, acylase (misleading), amidohydrolase (ambiguous), deaminase (ambiguous), fatty acylamidases, N-acetylaminohydrolase (ambiguous) are enzymes that catalyze the hydrolysis of an amide.

Amidase (Richards & Rolinson, 1961) act on the peptide linkage of the prosthetic group. Amidase belongs to the Family of hydrolyses, those acting on carbon-nitrogen bonds other than peptide bonds, specifically in linear amides. These enzymes are involved in nitrogen metabolism in cells and are widely distributed in nature. They have been found in prokaryotic and eukaryotic cells. (Kotlova *et al.*, 1998) This enzyme utilizes two substrates, which are monocarboxylic acid amide and H₂O and result in the formation of monocarboxylate and NH₃.

In enzymology, an amidase (EC 3.5.1.4), acylamidase, acylase (misleading), amidohydrolase (ambiguous), deaminase (ambiguous), fatty acylamidase, N-acetylaminohydrolase (ambiguous) are enzyme that catalyze the hydrolysis of an amide.

A. Potential Applications Of Amidase

- 1) Food industry
- 2) Waste treatment
- 3) Production of acrylic acid
- 4) Biosynthesis of hydroxamic acids
- 5) Production of nicotinic acid
- 6) Peptide synthesis
- 7) Production of amino acids and their derivatives

II. MATERIALS AND METHOD

A. Collection Of Soil Sample

The soil samples for the isolation of amidase producing bacteria were collected from different fields viz., cultivated soil – Farm of Unjha district, Non- Cultivated soil – garden of Gandhinagar district, Arid soil – Santalpur and High saline soil – white desert, Kutch district. The pH of all sites was between 6.0 and 7.5. Samples were brought to the laboratory and were kept at 4°C in refrigerator till further processing.



Short Communication

In vitro regeneration of *Chlorophytum borivillianum* Santapau & R.R. Fern.

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ABSTRACT

An efficient *in vitro* regeneration protocol was established from *ex vitro* leaf explants of *Chlorophytum borivillianum* Santapau & R.R. Fern. Callus induction was achieved on Murashige and Skoog (MS) basal medium supplemented with 0.7 μ M N⁶-benzylaminopurine (BAP) and 0.7 μ M 2,4-dichlorophenoxy acetic acid (2,4-D). A round 70% calli regenerated into multiple (~7) shoots with an average length of 6.5 mm when the same were subcultured on 0.7 μ M BAP and 0.7 μ M 2,4-D. Interestingly, higher (0.8-0.9 μ M) or lower (0.4-0.6 μ M) concentrations of BAP and 2,4-D than the optimized one (0.7 μ M) resulted in reduced regeneration with fewer shoots of shorter length. For *in vitro* rooting of shoots, various combinations of MS with BAP, 6-furfurylaminopurine (Kn) and α -naphthalene acetic (NAA) proved fruitful in comparison to MS without any plant growth regulator; though MS fortified with 3.5 μ M BAP + 0.2 μ M Kn + 6.8 μ M NAA generated a maximum number (25.9) of *in vitro* roots per shoot. The regenerated plantlets were acclimatized (with ~90% survival) in a mixture of vermiculite, soil and organic matters (1:1:1; v/v/v). The present study established a reproducible practice on *in vitro* organogenesis that can be suggested for large-scale clonal propagation and an alternative source of steroidal alkaloids.

Keywords: Acclimatization, callus, rooting, safed musli, shoot organogenesis

Abbreviations: 2,4-D: 2,4-dichlorophenoxy acetic acid; BAP: N⁶-benzylaminopurine; Kn: 6-furfurylaminopurine; MS: Murashige and skoog; NAA: α -naphthalene acetic acid; PGR: plant growth regulator

Chlorophytum borivillianum Santapau & R.R.Fern., a well recognized medicinal plant that belongs to family, Anthericaceae, is described as a 'white gold' or 'Divya Aushadi' in Indian traditional systems of medicine. It is more popular with the trade name 'Safed Musli' (Maiti and Geetha, 2005). Out of more than 200 species of genus *Chlorophytum*, allocated around tropical world (predominantly in India and Africa) (Govaerts *et al.*, 2012), *C. borivillianum* exhibited maximum level of steroidal saponin even up to 17% of its dry weight featured on genotype (Bordia *et al.*, 1995). In Ayurveda, it comes under the group of 'Vajikaran Rasayana' owing to the aphrodisiac potential of its bioactive elements. It contains β -sitosterol, stigmasterol, sarasapogenin and diosgenin (Vidhu *et al.*, 2009). The root is preferred in the conventional system of medicine as a source of multiple

steroidal alkaloids. It is traded worldwide from local to global levels and its International demand has been assessed as 300-700 tons per annum, an amount that transcends its natural population (Haque *et al.*, 2011). This species has been listed in IUCN Red List due to the indiscriminate exploitation of its natural population for industrial isolation of steroidal elements. Recently, this species is evaluated as Critically Endangered species based on criterion A2cd ver. 3.1, as it has declined by 80% over a period of ten years (Ved *et al.*, 2015). An alternative approach for production of steroidal elements of the plant is indispensable that can complement the conventional seed-based (merely 5-13% germination) or vegetative (sluggish) propagation system. Keeping this in view, the present study aimed at *in vitro* induction of callus and its regeneration into shoot and root

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BIOCHEMICAL STUDIES OF DIFFERENTIATING CALLUS CULTURES OF *OROXYLUM INDICUM* (L.) VENT.

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Abstract

Some biological parameters in respect to total sugar, protein, total amino acid, peroxidase, Polyphenol oxidase and IAA oxidase activity were determined during the process of shoot regeneration in the callus culture of *Oroxylum indicum* (L.) Vent. Following stages were taken into consideration to describe biochemical changes: callus, differentiating green callus, callus with shoot primordia, differentiating callus with multiple shoots and shoots of 6 month old plant. *In vivo* leaf used as control. Reducing sugar and amino acid found increased during initial stage and play important role during the *in vitro* growth and differentiation. Whereas, protein was found higher in differentiated stage and shows rapid structural build up. The biochemical changes in terms of enzyme activities varied during different stages of *in vitro* organogenesis.

Key words: *Oroxylum indicum*, biochemical, metabolites

Introduction

Oroxylum indicum (L.) Vent., belongs to the Bignoniaceae family grows wild in India, Sri Lanka, Phillipines and Indonesia (Anonymous, 1972), at an altitude of 1200m and found mainly in ravine and moist place in the forests (Bennet *et al.*, 1992; Dey, 1980). Every parts of this plant possesses medicinal importance. For high medicinal value, it is collected from its natural habitat in indiscriminate manner, so, this plant become vulnerable in Kerala, Maharashtra, M.P. and Chhatisgarh (Darshan and Ved, 2003; Jayaram and Prasad, 2008). A short span of viability and low germination rate, restrict the propagation of *Oroxylum indicum* by seeds (Dwivedi and Boro, 2012). Various bioactive compounds like chrysin, oroxylin-A, scutellarin, baicalcin are present in stem bark and leaves (Sankara and Nair, 1972-a; Sankara and Nair, 1972-b). Seeds of this plant are reported to contain ellagic acid (Vasanth *et al.*, 1991). The plant is used in many Ayurvedic preparations like Dasamoola, Chyawanaprasha, Brahma rasayana, Narayana Taila, Awalwha and Dantyardarishta (Anonymous, 1998).

Plant has several biochemical processes starting from germination till the end of plant life. The growth speed,

types, development patterns at every stage is highly controlled by some total of biochemical pathways where it is in *ex vitro* or *in vitro* growth condition. Biochemical attributes are indicators of morphogenetic potential, growth and differentiation, representing differential gene action or expression or change in endogenous level of growth regulators in cell cultures and are used for analysis of gene function and metabolic regulation (Scandalios, 1974; Carrillo and Mata, 2000). Many investigations have been made about the physiological changes taking place during organogenesis in callus culture (Saka and Macda, 1974; Ross *et al.*, 1973; Malik and Kumari, 1977; Santos *et al.*, 2008; Cheniany *et al.*, 2010). Estimation of different metabolites like sugars, protein, amino acid and oxidative enzymes are interpreted to understand of mobilization and utilization of storage reserves. Hence, present study was an attempt to observed biochemical changes during *in vitro* organogenesis of *Oroxylum indicum* (L.) Vent.

Materials and Methods

Callus cultures were derived from leaf obtained from 20-25 days old seedling on MS (Murashige and Skoog, 1962) medium supplemented with different concentration of BAP with IAA. For morphogenesis and shoot differentiation, callus was transferred on same medium with same hormonal concentration and combination. All

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High Performance thin layer chromatographic quantification of key cholesterol reducing compound (β -sitosterol) from leaf, bark, fruit and root of *Terminalia arjuna*, *T. bellerica* and *T. chebula*

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Online published on 12 January, 2018.

Abstract

The present study aims at comprehensive production and quantification of the steroid β -sitosterol: a cholesterol reducer, extracted from the leaf, bark, fruit and root of three species of *Terminalia* (namely, *T. arjuna*, *T. bellerica* and *T. chebula*) by means of high performance thin layer chromatography (HPTLC). The fingerprinting analysis operated on silica gel 60F₂₅₄ HPTLC aluminium sheets with CAMAG Linomat 5 sample applicator projected a pH range of 0.63 to 0.69 with a linearity regression equation $Y = 3464.522 + 78570 \times X$ for β -sitosterol. The r -value appeared for this equation was 0.99495 with sdv of 4.37 screened at 540 nm. Moreover, the limit of detection and limit of quantification values of β -sitosterol were 200 ng/spot and 600 ng/spot, respectively; evincing the HPTLC technique to be a robust one. The quantified values of β -sitosterol was maximal (7.798 ng/ml) in fruits of *T. arjuna*, followed by 4.113 ng/ml in bark of *T. bellerica*. The bark of *T. chebula* also confirmed to possess 2.789 ng/ml of β -sitosterol. Except the fruits and roots, all other parts of *T. chebula* possessed relative quantity of β -sitosterol. Thus, the present quantification would be of much help in the production of β -sitosterol in *Terminalia* species.

