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g-C_3N_4/CuO and g-C_3N_4/Co_3O_4 nanohybrid structures as efficient electrode materials in symmetric supercapacitors

Jithesh Kavil,[a] P. M. Anjana,[bc] Deepak Joshy,[a] Ameya Babu,[a] Govind Raj,[d] P. Periyat*[a] and R. B. Rakhi*[bc]

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Metal oxide dispersed graphitic carbon nitride hybrid nanocomposites (g-C_3N_4/CuO and g-C_3N_4/Co_3O_4) were prepared *via* a direct precipitation method. The materials were used as an electrode material in symmetric supercapacitors. The g-C_3N_4/Co_3O_4 electrode based device exhibited a specific capacitance of 201 F g^{-1} which is substantially higher than those using g-C_3N_4/CuO (95 F g^{-1}) and bare g-C_3N_4 electrodes (72 F g^{-1}). At a constant power density of 1 kW kg^{-1}, the energy density given by g-C_3N_4/Co_3O_4 and g-C_3N_4/CuO devices is 27.9 W h kg^{-1} and 13.2 W h kg^{-1} respectively. The enhancement of the electrochemical performance in the hybrid material is attributed to the pseudo capacitive nature of the metal oxide nanoparticles incorporated in the g-C_3N_4 matrix.

Introduction

Renewable energy storage and its supply upon demand have been a major challenge for researchers owing to the short life span and poor power delivery of conventionally used lithium-ion batteries.[1] The supercapacitor has been recognized as a suitable storage device that can be used in combination with batteries to mitigate the power delivery problems associated with batteries.[2,3] Supercapacitors possess excellent performance recyclability due to the absence of any mass transfer between the electrodes.[4] Carbon-based electrode materials have been used conventionally in supercapacitors owing to their high surface area and storage capacity.[5,6] Nitrogen-doped carbon allotropes emerged recently as supercapacitor electrodes, which show excellent electrode electrolyte interaction due to the presence of lone pair electrons on the nitrogen atom.[7]

Graphitic carbon nitride (g-C_3N_4) is considered as an intrinsically nitrogen-rich system with lamellar structure. It is the most stable allotrope of carbon nitrides at ambient atmosphere, but it also has rich surface properties that are attractive for many applications including supercapacitor electrode and hydrogen evolution photocatalyst.[8] The polymeric structure of g-C_3N_4 arises from the repetition of tri-*s*-triazine (symm. 1,3,5 triazine) units and the 2D lamellar structure arises from the weak van der-Waals interaction between the layers. The lone pair of electron on nitrogen could provide surface polarity on the electrode material and that could offer several binding sites for the electrolyte ions to interact with the electrode surface.[9] However, the semiconducting nature, low surface area and the agglomerated layer structure limit its application as a supercapacitor electrode.[10]

As in other carbon electrodes, the charge storage in g-C_3N_4 is due the formation of electrical double layer at the electrode–electrolyte interface (EDLC) which is non-faradaic in nature. However the pseudo capacitive behavior in transition metal oxides (TMO), sulphides and conducting polymers arises due to the fast and reversible redox process between the electroactive material and electrolyte molecule (faradaic process).[11–15] Thus TMO with pseudocapacitive nature can be suitably coupled with g-C_3N_4 layer structure to mitigate the limitations of bare g-C_3N_4 electrodes.[16]

The commonly used transition metal oxides are ruthenium oxide,[17] manganese dioxide,[18] tungsten oxide,[19] nickel oxide,[20] *etc.* Among them, Co_3O_4 and CuO have received a great deal of attention due to their economically viable and environmentally friendly nature.[21,22] Moreover, as reported by Zhou *et al.* Co_3O_4 shows a very high theoretical capacitance of 3560 F g^{-1} with an excellent shuttling between its Co^{2+} and Co^{3+} ions during electrochemical process.[23,24] In a recent report by Zheng *et al.* mesoporous Co_3O_4 was anchored on the g-C_3N_4 surface, and the composite material showed a specific capacitance value of 780 F g^{-1} at a current density of 1.25 A g^{-1}.[25] In another attempt, Shim *et al.* fabricated a supercapacitor from carbon and CuO anchored g-C_3N_4, which has given a specific capacitance value of 247.2 F g^{-1} at a current density of 1 A g^{-1}.[26] In the available reports, the electrochemical measurements were carried out in three electrode

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RESEARCH ARTICLE | OCTOBER 29 2019

Structural, optical and antimicrobial properties of green synthesized cerium oxide nanoparticles