Keywords

 β -sitosterol, HPTLC, Quantification, *Terminalia*.

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
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Interrelationship between serum 25-hydroxyvitamin D₃ concentration and lipid profiles in premenopausal Indian women

Pinal A. Patel, Prerna P. Patel, Zulf Mughal¹, Raja Padidela¹, Ashish D. Patel, Vivek Patwardhan², Shashi A. Chiplonkar², Vaman Khadilkar², Anuradha Khadilkar²

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ABSTRACT

Context: Vitamin D deficiency is prevalent worldwide, and observational studies have associated it with an atherogenic lipid profile. **Aim:** To determine the interrelationship between Vitamin D and lipid profile in apparently healthy premenopausal Indian women, considering confounding factors such as lifestyle that independently influence lipids. **Setting and Design:** Cross-sectional study. **Subjects and Methods:** One hundred and twenty healthy premenopausal women (20–45 year) were recruited from Gujarat, India. Data were collected on anthropometry, physical activity, sunlight exposure, and diet. Fasting blood samples were collected for the measurement of serum 25-hydroxyvitamin D₃ (25[OH]D), parathyroid hormone, and lipid profile. **Statistical Analysis:** Pearson's correlation coefficient was used to derive correlation between serum 25(OH)D concentrations and serum lipids. **Results:** Ninety-three percent women showed Vitamin D deficiency (serum 25[OH]D < 20 ng/ml). Serum 25(OH)D concentrations showed significant inverse correlation with total cholesterol (TC) ($r = -0.202, P = 0.027$), triglycerides (TG) ($r = -0.284, P = 0.002$), and low-density lipoprotein-cholesterol (LDL-C) ($r = -0.184, P = 0.044$) and positive correlation with high-density lipoprotein-cholesterol (HDL-C) ($r = 0.250, P = 0.006$). On dichotomizing the population according to median 25(OH)D concentration (11.1 ng/dl), no significant differences were observed between the groups for anthropometry, sunlight exposure, and lifestyle. Serum lipid profiles were significantly different, above median serum 25(OH)D concentration group showed favorable serum lipids (TC: 179.3 ± 30 vs. 191.8 ± 31.7 mg/dl; TG: 140 ± 39.1 vs. 165.5 ± 53.4 mg/dl; LDL-C: 100 ± 30.2 vs. 112 ± 32 mg/dl; HDL-C: 53 ± 14 vs. 47.6 ± 9.3 mg/dl) ($P < 0.05$). **Conclusions:** This study demonstrates that association of 25(OH)D concentrations with lipid profile even after considering lifestyle factors which independently influence lipids. Intervention trials would be required to prove this association to be causation.

Key words: Cholesterol, lifestyle factors, lipoprotein, triglycerides, Vitamin D

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INTRODUCTION

Vitamin D is a fat-soluble vitamin and a prohormone which has two isoforms, ergocalciferol (Vitamin D₂) available from

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Research Article

Optimization of Oil Extraction from *Jatropha* Waste Using Response Surface Methodology

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Received: 23 February 2016; Revised: 12 March 2016; Accepted: 15 March 2016

Abstract: Enzymatic oil extraction from *Jatropha curcas* was performed using bacterial strain. The optimization was done by Response Surface Methodology (RSM) for pH, temperature, shaking speed and incubation time. For this Central Composite Design (CCD) was used for laboratory experiment. The response surface method was analyzed using Design Expert version 9.0.5 (Stat-Ease, Inc.) software. In this experiment shaking speed-incubation time; pH-temperature; temperature-incubation time were significant but shaking speed-pH; shaking speed-temperature; pH-incubation time were not significant ($P < 0.05$). From the experiment the optimum conditions for maximum oil yield (8.96%) were shaking speed 100 rpm, pH 5.0, temperature 37°C and incubation time 48 hrs. ANOVA statistics showed that experimental data had correlation coefficient (R^2) of 0.8596 with calculated model. The Coefficient of Variance (CV) recorded to be 11.01%. From this experiment it can be concluded that the central composite design was fit for this study and response surface method was appropriate method for optimization process.

Keywords: ANOVA statistics, Central Composite Design, Enzymatic oil extraction, *Jatropha curcas*, Response Surface Methodology.

 Article Text

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Original article



Dietary calcium intake influences the relationship between serum 25-hydroxyvitamin D₃ (25OHD) concentration and parathyroid hormone (PTH) concentration

Prerna Patel¹, M Zulf Mughal², Pinal Patel¹, Bhругu Yagnik³, Neha Kajale⁴, Rubina Mandlik⁴, Vaman Khadilkar⁴, Shashi A Chiplonkar⁴, Supriya Phanse⁴, Vivek Patwardhan⁴, Ashish Patel¹, Anuradha Khadilkar⁴

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Abstract

Objectives To investigate whether dietary calcium intake will modify the relationship between serum 25-hydroxyvitamin D₃ (25OHD) with intact serum parathyroid hormone (PTH) concentrations in apparently healthy Indian adolescents.

Study design Cross-sectional study.

Setting and participants Apparently healthy adolescents aged 10–14 years (n=181), from Gujarat, western India. Study conducted from January 2012 to March 2014.

Methods Serum 25OHD concentrations and intact serum PTH concentrations (both using chemiluminescent microparticle immunoassay) were measured. Diet was recorded through 24 h diet recall and calcium intake was computed (C-diet V.2.1). To assess relationship between 25OHD and PTH, data were dichotomised according to median calcium intakes (520 mg/day) and relationship between serum 25OHD and PTH in the two subgroups was plotted.

Results Subjects with calcium intakes above median (>520 mg/day) had lower intact serum PTH values for given serum 25OHD concentration while those with calcium intakes below median (<520 mg/day) had higher intact serum PTH values for given serum 25OHD concentration. Serum 25OHD concentration was negatively correlated with intact serum PTH concentration at lower as well as higher calcium intakes

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ICV 2011: 5.09

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NAAS Rating

2012 : 1.3;

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SJIF 2012: 3.947,

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EFFECT OF SIEVING ON MICROBIAL BIOMASS-C AND N IN SOIL OF PATAN, GUJARAT, INDIA

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Corresponding author's e-mail: hodmicrobiology@gmail.com

ABSTRACT:

Large soil particle favors environment to the microbial biomass to carry out their activities of soil particles tend to moisture that helps microbial activity. As Compactness increase with large clay fraction due to smearing effect that results in lowered activity if microbial biomass. Present study also give the picture of biomass effect by C/N ration with environmental condition and also by sieving of sample.

KEY WORD: *Biomass, Soil fraction, Soil properties.*

INTRODUCTION:

Soil microbial biomass is a labile pool of soil organic matter which actively makes available plant available nutrients through degradation and decomposition process. The activities of the constituent microorganisms are governed by available moisture which in turn is a function of soil physical properties. The texture of soil also has influence on turnover of nutrients through microbial biomass. Present investigations were carried out to study the effect of sieving on microbial biomass. Large soil particle favors environment to the microbial biomass to carry out their activities as these soil particles tend to moisture that helps microbial activity. As

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Interrelationship between serum 25-hydroxyvitamin D₃ concentration and lipid profiles in premenopausal Indian women : Indian Journal of Endocrinology and Metabolism

Jan-Feb 2017 - Volume 21 - Issue 1

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Original Article

Interrelationship between serum 25-hydroxyvitamin D₃ concentration and lipid profiles in premenopausal Indian women

Patel, Pinal A.; Patel, Prerna P.; Mughal, Zulf¹; Padidela, Raja¹; Patel, Ashish D.; Patwardhan, Vivek²; Chipplonkar, Shashi A.²; Khadiilkar, Vaman²; Khadiilkar, Anuradha²

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A new pea crab species of the genus *Arcotheres* Manning, 1993 (Crustacea: Decapoda: Brachyura: Pinnotheridae) from India

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DOI: <https://doi.org/10.11646/zootaxa.4433.1.13>

Keywords: Crustacea, Pinnotheridae, new species, dactylus length, Gulf of Mannar, India

Abstract

A new species of pinnotherid crab, *Arcotheres shahi* n. sp., is described on the basis of specimens collected during a crustacean survey along the coastal areas of Pamban fishing harbor in the Gulf of Mannar, Tamil Nadu state, east coast of India. The new species resembles *A. pernicola* (Bürger, 1895), *A. winckworthi* (Gordon, 1936) and *A. rayi* Ahyong & Ng, 2007, in having the dactyli of the longer fourth pereopod longer than that of fifth pereopod. *Arcotheres shahi* n. sp. differs from these three known species in the shape of female carapace, frontal region and chela, setal pattern on the dactyli of the fourth and fifth pereopods and relative length of the ambulatory pereopods.

Redescription of *Arcotheres placunae* (Hornell & Southwell, 1909) (Crustacea: Decapoda: Brachyura: Pinnotheridae) from India and Pakistan

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PETER K. L. NG

Lee Kong Chian Natural History Museum, Faculty of Science, National University of Singapore, 2 Conservatory Drive, 117377 Singapore.

DOI: <https://doi.org/10.11646/zootaxa.4433.1.2>

Keywords: Crustacea, taxonomy, pea crab, *Placuna placenta*, type locality, Gulf of Kachchh, Gujarat, South Asia

Abstract

The identity of *Arcotheres placunae* (Hornell & Southwell, 1909) (Pinnotheridae), a pea crab associated with the window pane shell, *Placuna placenta*, has been confused as the types are lost and the original figures are inaccurate and do not match the description given of the species. In the present study, fresh specimens of the species were collected from the type locality (Gulf of Kachchh, Gujarat, India), and the species is here redescribed and refigured, and its affinities with similar species is discussed. To stabilize the taxonomy of *A. placunae*, a neotype is chosen from amongst the fresh material.

Home / Archives / Vol. 4502 No. 1: 19 Oct. 2018 / Monograph

An annotated checklist of the marine brachyuran crabs (Crustacea: Decapoda: Brachyura) of India

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Lee Kong Chian Natural History Museum, Faculty of Science, National University of Singapore, 2 Conservatory Drive, 117377 Singapore, Republic of Singapore.

DOI: <https://doi.org/10.11646/zootaxa.4502.1.1>

Keywords: Crustacea, new records, biodiversity, crustacean fauna, coastal areas

Abstract

An annotated checklist of the marine brachyuran crabs occurring in India is compiled from published literature and augmented by collections between 2005 and 2015. A total of 910 species belonging to 361 genera and 62 families are herein listed from Indian waters. Specimens representing 130 species were obtained from Gujarat state during 2005 and 2015, of which 23 are new records to Gujarat state and two species are reported for the first time from the west coast of India. The highest number of species were recorded from the Andaman and Nicobar islands (588 species) while the smallest number were from Goa and Karnataka state (82 species). The records indicate that the east coast of India, with 803 species, is more diverse than the west coast, which has 446 species.



Isolation, Characterization and Activity of Amidase Producing *Paenibacillus Polymexa* from Semi Arid Soils

H.s.surti¹, V.C. Solank², A.T. Thakkar³, S.A.bhatt⁴
^{1, 2, 3, 4} Dept. of Life Sciences, HNGU, Patan

Abstract: Soil samples from different locations were collected and the amidase producing organisms were isolated by enrichment culture method in soil extract medium using acetamide as sole source of C and N and incubating at 37°C. A total of 29 bacterial isolates were obtained. Eight strains showed amidase production. The highest amidase producing strain (HSS22) was revealed as *Paenibacillus polymexa*. Acetamide containing mineral salt media when supplemented with Sodium citrate for *P. polymexa* resulted in higher growth of bacteria but addition of NaCl did not show remarkable effect on bacterial growth, this indicated that amides could be efficiently utilized as N source. Isolate *P. polymexa* was found to show highest amidase activity (19.34 U/ml) among the nine amidase producing isolates. The pH tolerance, temperature and amidase production capabilities of *P. Polymexa* were compared. It was found that *P. polymexa* was able to grow at temperature of 37°C, the pH 8.0, whereas another six isolates showed amidase activity in the pH range of (6.0-9.0) and temperature (30°C) thus *P. polymexa* was selected for subsequent studies. The results for enzyme activity under the performance of different physiochemical conditions and purification as well as molecular weights are recorded and discussed.

Keywords: Amidase, Soil Samples, Bacteria, Physiochemical condition, Purification.

I. INTRODUCTION

An amidase (EC 3.5.1.4), acylamidases, acylase (misleading), amidohydrolase (ambiguous), deaminase (ambiguous), fatty acylamidases, N-acetylaminohydrolase (ambiguous) are enzymes that catalyze the hydrolysis of an amide. Amidase (Richards & Rolinson, 1961) act on the peptide linkage of the prosthetic group. Amidase belongs to the Family of hydrolyses, those acting on carbon-nitrogen bonds other than peptide bonds, specifically in linear amides. These enzymes are involved in nitrogen metabolism in cells and are widely distributed in nature. They have been found in prokaryotic and eukaryotic cells. (Kotlova *et al.*, 1998) This enzyme utilizes two substrates, which are monocarboxylic acid amide and H₂O and result in the formation of monocarboxylate and NH₃. In enzymology, an amidase (EC 3.5.1.4), acylamidase, acylase (misleading), amidohydrolase (ambiguous), deaminase (ambiguous), fatty acylamidase, N-acetylaminohydrolase (ambiguous) are enzyme that catalyze the hydrolysis of an amide.

A. Potential Applications Of Amidase

- 1) Food industry
- 2) Waste treatment
- 3) Production of acrylic acid
- 4) Biosynthesis of hydroxamic acids
- 5) Production of nicotinic acid
- 6) Peptide synthesis
- 7) Production of amino acids and their derivatives

II. MATERIALS AND METHOD

A. Collection Of Soil Sample

The soil samples for the isolation of amidase producing bacteria were collected from different fields viz., cultivated soil – Farm of Unjha district, Non- Cultivated soil – garden of Gandhinagar district, Arid soil – Santalpur and High saline soil – white desert, Kutch district. The pH of all sites was between 6.0 and 7.5. Samples were brought to the laboratory and were kept at 4°C in refrigerator till further processing.

Home / Archives / Vol. 4706 No. 4: 11 Dec. 2019 / Article

Redescription of *Arcotheres pernicola* (Bürger, 1895) (Crustacea: Decapoda: Brachyura: Pinnotheridae) from the oyster *Magallana gryphoides* (Schlotheim, 1820) in India

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PETER K. L. NG

Lee Kong Chian Natural History Museum, Faculty of Science, National University of Singapore, 2 Conservatory Drive, 117377 Singapore.

DOI: <https://doi.org/10.11646/zootaxa.4706.4.8>

Keywords: pea crab, *Perna*, rocky shore, Maharashtra, Crustacea

Abstract

The identity of *Arcotheres pernicola* (Bürger, 1895) (Pinnotheridae), a pea crab supposedly associated with the mussel *Perna*, has been unclear as the type specimen is in poor condition. Specimens collected from the oyster *Magallana gryphoides* (Schlotheim, 1820) from Alibaugh, Maharashtra state, India, are here referred to *A. pernicola* and the species is redescribed and refigured. Its affinities with allied congeners are also discussed.

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Isolation, Identification, Characterization and Optimization of Amylase producing organisms from sacred groves of Mahesana District

Prajapati, H V; Prajapati, D D; Bhatt, S A.

Asian Journal of Research in Pharmaceutical Science; Raipur Vol. 11, Iss. 1, (Mar 2021).

Full text preview

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(2) Dept. of Life.Science, Hemchandracharya North Gujarat University, Patan, India.

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ABSTRACT:

Amylase is the most widely used Food, fermentation, Starch processing, textile and papermaking. This research was conducted to isolate and identify a local amylase producing bacteria from sacred groves soil and characterize, Bacteria from soil were primarily screened on starch agar medium and out of 49 isolates, 15 were found to be amylase producers, The isolates were screened based on their clear zone ratio, enzyme activities The best isolate demonstrated an enzyme activity of MH-31, MH-48 and MH-43, It was then identified by a combination of biochemical tests, morphological and microscopic characteristics along with 16S rRNA gene sequencing from all six isolate the optimization Temp-35°C, pH-7, Carbon source-Glucose, Nitrogen Source-Yeast extract, salt Concentration: 3 this all condition were recooded.



Original Research Article

<https://doi.org/10.20546/ijcmas.2021.1002.184>

Study of Metabolic Diversity (Enzymatic Diversity) of *Pantoea dispersa*

Dipika Pandya^{1*}, Vikram Solanki¹, S. G. Patel² and S. A. Bhatt¹

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²Department of Plant Pathology, College of Agriculture, NAU, Bharuch Campus, India

*Corresponding author

ABSTRACT

Pantoea belong to a large group of organisms of the Enterobacteriaceae family, also called enteric bacilli. Enzymes are biocleaning agent without harmfully affecting environment. *Pantoea dispersa* are found with these potential which are metabolically diverse and produce different kinds of enzymes likes chitinase, CGTase, Pectinase, xylanase, Protease, L-Glutaminase etc. Extensive uses of agrochemicals create environmental pollution and severely affect living organisms. *Pantoea* has potential degrade harmful environmental pollutants. In present study nine different enzymes are selected for enzymatic profiling of *Pantoea dispersa*. Antimicrobial activity with different antibiogram was performed to check the sensitivity for the isolates. Qualitative assessment of these enzymes is carried out by standard protocol in which particular substrate of enzymes is used. Enzymatic activity was observed with the zone of utilization. Result of the study indicates that *Pantoea dispersa* is metabolically versatile as it produce all the enzymes viz., chitinase, xylanase, pectinase, CGTase, L-Glutaminase, protease, glycosidase and cellulase. Result of antibiotic sensitivity show that *Pantoea dispersa* was sensitive against all the beta lactum group of antibiotic and some of the macrolide and glycoside group of antibiotics at given concentration.

Keywords

Chitinase, CGTase,
Xylanase, Pectinase

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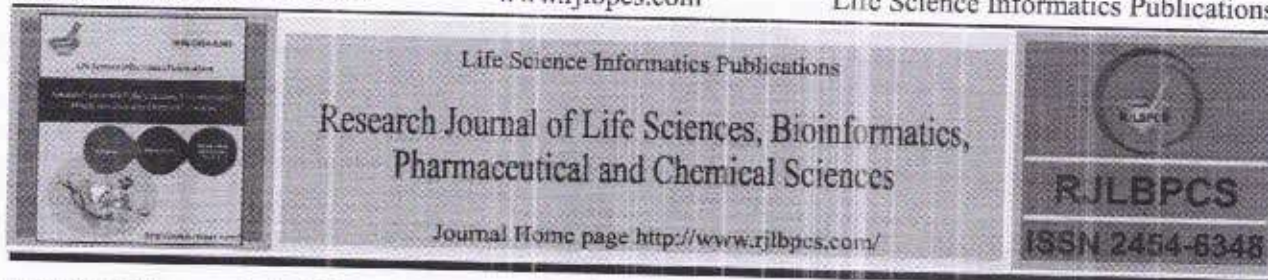
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Introduction

The genus *Pantoea* is a diverse group of yellow-pigmented, rod-shaped Gram-negative bacteria in the *Enterobacteriaceae*. Some of the first members were recognized as plant pathogens causing galls, wilting, soft rot and necrosis in a variety of agriculturally relevant plants, but since then, *Pantoea* strains have

been frequently isolated from many aquatic and terrestrial environments, as well as in association with insects, animals and humans (Dutta *et al.*, 2015; Adinarayana *et al.*, 2003). Some *Pantoea* isolates produce antimicrobials, and have been developed into commercial biocontrol products, such as BlightBan C9-1 and Bloomtime Biological, to help control fire blight of apple and pear trees



Original Research Article

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3d-TRANSITION METAL CHELATES OF SCHIFF BASE LIGAND: SYNTHESIS, CATALYSIS AND ANTIBACTERIAL STUDY

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ABSTRACT: Three metal chelates were synthesized by using metal perchlorates of divalent nickel, cobalt and copper with schiff base (HL). The schiff base ligand (HL) furnished O and N donor atoms for ligation. It has been prepared from anthranilic acid and ortho hydroxybenzaldehyde in ethanol. Techniques like elemental analysis, FT-IR, UV-Visible and mass spectrometry, thermal analysis, molar conductance and magnetic susceptibility were carried out to identify the chelate compounds. General formula of $[M(HL)OH]$ type in all cases was proposed by the spectral and elemental analysis. The ratio of ligand to metal has been found as 1:1 for all metal chelates. Infrared spectral data implied the inclusion of oxygen (of COOH and phenolic OH) and azomethine nitrogen in tridentate coordination mode with central metal ion. The study of conductivity measurement indicated the nonelectrolytic nature of chelates. Catalysis by these chelates was studied. The activation energy for the synthesized metal chelates were evaluated by the broido method. Antibacterial property was examined for all metal chelates and its parent ligand against gram positive (*B. subtilis*, *B. cereus*) and gram negative (*E. coli*, *P. aeruginosa*) bacterial species.