P. Vinisha Valsaraj ✉; Divyarthana

+ Author & Article Information

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The This article is to report non toxic, green synthesis cerium oxide nanoparticles (CeO2 NPs) from ammonium ceric nitrate using *Moringa oleifera* leaf extract as reducing as well as stabilizing agent. The as prepared nanoparticles were characterised by X-ray powder diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), Thermogravimetric analysis (TGA), Raman spectroscopy, Field Emission Scanning Electron Microscopy (FESEM), UV-Visible diffuse reflectance spectroscopy (UV), and EDAX. The average crystallite size was estimated from the XRD pattern using Debye Scherrer equation as about 9-10 nm. XRD analysis revealed the cubic fluorite structure of the synthesized nanoparticles. FT-IR reflects stretching frequencies at 500 cm−1 which confirmed the Ce-O stretching bands and showing utilization of natural components for the production of nanoparticles. TGA predicts the successful capping of CeO2 NPs by bioactive molecules present in the plant extract. The SEM images reveal that the prepared ceria nanoparticles are composed of spherical nanoparticles in agglomerated form. The as-synthesized CeO2 nanoparticles have antibacterial activity. The desired structural and optical properties of CeO2 make it as promising material for photocatalytic and optoelectronic applications.

RESEARCH ARTICLE | OCTOBER 29 2019

Ultrafast dye removal using capped TiO_2 nanocrystallites

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Capped and uncapped TiO_2 nanocrystallites of anatase phase were prepared via precipitation method. Oleic acid was used as an effective capping agent during precipitation. The synthesized TiO_2 nano crystallites were characterized using PXRD, IR, and UV. The crystallite size calculated using Debye Scherrer equation indicated that the prepared materials are in nano size. Nano crystalline TiO_2 was used as a dye adsorbent. It was found that the prepared nanocrystallites have excellent dye adsorption properties towards methylene blue (MB) dye. The effect of pH, contact time, initial dye concentration, and adsorbent dosage on the adsorption capacity was systematically investigated. It was found that nanocrystalline TiO_2 could remove more than 95% dye concentration in 10 minutes. The dye adsorption capacity of capped TiO_2 has been determined to be 300 mg g^{-1} at the initial solution pH of 10. Freundlich, Langmuir, and Dubnin-Radushkevich-Kaganer isotherm models were applied to investigate the adsorption process. Freundlich isotherm model shows the best fit to the equilibrium adsorption at all the studied experimental conditions. Adsorption kinetics was analyzed by pseudo-first order, pseudo-second order, and intra-particle diffusion kinetic models. It was found that methylene dye adsorption follows the pseudo second-order kinetics.

NEWLY FABRICATED TITANIUM DIOXIDE DOPED POLYMER MEMBRANE FOR DYE REMOVAL FROM AQUEOUS SOLUTIONS

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Abstract: TiO_2 particle doped cross-linked Poly vinyl alcohol- Carboxy methyl cellulose (PVA-CMC membrane was fabricated by solution casting method. These membranes are explored for the purpose of effective removal of methylene blue (MB) and malachite green (MG) dyes from aqueous solutions. Adsorption capacity was measured by UV-Visible spectrophotometer. Optimisation studies were done at different time, pH, initial concentration and temperature. The membranes were characterized by XRD, FTIR, UV and SEM. Kinetic and thermodynamic studies reveal that pseudo second order kinetic model and Langmuir isotherm models are best explained by the mechanism of adsorption of MB and MG dyes onto PVA-CMC-TiO_2 membrane. The regeneration of membranes were effectively done.

Keywords **: Membrane adsorption, Methylene blue, Malachite green, Titanium dioxide, Composite membrane.**

1. Introduction

Removal of toxic chemicals from waste water is the major issue regarding the environmental remediation. The industries such as textile, food, tannery etc uses large amount of water day by day and there by discharging pollutants to water bodies. The disposal of these effluents are of major concern due to their toxicity in low concentration. The treatment of these pollutants extremely low concentration is very difficult. So that we have to take alternative measures to overcome these problems. The removal of toxic dyes become great challenge in day to day life. Membrane adsorption technology is most promising approach to be employed for the removal of pollutants due to their high efficiency, cost effectiveness, and catalytic activities [1]. Our study emphasized on the ability of composite membrane to remove dyes from aqueous solutions. Composite membranes were used because of their co operative effect of both organic as well as inorganic components.

The current study focused on the fabrication of cross-linked PVA-CMC-TiO_2 composite membrane and their effect on the adsorption of Methylene blue (MB) and Malachite green (MG) dyes towards these membranes were explained. CMC is an important derivative of cellulose that combines with PVA to form the material having excellent physico- chemical properties [2]. TiO_2 was used as an inorganic doper for the fabrication of composite membrane because of low cost, non toxicity, strong oxidative properties, chemical and thermal stability [3]. The introduction of TiO_2 particle into PVA-CMC matrix will improve hydrophilic as well as antifouling properties [4].