KEYWORDS: Schiff base, Metal chelates, Catalysis and Antibacterial activity

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1. INTRODUCTION

Schiff bases are considered as great chelating agents due to their straightforwardness of formation, particular property of azomethine group as well as flexibility of synthesis. Schiff bases, due to azomethine (R-HC=N-R') group are extremely important for chemical and pharmaceutical industries. The presence of a lone pair of sp^2 hybridized orbital in azomethine nitrogen atom found

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High Performance thin layer chromatographic quantification of key cholesterol reducing compound (β -sitosterol) from leaf, bark, fruit and root of *Terminalia arjuna*, *T. bellerica* and *T. chebula*

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Abstract

The present study aims at comprehensive production and quantification of the sterol β -sitosterol: a cholesterol reducer, extracted from the leaf, bark, fruit and root of three species of *Terminalia* (namely, *T. arjuna*, *T. bellerica* and *T. chebula*) by means of high performance thin layer chromatography (HPTLC). The fingerprinting analysis operated on silica gel 60F₂₅₄ HPTLC aluminium sheets with CAMAG Linomat 5 sample applicator projected a pH range of 0.63 to 0.69 with a linearly regression equation $Y = 3464.522 + 78570 \cdot X$ for β -sitosterol. The r -value appeared for this equation was 0.99495 with sdv of 4.37 screened at 540 nm. Moreover, the limit of detection and limit of quantification values of β -sitosterol were 200 ng/spot and 600 ng/spot, respectively; evincing the HPTLC technique to be a robust one. The quantified values of β -sitosterol was maximal (7.796 ng/ml) in fruits of *T. arjuna*, followed by 4.113 ng/ml in bark of *T. bellerica*. The bark of *T. chebula* also confirmed to possess 2.789 ng/ml of β -sitosterol. Except the fruits and roots, all other parts of *T. chebula* possessed relative quantity of β -sitosterol. Thus, the present quantification would be of much help in the production of β -sitosterol in *Terminalia* species.

Keywords

β -sitosterol, HPTLC, Quantification, *Terminalia*.

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Illia C. Patel et al., Medicinal Plants - International Journal of Phytomedicines and Related Industries, 2019

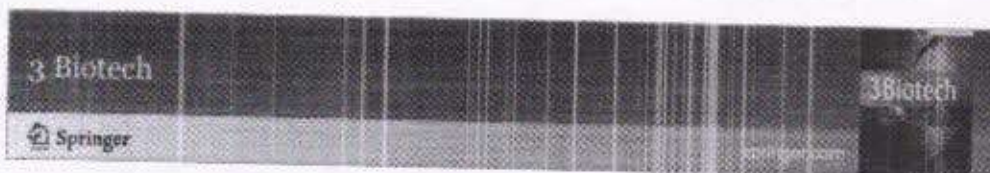
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Concurrent production and relative quantification of vasicinone from in vivo and in vitro plant parts of Malabar nut (*Adhatoda vasica* Nees)

Jitendriya Panigrahi,¹ Saikat Gantait,^{2,3} and Ila C. Patel⁴

Abstract

The present study documents a simultaneous production and comparative assessment of extracted vasicinone from in vivo (leaves and stems) and in vitro (leaves, stems and calli) plant parts of *Adhatoda vasica* Nees, a well-known medicinal plant. High-performance thin layer chromatography (HPTLC) analysis of the above-mentioned plant parts, collected at their 60-day-old growth stage, was performed via methanolic extraction and with the aid of toluene:butanol:butyl acetate (9:0.5:0.5; v/v/v) solvent system. The method was validated with the help of aluminium sheet pre-coated with silica gel 60 F₂₅₄ TLC plates, following the ICH guidelines in order to maintain accuracy, precision and repeatability. Correlation coefficient, limit of detection and limit of quantification values were found to be reasonable. The outcome revealed a linearity that ranged between 2 and 6 µg/spot. During the comparison of estimated vasicinone quantity from in vivo and in vitro plant parts, it was evident that in vitro samples produced relatively higher vasicinone than that of the in vivo counterparts. Maximum vasicinone (6.402 ± 0.010% of dry weight) production was quantified from in vitro leaves followed by calli (5.222 ± 0.092% of dry weight) and in vitro stems (2.007 ± 0.041% of dry weight). On the other hand, in vivo leaves and stems produced comparatively lower quantities of vasicinone (2.412 ± 0.139 and 1.933 ± 0.046% of dry weight, respectively) suggesting the in vitro clonal propagation as a superior approach in comparison to in vivo propagation. Nonetheless, simultaneous production from both the sources (in vivo and in vitro plant parts) provides a new avenue for augmented production of vasicinone.


Keywords: *Adhatoda vasica*, HPTLC, Malabar nut, Medicinal plant, Vasicinone

Introduction

Adhatoda vasica Nees (syn, *Justicia adhatoda* L.), commonly known as Malabar Nut (or Vasaka) is a perennial shrub and belongs to the family Acanthaceae. It grows in sub-Himalayan tracts and has conventionally been utilized in Ayurvedic and Unani medicine for more than 2000 years (Jayapaul et al. 2005). It is basically an evergreen shrub of 1–2.5 m height with opposite ascending branches producing a vile smell and bitter taste. Several ethnopharmacological studies on *A. vasica* reported the aerial portions of the plant (like stem, leaf, flower, fruit and seeds) to contain vasicine, vasic-

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An Efficient In Vitro Approach for Direct Regeneration and Callusgenesis of *Adhatoda vasica* Nees, a Potential Source of Quinazoline Alkaloids

Jitendriya Panigrahi, Saikat Gantait  & Illa C. Patel*National Academy Science Letters* **40**, 319–324 (2017)173 Accesses | 8 Citations | [Metrics](#)

Abstract

The present study reports a comprehensive approach on in vitro direct regeneration and callus induction of *Adhatoda vasica* Nees from in vivo nodal segment (NS) explants. For direct initiation of shoots, 0.6–1.4 mg/l of N⁶-benzyladenine (BA) was employed in Murashige and Skoog (MS) medium. The earliest shoot initiation was recorded within 6 days of inoculation, whereas maximum number (7.4) and length (7.2 cm) of shoots with highest number (2.8) of leaves per shoot were recorded in MS medium plus 1.1 mg/l BA. Isolated shoots were transferred to MS medium, supplemented with diverse combinations of indole-3-butyric acid (IBA) (0.1–2.5 mg/l) and α -naphthalene acetic acid (NAA) (1–3 mg/l), for the

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Zootaxa. 2018 Jun 11;4433(1):195-200. doi: 10.11646/zootaxa.4433.1.13.

A new pea crab species of the genus *Arcotheres* Manning, 1993 (Crustacea: Decapoda: Brachyura: Pinnotheridae) from India

Jigneshkumar N Trivedi ¹, Ernesto Campos, Kauresh D Vachhrajani

Affiliations

PMID: 30313248 DOI: 10.11646/zootaxa.4433.1.13

Abstract

A new species of pinnotherid crab, *Arcotheres shahi* n. sp., is described on the basis of specimens collected during a crustacean survey along the coastal areas of Pamban fishing harbor in the Gulf of Mannar, Tamil Nadu state, east coast of India. The new species resembles *A. pernicola* (Bürger, 1895), *A. winckworthi* (Gordon, 1936) and *A. rayi* Ahyong Ng, 2007, in having the dactyli of the longer fourth pereopod longer than that of fifth pereopod. *Arcotheres shahi* n. sp. differs from these three known species in the shape of female carapace, frontal region and chela, setal pattern on the dactyli of the fourth and fifth pereopods and relative length of the ambulatory pereopods.

Keywords: Crustacea, Pinnotheridae, new species, dactylus length, Gulf of Mannar, India.

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An annotated checklist of the marine brachyuran crabs (Crustacea: Decapoda: Brachyura) of India

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DOI: <https://doi.org/10.11646/zootaxa.4502.1.1>

Keywords: Crustacea, new records, biodiversity, crustacean fauna, coastal areas

Abstract

An annotated checklist of the marine brachyuran crabs occurring in India is compiled from published literature and augmented by collections between 2005 and 2015. A total of 910 species belonging to 361 genera and 62 families are herein listed from Indian waters. Specimens representing 130 species were obtained from Gujarat state during 2005 and 2015, of which 23 are new records to Gujarat state and two species are reported for the first time from the west coast of India. The highest number of species were recorded from the Andaman and Nicobar islands (588 species) while the smallest number were from Goa and Karnataka state (82 species). The records indicate that the east coast of India, with 803 species, is more diverse than the west coast, which has 446 species.

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Systematic review of determinant to health insurance buying behavior model

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Online published on 23 November, 2018

Abstract

While health insurance is not a new product and with the lime majority people aware of it, but this awareness has not reached to that extent that people buying the Health Insurance. The study is descriptive in nature and based on the systematic review of the literature. To know health insurance buying behavior, the study has been examining the determinants of health insurance buying behavior. While this stream of research has shaped significant findings, it has yet to substantially precede our understanding behavior in health insurance buying behavior. To fill this gap, the existing paper utilizes a systematic review to combine past research, disclose the key determinants of health insurance buying behavior, and illuminate a deeper understanding of the topic. The various demographic social and economic variables used for the survey are earning or wage structure, expenditure, savings, education, health insurance literacy, health risk, health infrastructure availability, health insurance plan, Third party administrators etc. This study thus helps health insurance researchers enlarge their baseline understanding of these foundation determinants and carry out more productive future research on health insurance buying behavior in healthcare. The study described the determinant of the health insurance buying behavior of household's model.

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SHe-BOX' (Sexual Harassment Electronic Box): Social and technological innovation with reference to safe workplace.

Dr.Smita B. Vyas

Department of Law, H.N.G.University Patan,Gujarat, India

Abstract

Sexual Harassment electronic Box is a portal of online complaint Management System for women who are working in the public and private organizations to register complaints of sexual harassment at working place. In July 2017, the minister for women and child development, Smt. Maneka Sanjay Gandhi launched this online portal. As per enactment of the Protection of Women from Sexual Harassment at Workplace Prevention Prohibition and Redressal Act (The SH Act), 2013 workplace should be safe and secure and it should be free from sexual harassment. Women in India are vulnerable to the fear of being avoided socially when they complain against sexual harassment. SHe-Box is a step in the right direction to challenge this situation and to finally give the Indian working women the fair status and support they deserve.

Keywords: *Sexual Harassment Electronic Box (SHe-BOX), Ministry of Women and Child Development (MWCD), Sexual Harassment Act, 2013, workplace*

INTRODUCTION

In Last year, the #MeToo campaign (#MeToo trends on social media as women speak up about sexual abuse.) was really eye opener of the world on how deep-rooted and rampant sexual harassment is, and how important it is to report and talk about it [1]. When there is a matter of reporting, Indian woman – typically who is earning barely enough money to make ends meet – may be not even aware that she can complain against of someone regarding sexual harassment. In July 2017 The Minister for Women and Child Development, Smt. Maneka Sanjay Gandhi launched a comprehensive portal of SHe-Box online complaint Management System for women who are working in the public and private organizations [2]. This social and technological innovation is the beginning of a new and progressive era for women in the India. This portal and system could become the crunch point for women encountering sexual harassment at the workplace in India.

OBJECTIVES, METHODS AND MATERIALS

- To find out the society's perception regarding sexual harassment.
- To understand the enactment of Sexual Harassment Act 2013.
- To analyze the technical innovation and mechanism of SHe-BOX portal.
- To understand outcomes of SHe-BOX.

Secondary data collected from Government documents, newspaper, published papers, books and internet sources.

Near Field Communication Technology: Communication Mechanism and Threats

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Abstract— Near Field Communication is wireless short-distance communication technology. The necessary components in communication are availed on low cost and also it is fast in connecting. This paper discusses security threats in NFC and a solution that could be implemented between an RFID tag and a reader to exchange a secret without performing any expensive computation. NFC operates on three modes: Peer-to-Peer, Reader/Writer, and Card Emulation. We have introduced an NFC specific key agreement mechanism, which provides cheap and fast secure key agreement. Key agreement techniques without authentication can be used to provide a standard secure channel. This resistance against Man-in-the-Middle attacks makes NFC an ideal method for secure pairing of devices. The paper describes some key threats applicable to NFC such as eavesdropping, data corruption, data modification, data insertion, and man-in-the-middle-attack and solutions to protect against these threats.

Keywords— Key Agreement, Near Field Communication, Operation Modes, RFID, Threats.

I. INTRODUCTION

NFC is a technology for wireless short-distance communication. It's Point-to-point communication technology. The operational range for NFC is within less than 20 cm. Such short range is good from a security perspective as it diminishes the threat of eavesdropping. Other reasons to use NFC are the low cost of the necessary components and that the connecting time is negligible.

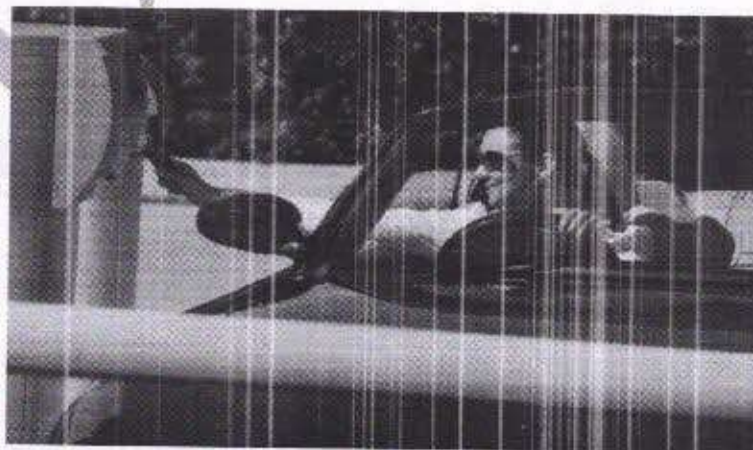


Fig. 1 Using NFC



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Title

USAGE OF DATA MINING METHODS FOR IMPROVISATION OF EDUCATION

Authors

Bhavesh M. Patel
Dr. Ashok R. Patel

Abstract

Data mining (DM) is the process to discover different patterns, co-relations and anomalies among large datasets to estimate future outcomes. While usage of tools and techniques of data mining to extract knowledge automatically from huge database generated by or related to student's learning and educating activities from educational environment is called Educational data mining (EDM). EDM is very useful in education system particularly when examining students' learning performances. It analyzes education related data to design models to improve student' learning experiences and enhance effectiveness of institution. Hence, EDM can aid educational institutions to offer high quality education for its learners. This research paper focuses on data mining techniques which can be used to improve education.

Key Words

Educational Data Mining (EDM); Data Mining (DM); Prediction; Clustering; Classification;

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Hydrodynamic lubrication of a porous slider: shuns simplifying assumption of a small porous facing thickness

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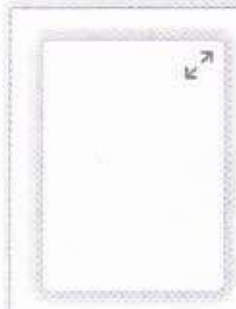
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Abstract. This investigation analyzes the lubricating characteristics of a ferrofluid based plane porous slider without the use of the simplifying assumption of a small porous facing thickness. The magnetic fluid flow model of Neuringer and Rosensweig has been adopted here. It is observed that the performance characteristics getting improved owing to magnetization of the lubricant. Further, significant deviations from the past results are observed regarding the ranges of some parameters for which the simplifying assumption yield that satisfactory results.


Keywords: slider bearing, porosity, magnetic fluid, infinite series solution, load carrying capacity.

*. Corresponding author



Soft Computing for Problem Solving pp 109–120

Hydromagnetic Squeeze Film in a Longitudinally Rough Conducting Conical Plates

Jatinkumar V. Adeshara, M. B. Prajapati, G. M. Deheri & R. M. Patel 

Conference paper | First Online: 28 November 2019

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Abstract

This article wishes to study the presentation of the longitudinally rough and hydromagnetically conducting conical plates. Here, both the plates are chosen to be conducting electrically while an electrically conducting lubricant fills the clearance space between the plates. A transverse magnetic field is applied. Christensen and Tonder's used stochastic averaging process regarding roughness, the associated stochastically averaged Reynolds' type equation is resolved. This gives pressure and



Spectral and Microbial Screening of One-Pot Multicomponent Synthesis of Fused Quinazolinone Derivatives

K. V. Goswami^{1*}, S. N. Parajapati², T. K. Goswami¹,
H.D.Chaudhari¹ and Kokila A. Parmar³

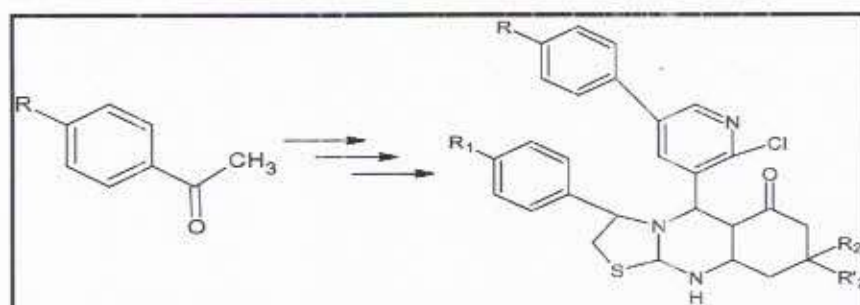
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ABSTRACT

Heterocyclic compounds containing)-2-chloro-3-formyl pyridine and 2-amino thiazole quinazolin-6(7H)-one are reported to possess significant biological activity. Synthesis of 5-(2-chloro-5-(4-substitutedphenyl)pyridin-3-yl)-3-(4-substitutedphenyl)-8,8-disubstituted-8,9-dihydro-5H-thiazolo [2,3-b] quinazolin-6(7H)-one derivatives have been described. These compounds have been characterized on the basis of UV, IR, ¹H NMR, Mass and elemental analysis. Compounds have been evaluated for their antimicrobial activity. Among the series containing some of the compounds showed promising results against standard drugs.

Graphical Abstract



Keywords: Fused Quinazolinone derivatives, Spectral studies, Microbial screening, One-Pot Multicomponent Synthesis.

Solar Light Induced and TiO₂ Assisted Heterogeneous Degradation of Textile Dye Janus Green

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Department of chemistry, Hemchandracharya North Gujrat University Patan-384265, Gujarat, INDIA

Abstract

The photocatalytic degradation of textile dye Janus Green has been investigated in presence of H₂O₂. The influence of various reaction parameters such as concentration of dye, amount of photocatalyst, change of pH, Hydrogen peroxide, light intensity, etc. It was found that the dye degradation followed pseudo first order kinetics. Process of degradation was followed spectrophotometrically at maximum wavelength 615 nm. Rate of photodegradation of Janus Green dye and optimal conditions are explained. Participation of OH radical is confirmed by the use of scavengers. A tentative mechanism of photodegradation of Janus Green is reported.

Keywords: Titanium dioxide, Hydrogen peroxide, Janus Green

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Introduction

The methods used for the removal of organic dyes and pigments from wastewaters are classified into three main categories: physical, chemical and biological methods, such as coagulation, adsorption, membrane process and advanced oxidation process (AOP) [1-7]. Titanium dioxide (TiO₂) has emerged as an excellent photocatalyst material for removal of environmental contaminants [8]. Synthetic dyes have been used in the textile, leather, paper, printing inks, plastics, cosmetics, paints, pharmaceutical, and food industries. It is estimated that 15% of these dyes is lost in the synthesis, processing of colorants, dyeing, printing and finishing [9-11]. Many processes have been proposed over the years and are currently employed to destroy toxic chemicals discharged along with textile wastewater. Photocatalytic detoxification (AOPs) has been focussed as an alternative method to clean up polluted water. This technique adopts the possibility of combining the heterogeneous catalysis with solar light to achieve mineralisation of toxic pollutants present in textile wastewater [12]. Photocatalytic degradation of Direct Blue 1 dye in the presence of an aqueous heterogeneous suspension of ZnO irradiated with visible light has been investigated [13]. TiO₂ has been reported as a good semiconductor for removal of many organic compounds, may be due to high oxidation efficiency, complete decomposition process, cheap and nontoxic material [14-15]. A photocatalysts could be heterogeneous if it is present in a different phase than the reaction mixture. The advantages of heterogeneous catalysts are cheap, non-toxic can be easily separated from the reaction mixture, and can be reused [16-17]. Many commercially available dyes are known and approximately one million tons of these dyes are produced annually worldwide. Also, the synthetic dyes represent a relatively large group of organic chemicals that are met in practically all spheres of our daily life. The cationic dye such as Janus Green is an important group of organic compounds which have a variety of scientific and industrial applications [18-19]. Here solar induced and TiO₂ assisted Heterogeneous degradation of studied.

Experimental

Chemical Used

Janus Green was obtained from ACS chemicals India Ltd. and its characterised are given in **Table 1**. Hydrogen peroxide with 30% volume was brought from FINAR India Ltd. and was used as received. A commercial product of Titanium dioxide was supplied by CHITI CHEM Vadodara, India Ltd. and it is used as a photocatalyst. All chemicals were of analytical grade and used without further purification.


Instrumentation

The concentration of the dye solution was monitored using absorbance recorded on UV-visible double beam spectrophotometer (Thermo scientific-evolution 201) and pH was checked with pH meter (Systronics model n EQ - 361). The stock solution of dye was prepared in double distilled and deionized water with conductance 1.5×10^{-6} and

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Original Research Paper | [Published: 29 June 2022](#)

High-performance thin-layer chromatography chemical fingerprinting: a modern technique for comparative assessment of a multivariate chromatogram analysis of *Padina boergesenii*

[Masuma M. Hakim](#)  & [Illa C. Patel](#)

[JPC – Journal of Planar Chromatography – Modern TLC](#)
35, 395–402 (2022)

56 Accesses | 1 Citations | [Metrics](#)

Abstract

Gujarat's coastline holds immense storage of valuable marine macroalgae. *Padina boergesenii* is normally familiar as leafy rolled-blade algae pleasingly studied for its medicinal effects. This alga is therapeutically worthwhile owing to the existence of essential phytoconstituents in it. The purpose of this evaluation was to understand the various steps of methods setup like extraction methods, mobile phase and reagent work on high-performance thin-layer chromatography chemical fingerprinting for marine algae. The qualitative examination of ethanolic and methanolic extracts of algae revealed the presence of a number of bioactive compounds. Toluene–ethyl

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Study of Metabolic Diversity (Enzymatic Diversity) of *Pantoea dispersa*

Dipika Pandya^{1*}, Vikram Solanki, S. G. Patel² and S. A. Bhatt¹¹Department of life Science, Hemchandracharya North Gujarat University, Patan, India²Department of Plant Pathology, College of Agriculture, NAU, Bharuch Campus, India

*Corresponding author

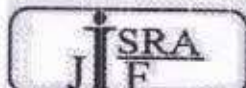
Abstract:

Pantoea belong to a large group of organisms of the Enterobacteriaceae family, also called enteric bacilli. Enzymes are biocleaning agent without harmfully affecting environment. *Pantoea dispersa* are found with these potential which are metabolically diverse and produce different kinds of enzymes likes chitinase, CGTase, Pectinase, xylanase, Protease, L-Glutaminase etc. Extensive uses of agrochemicals create environmental pollution and severely affect living organisms. *Pantoea* has potential degrade harmful environmental pollutants. In present study nine different enzymes are selected for enzymatic profiling of *Pantoea dispersa*. Antimicrobial activity with different antibiogram was performed to check the sensitivity for the isolates. Qualitative assessment of these enzymes is carried out by standard protocol in which particular substrate of enzymes is used. Enzymatic activity was observed with the zone of utilization. Result of the study indicates that *Pantoea dispersa* is metabolically versatile as it produce all the enzymes viz., chitinase, xylanase, pectinase, CGTase, L-Glutaminase, protease, glycosidase and cellulase. Result of antibiotic sensitivity show that *Pantoea dispersa* was sensitive against all the beta lactum group of antibiotic and some of the macrolide and glycoside group of antibiotics at given concentration.

Keywords: Chitinase, CGTase, Xylanase, Pectinase[Download this article as](#)

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Soft Computing for Problem Solving pp 219–233

Study of Longitudinal Roughness on Hydromagnetic Squeeze Film Between Conducting Rotating Circular Plates

Jatinkumar V. Adeshara, M. B. Prajapati, G. M. Deheri & R. M. Patel 

Conference paper | First Online: 28 November 2019

776 Accesses

Part of the Advances in Intelligent Systems and Computing book series (AISC, volume 1057)

Abstract

This investigation addresses the problem of squeeze film with electrical conduction between longitudinally rough surfaces and electrical lubricant in the existence of a transverse magnetic field for rotating circular plates. The surfaces are taken to be longitudinally rough in nature. In view of Christensen and Tonder's stochastic averaging method, the arbitrary irregularity of the bearing surfaces is modeled by a stochastic arbitrary inconstant with non-zero variance, skewness, and mean. The

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Article

Performance of hydromagnetic squeeze films between conducting porous rough conical plates

December 2010 · *Mechanica* 45(6):767-783

DOI:10.1007/s11012-010-9279-y

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Abstract

An endeavor has been made to discuss the behavior of hydromagnetic squeeze film between two conducting rough porous conical plates. The plates are considered to be electrically conducting and the clearance space between them is filled by an electrically conducting lubricant. A transverse magnetic field is applied between the plates. Efforts have been made to solve the concerned Reynolds' equation with the associated boundary conditions to get the pressure distribution. This in turn, is used to obtain the expression for load carrying capacity leading to the calculation of the response time. The results are presented graphically as well as in tabular form. It is suggested by the results that the bearing system records an enhanced performance as compared to that of a bearing system working with a conventional lubricant. It is noticed that the pressure, load carrying capacity and the response time increase steadily with increasing values of the magnetization parameter. In general, the bearing suffers owing to transverse surface roughness. However, the negatively skewed roughness tends to better the performance of the bearing system marginally. This performance gets further improved especially, when the negative variance is involved. It is observed that the semi-vertical angle increases the load carrying capacity. Besides, the conductivity also increases the load carrying capacity significantly. In addition, it is revealed that the negative effect induced by the porosity can be neutralized to a nominal extent by the positive effect of the magnetization parameter in the case of negatively skewed roughness in the presence of negative variance. Thus, this study provides ample scopes for improving the performance of the bearing system considerably by choosing a suitable combination of magnetization parameter, semi-vertical angle and the conductivities of the plates.

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A Effect of hydromagnetic squeeze films between two conducting Longitudinally rough circular plates

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Abstract— The present article is to study and discuss the behaviour of the hydromagnetic squeeze film between two conducting longitudinally rough circular shape of the bearing surfaces and electrically conducting lubricant in the presence of transverse magnetic field is investigated for circular shape of the bearing surfaces. The surfaces of bearings are assumed to be longitudinally rough. The roughness of the bearing surface is modified by the stochastic random variable mean with non-zero mean, variance, and skewness. The associated Reynold's equation is stochastically averaged with respect to the random roughness parameter. The results establish that longitudinal roughness is more helpful as compared to transverse roughness. Then, it is solved with suitable boundary conditions to get the pressure distribution, which is further used to obtain the load carrying capacity leading to the calculation. From this presentation it is clearly seen that the hydromagnetic lubrication substantially increased the load capacity of the bearing system. Furthermore, the load bearing capacity increases due to the increase in conductivity of the plates and standard deviation associated with the longitudinal roughness in the case of negatively skewed roughness. In addition, the adverse effect of variance (+ ve), positive skewness of the plates can be compensated up to certain extent by the suitable combination of conductivity and magnetization in the case of negatively skewed roughness while negative variance is involved. Thus, this investigation makes it clear that longitudinal roughness must be given due respect while designing the bearing systems.

Keywords— Hydromagnetic lubrication, squeeze film, Reynolds' type equation, longitudinal roughness, load bearing capacity.

I. INTRODUCTION

It is well known that if the liquid metals such as mercury and sodium could be pumped or held between the moving surfaces of the bearing, bigger loads could be supported by the applying a large magnetic field. Because of a large electrical conductivity of liquid metals, the possibilities of electromagnetic pressurization from the application of an external magnetic field have been explored and investigated. This electromagnetic pressurization comes into effect when a large external electromagnetic field through the electrically conducting lubricant is applied to induce circulating current in turn, interacts with the magnetic field to create a body force which pumps the fluid between the bearing surfaces. Since the liquid metals are good electrical conductors, it is possible to increase the load carrying capacity by utilizing the electromagnetic force thereby, overcoming the defect associated with lubricants at high temperature and hence alleviating the drawback of low viscosity. Considerably high increase in load carrying capacity is possible with the use of super conducting magnets while a very little power is required to provide the magnetic field.

A number of theoretical and experimental studies on the hydromagnetic lubrication for porous as well as plane metal bearings have appeared. Elco and Huges [1], Kuzma [2], Kuzma et. al. [3], studied magnetohydrodynamic pressurization and behavior in liquid metal lubrication squeeze films. Shukla [4], Shukla and Prasad [5] investigated the hydromagnetic theory of squeeze film for conducting lubricants, surfaces, studied the effect of the conductivities of the surfaces on the performance of the bearing system between two non-conducting-non porous surfaces in the presence of transverse magnetic field. A number of theoretical and experimental studies [6-8] have been devoted to magnetohydrodynamic lubrication. Sinha and Gupta [9-10], Patel and Hingu [11], discussed the study of hydromagnetic effect on the porous squeeze films wherein they considered annular,

Hydromagnetic squeeze film behavior between longitudinally rough circular step bearing and slip velocity effect

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Abstract:

A circular step bearing which normally approaches a parallel rough circular surface in the presence of a hydromagnetic fluid is considered by taking into account the velocity slip. Beavers and Joseph's slip model was used to study the effect velocity slip, while the stochastic averaging process of Christensen and Tonder is accountable for assessing the longitudinal effect of surface roughness. The statistically averaged equation of the Reynolds' type is solved to obtain the pressure distribution leading to the calculation of the load bearing capacity. The calculated results presented in graphical form clearly mention that the performance is suggestively improved. The effect of roughness and slip velocity is adverse in general but there are some possibilities to improve performance by choosing the suitable combination of hydromagnetization, conductivity, radii ratio and the variance (-ve) in case of negatively skewed roughness associated with longitudinal roughness.

Key words:

Circular step bearing, hydromagnetic fluid, longitudinal roughness, slip velocity, load carrying capacity

Nomenclature:

- r Radial coordinate
- r_o Outer radius
- r_i Inner radius
- k = $\frac{r_i}{r_o}$ – Radii ratio
- h Lubricant film thickness
- H Thickness of solid housing
- s Electrical conductivity of the lubricant
- μ Viscosity of the lubricant
- B_o Uniform transverse magnetic field applied between the plates
- M = $B_o h \left(\frac{s}{\mu} \right)^{1/2}$ – Hartmann Number
- p_s Supply Pressure
- Q Flow rate
- P_s^{*} Dimensionless supply pressure
- p Lubricant pressure
- P Non-dimensional pressure
- w Load carrying capacity
- W Dimensionless load carrying capacity
- h_o^{*} Surface width of lower plate
- h₁^{*} Surface width of upper plate
- s_o Electrical conductivity of lower surface

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Isolation, Identification, Characterization and Optimization of Amylase producing organisms from sacred groves of Mahesana District

Prajapati, H V; Prajapati, D D; Bhatt, S A.

Asian Journal of Research in Pharmaceutical Science; Raipur Vol. 11, Iss. 1, (Mar 2021).

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H. V. Prajapati¹, D. D. Prajapati¹, S. A. Bhatt²

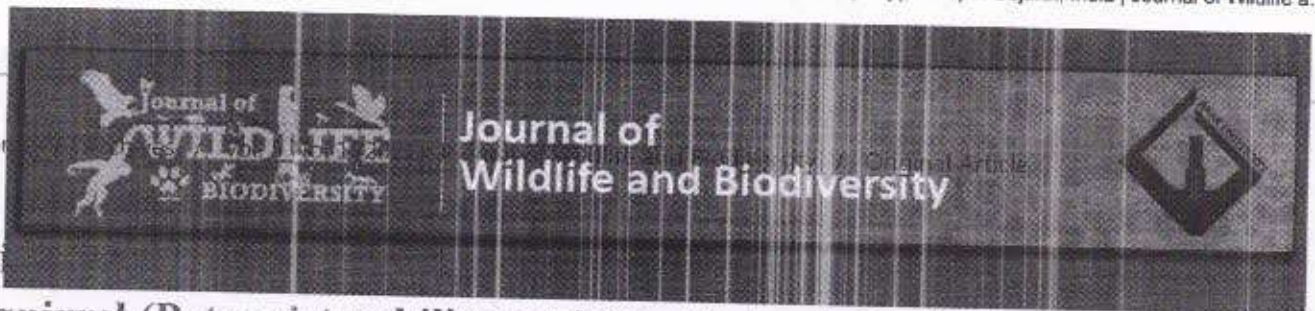
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ABSTRACT:

Amylase is the most widely used Food, fermentation, Starch processing, textile and papermaking. This research was conducted to isolate and identify a local amylase producing bacteria from sacred groves soil and characterize, Bacteria from soil were primarily screened on starch agar medium and out of 49 isolates, 15 were found to be amylase producers, The isolates were screened based on their clear zone ratio, enzyme activities The best isolate demonstrated an enzyme activity of MH-31, MH-48 and MH-43, It was then identified by a combination of biochemical tests, morphological and microscopic characteristics along with 16S rRNA gene sequencing from all six isolate the optimization Temp-35°C, pH-7, Carbon source-Glucose, Nitrogen Source-Yeast extract, salt Concentration: 3 this all condition were recorded.



Squirrel (*Petaurista philippensis*) in Gujarat, India

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Nishith Dharaiya

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DOI: <https://doi.org/10.22120/jwb.2020.130618.1163>

Keywords: Arboreal, encounter rate, protected areas, rodents, western India

Abstract

We assessed the distribution pattern and abundance of *Petaurista philippensis* in the state of Gujarat, India. It is the only species of flying squirrel found in the western states of India. The species was distributed on a large geographic area with confined populations in the eastern dry and moist deciduous forest stretch with tall trees within the state. During the study period, 33 times flying squirrels were encountered at 14 sites in 7 districts, concentrated mainly in protected areas. The overall encounter rate was 0.50 individuals/km among which, the central districts of Gujarat showed the highest while the north-east districts showed the lowest abundance of *P. philippensis*. It was found to be a tree-dwelling species, positively associated with old-growth forests with tall trees. The abundance rates were found to be associated with forest degradation and hunting practices. Illegal hunting practices persists in some areas of Gujarat, may affect the population number and trend. Apart from forest degradation and fragmentation, hunting for domestic consumption, ethnomedicinal uses, traditions, and human-made forest fires were the major potent threats of flying squirrels as found during the present study.

References



Justicia beddomei, a source of comprehensive vasicinone production

In: Israel Journal of Plant Sciences

Authors: Jitendriya Panigrahi, Saikat Gantait, and Ila C. Patel

Online Publication Date: 27 Aug 2019

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The present study formulates a method for comprehensive production of vasicinone, a quinazoline alkaloid, from multiple plant parts of *in vitro* and in-field-grown *Justicia beddomei*. HPTLC analysis of plant parts was executed with methanolic extract using toluene: butanol: butyl acetate (90:50:5; v/v/v) as the solvent system. Validation of methodology was accomplished using TLC plates (silica gel 60 F₂₅₄-pre-coated aluminium sheet) following the ICH manual to maintain accuracy, precision and repeatability with a linearity ranging 2–6 µg/spot. Validation data offers precision to the methodology adapted in the present study (LOD 1 µg/spot and LOQ 3 µg/spot). It was evident that *in vitro* samples produced relatively higher levels of vasicinone than that of their in-field counterparts. The highest vasicinone (2.07±0.025% of dry weight) production was quantified from *in vitro* stem, signifying a new resource for the production of vasicinone from identified parts of *in vitro* and in-field propagated *J. beddomei* plants.

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HPTLC Fingerprinting of Isoflavonoids and Metabolites Quantification from in vivo and in vitro Developed Parts of Pueraria tuberosa (Willd.) DC

Patel Illa, Hakim Masuma, Rathod Dipika

Abstract

Pueraria tuberosa (Willd.) DC, a medicinally important plant, produces different types of isoflavonoids including Genestein. This plant requires conservation. In present study, callus was developed from in vivo tuber and in vitro seedling. Murashige and Skoog medium supplement with combination of BAP (6-Benzylaminopurine) (1.5mg/l) and 2,4-D (1.5mg/l) were found to be more effective. Fresh in vitro shoots produced from nodal explants of in vitro germinated seedling on MS medium supplement with BAP (1mg/l) and NAA (α -naphthaleneacetic acid) (1.5mg/l). In vitro regenerated shoots were transferred to rooting media having IBA (indole-3-butyric acid) (1mg/l); and NAA (0.5mg/l) was found more effective. The phytochemical analysis revealed the presence of alkaloids, carbohydrates, glycosides, saponin, phenols, protein, steroid, tannins, flavonoids and quinone in the extracts of in vivo and in vitro plant samples. Quantitative analysis of in vivo and in vitro parts showed that they are good source of primary and secondary metabolites. The HPTLC (High-performance thin-layer chromatography) analysis was carried out on silica gel 60F₂₅₄ HPTLC aluminium sheets with CAMAG Linomat 5 applicator. The plate was developed using Toluene: ethyl acetate (16:4v/v) mobile phase. Isoflavonoids were detected at 254, 366 and 540nm (after derivatization). These developed fingerprinting of in vivo and in vitro parts of *P. tuberosa* will help to select ideal part for phytochemical extraction. **Keywords:** HPTLC fingerprinting, Isoflavonoids, micro-propagation, *P. tuberosa*, metabolites

Cite this Article

Patel Illa, Hakim Masuma, Rathod Dipika. HPTLC Fingerprinting of Isoflavonoids and Metabolites Quantification from in vivo and in vitro Developed Parts of *Pueraria tuberosa* (Willd.) DC. *Research & Reviews: A Journal of Pharmaceutical Science*. 2019; 10(3): 34-45p.

Keywords

P. tuberosa; micro propagation; HPTLC fingerprinting; Iso-flavonoids

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Impact of seasonal variation on 'daidzein' accumulation in callus and in vivo parts of *Pueraria tuberosa* (Willd.) DCJune 2020 | *Medicinal Plants - International Journal of Phytomedicines and Related Industries* 12(2)DOI: [10.5958/0975-8892.2020.00031.3](https://doi.org/10.5958/0975-8892.2020.00031.3)Project: [In vitro propagation and conservation of economically important over exploited as well as threatened/endangered plant species for sustainable supply of planting materials and secondary metabolites](#)

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Abstract

Daidzein-natural isoflavones found in *Pueraria tuberosa* (Willd.) DC. (Fabaceae) which is a potent medicinal plant. It acts as signal carriers and responds to the pathogenic attacks and reduces pain during menopause, osteoporosis and also antidiabetic in nature. In the present work, in vitro callus development from tuber explants during both rainy and summer seasons was conducted. Further, a simple unambiguous and rapid high-performance thin-layer chromatography method was established for quantitative estimation of daidzein in callus and in vivo parts to assess the impact of seasonal change on valuable phytochemical accumulation. Maximum callusing (90 %) was obtained on MS medium fortified with a combination of 6 N-Benzylamino purine (2 mg/l) and 2,4-dichlorophenoxyacetic acid (2 mg/l) during the summer season from the tuber explant. During the HPTLC method validation, the linearity range obtained was 100-1000 ng/spot with a regression value (r) value of 0.99845. All the parts were found to contain a significant amount of daidzein. The maximum daidzein (2112.597 ± 0.35 ng/g) content was obtained from a young tuber bark followed by callus (171.903 ± 0.33 ng/g) during the summer season compared to rainy season parts and callus. Thus, it can be concluded that in vitro callus is an alternative source of daidzein without destroying the natural plant and the developed HPTLC method could be used for quality control analysis and recommended for daidzein quantification for different herbal formulation and drug preparation.

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First record of Brachyuran crab *Rhinolambrus lippus* (Lanchester, 1901) (Crustacea: Decapoda: Parthenopidae) from India

Jigneshkumar N. Trivedi

S. H. Tan

Abstract

The present paper reports the occurrence of the rare parthenopid species *Rhinolambrus lippus* (Lanchester, 1901) for the first time from India. The species is so far reported from Malaysia, Djibouti and Madagascar.

Keywords:

Brachyura; new record; Gulf of Mannar; geographic distribution; Indo-Pacific region

The taxonomy of the family Parthenopidae has changed a lot over the years with many genera reclassified under new subfamilies (Ng *et al.*, 2008). Tan (2004) undertook a study on the revision of Parthenopidae and revised the taxonomy of the subfamilies including subfamily Parthenopinae (Tan and Ng, 2007). Tan and Ng (2007) listed 32 genera under Parthenopinae, by elevating many subgenera (*sensu* Flipse, 1930) to genera including the subgenus *Rhinolambrus* A.

Milne-Edwards, 1878. *Rhinolambrus* differs from other genera in the presence of a 'neck' like structure at the gastrobranchial notch which is part of the longitudinal elongation of the epistome (Tan *et al.*, 1999). *Rhinolambrus* currently contains 13 species (Ng *et al.*, 2008) distributed in the Indo-Pacific region out of which 6 species: *R. contrarius* (Herbst, 1804), *R. cybelis* (Alcock, 1895), *R. lamelliger* (White, 1847), *R. longispinus* (Miers, 1879), *R. pelagicus* (Rüppell, 1830), and *R. turriger* (White, 1847) are reported from India (Trivedi *et al.*, 2018). The present study reports the occurrence of a seventh species *Rhinolambrus lippus* (Lanchester, 1901) for the first time from

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Arch Dis Child, 2016 Apr;101(4):316-9. doi: 10.1136/archdischild-2015-308985. Epub 2015 Sep 10.

Dietary calcium intake influences the relationship between serum 25-hydroxyvitamin D3 (25OHD) concentration and parathyroid hormone (PTH) concentration

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Abstract

Objectives: To investigate whether dietary calcium intake will modify the relationship between serum 25-hydroxyvitamin D3 (25OHD) with intact serum parathyroid hormone (PTH) concentrations in apparently healthy Indian adolescents.

Study design: Cross-sectional study.

Setting and participants: Apparently healthy adolescents aged 10-14 years (n=181), from Gujarat, western India. Study conducted from January 2012 to March 2014.

Methods: Serum 25OHD concentrations and intact serum PTH concentrations (both using chemiluminescent microparticle immunoassay) were measured. Diet was recorded through 24 h diet recall and calcium intake was computed (C-diet V.2.1). To assess relationship between 25OHD and PTH, data were dichotomised according to median calcium intakes (520 mg/day) and relationship between serum 25OHD and PTH in the two subgroups was plotted.

Results: Subjects with calcium intakes above median (>520 mg/day) had lower intact serum PTH values for given serum 25OHD concentration while those with calcium intakes below median (<520 mg/day) had higher intact serum PTH values for given serum 25OHD concentration. Serum 25OHD concentration was negatively correlated with intact serum PTH concentration at lower as well as higher calcium intakes (r=-0.606 and -0.483, respectively, p<0.01 for both). Using a regression analysis, predicted values for intact serum PTH concentration for the given serum 25OHD concentrations were plotted. The plot revealed a negative shift with increasing calcium intake.

Conclusions: Dietary calcium intake modifies the relationship between serum 25OHD concentrations and intact serum PTH concentrations. Thus, dietary calcium intake should be taken into account when assessing an individual's vitamin D status.

Keywords: Adolescent Health; Calcium; Parathyroid Hormone; Vitamin D.

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High-performance thin-layer chromatography chemical fingerprinting: a modern technique for comparative assessment of a multivariate chromatogram analysis of *Padina boergesenii*

[Masuma M. Hakim](#)  & [Illa C. Patel](#)

JPC – Journal of Planar Chromatography – Modern TLC
35, 395–402 (2022)

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Abstract

Gujarat's coastline holds immense storage of valuable marine macroalgae. *Padina boergesenii* is normally familiar as leafy rolled-blade algae pleasingly studied for its medicinal effects. This alga is therapeutically worthwhile owing to the existence of essential phytoconstituents in it. The purpose of this evaluation was to understand the various steps of methods setup like extraction methods, mobile phase and reagent work on high-performance thin-layer chromatography chemical fingerprinting for marine algae. The qualitative examination of ethanolic and methanolic extracts of algae revealed the presence of a number of bioactive compounds. Toluene–ethyl

ORIGINAL ARTICLE

Production , Optimization and Partial Purification of Chitinase by *Pantoea dispersa* isolated from Vegetable dumping site of Patan District.Dipika Pandya^{1*}, Dave Dhruv¹, Asha Thakkar¹ and S. A. Bhatt¹

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ABSTRACT

To enhance chitinase synthesis, growth environment parameters were optimized. Chitinase production in liquid medium containing 1.5 percent acid swollen chitin was found to be the best medium for chitinase production. Maximum chitinase production was obtained at 35 °C, pH 7, during of 96 hrs incubation and at 150 rpm. From *Pantoea dispersa* extracellular chitinase from *Pantoea dispersa* was partially purified using ammonium sulphate precipitation followed by concentration using various sizes of concentration tubes namely-40% to 80%. Chitinase seemed to have the highest specific activity at the 50% ammonium sulphate precipitation level, with 1.87 specific activity recorded at this concentration. The results obtained for optimization of production and partial purification are discussed.

Keywords: *Pantoea dispersa*, chitinase production, Chitin

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INTRODUCTION

Chitin is a linear polysaccharide composed of N-Acetyl-D-glucosamine (NAG) units that seem to be 1,4-linked. It is the earth's second most prevalent biopolymer and a consistent source of renewable raw materials [1]. Chitinases (EC3.2.1.14) are the enzymes that hydrolyze 1,4 glycosidic bonds which link chitin NAG residues. Chitin bioconversion naturally occurs and is crucial to reduce complex chitin to simpler carbon and nitrogenous compounds that can be used by other microorganisms [10]. Bacteria, fungi, plants, insects, crustaceans, and vertebrates all synthesize these enzymes to fulfill their nutritional requirements. These enzymes play a key role in the morphogenesis of fungi, insects, and crustaceans. They are involved in pathogen defense processes in plants and viz., most likely, vertebrates as well. Chitinases have a wide range of industrial and pharmaceutical applications, including biocontrol of plant pathogenic fungi and insects, synthesis of chito oligosaccharides and waste management.

Chitinases are consequently important in agricultural and medical domains, and they are particularly significant in the seafood business for the breakdown of crab chitinous waste.

Chitinase is synthesized by a diverse range of organisms, including bacteria, fungus, actinomycetes, yeast, plants, protozoans, coelenterates, nematodes, mollusks, arthropods, and humans [2, 15]. Several factors have been reported to influence chitinase production by bacteria, including chitin, yeast extract, ammonium sulphate, trace elements, tween-20, magnesium sulphate, ammonium chloride, potassium nitrate, diammonium hydrogen phosphate, sodium nitrate, l-glutamine, l-asparagine, peptone, and urea. The conventional parametric or One-Factor-At-a-Time (OFAT) approach for choosing carbon and nitrogen sources for chitinase production is described in a large number of reports [5,12].

Microbial chitinases have been linked to parasite protection in fungi, protozoa, and invertebrates, as well as the degradation of fungal pathogen micelles. Chitinase is also engaged in the defensive systems of both plants and vertebrates. Baculoviruses employed in biological control of insect pests generate chitinase