2. Experimental

2.1. Chemicals

PVA (99% hydrolysed, M.W=115,000, LOBA Chemie, India), Carboxy methyl cellulose sodium salt (M.W=250000, LOBA Chemie, India), Maleic acid (M.W=116.08, Merck), Double distilled water is used as solvent for the preparation of membrane. Methylene blue and Malachite green dyes were commercial grade. Stock solutions of dyes were prepared by dissolving their powder in demineralised water to give 10ppm solution.

2.2. *Preparation of titanium dioxide doped polymer membrane*

Membrane of different compositions were made by mixing Poly vinyl alcohol, Carboxy methyl celluose and Titanium dioxide, in different proportions. Maleic acid was added as a cross-linker. A definite amount of Poly vinyl alcohol dissolved in hot water was boiled with maleic acid in dil.H_2SO_4. To this CMC dissolved in distilled water was added carefully and heated. TiO_2 suspended in distilled water was then slowly added to the above mixture in drop wise manner and homogenized using vortex mixer. Different composition membranes were prepared by mixing different ratios of the components and the slurry obtained was carefully casted on to a Petridish. It was then dried in a hot air oven at 55°C. The resultant membrane was peeled off by soaking it in double distilled water for several hours.

2.2.1. *Physico - chemical characterization*

Crystalline nature of membrane was determined using X-ray diffractometer (Rigaku Miniflex 600) equipped with CuKα radiation (λ= 1.54056A°) at 2θ angles between 5° and 80°. FTIR spectra in KBr pellet were recorded using Agilent cary 630 FTIR spectrometer with wave number ranging from 4000-500cm^{-1} was helpful to identify the structure of composite membrane. The surface morphology of the PVA-CMC-TiO_2 membrane was examined using scanning electron microscopy (SEM) operated at an accelerating voltage of 5kV. UV-Visible absorption spectra of PVA-CMC membrane and PVA-CMC-TiO_2 membrane were measured in the wavelength range from 200-800nm using JASCO V-660 UV-visible spectrophotometer. Optical band gap can be determined from tauc plot using kubelka munk equation and evaluated by following equation

$$(\alpha h\nu)^{1/2} = B(h\nu - E_g)$$

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Ion Exchanger Doped Polymer Composite Membrane For Heavy Metal Removal From Aqueous Solutions

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A novel cross-linked polyvinyl alcohol- polystyrene sulphonic acid zirconium phosphosilicate (PVA-PSSA-ZPS) membrane was prepared by dispersing zirconium phosphosilicate gel into PVA-PSSA blend by solution casting method. It was used as an effective adsorbent for the removal of heavy metals, such as Pb^{2+}, Cu^{2+}, Cd^{2+}, Ni^{2+}, Co^{2+} and Hg^{2+} ions from aqueous solutions. The adsorption capacity of Pb^{2+}, Cu^{2+}, Cd^{2+}, Ni^{2+}, Co^{2+} and Hg^{2+} ions over PVA-PSSA-ZPS membranes are 0.7221, 0.6961, 0.7035, 0.6738, 0.6812 and 0.6105, respectively. The incorporation of ZPS into PVA-PSSA blend increased the selectivity of heavy metals towards the membrane. The membrane was characterized by XRD, FTIR, TGA-DSC, SEM and UV-Visible spectroscopy. Adsorption studies were carried by batch adsorption method. Effect of pH, contact time, initial concentration, etc., on heavy metal adsorption, were studied. The extent of adsorption for various metal ions was found to be in the order of $Pb^{2+} > Cu^{2+} > Cd^{2+} > Ni^{2+} > Co^{2+} > Hg^{2+}$. Kinetic and thermodynamic studies were carried out to explain the type of adsorption process.

KEYWORDS

Membrane adsorption, Heavy metals, Polyvinyl alcohol, Polystyrene sulphonic acid, Zirconium phosphosilicate, Desorption

1. INTRODUCTION

Environmental pollution has been a major crisis faced by human beings as well as aquatic life due to urbanization and economic development. Shortage of clean water has become one of the major issues faced by society due to population growth, climate change, industrialization, etc. Among the various pollutants, heavy metals are of special concern due to its high toxicity. Membrane adsorption technology plays an important role in the separation of heavy metals as well as other organic pollutants from wastewater because of low cost and lower consumption of energies. Adsorption is considered as the most economic method for wastewater treatment due to its high efficiency, increased life span, good mechanical, thermal and chemical stability [1]. The current study deals with the use of novel ion exchanger doped polymer composite membrane in the effective removal of heavy metal ions from aqueous solutions. Polyvinyl alcohol- polystyrene sulphonic acid- zirconium phosphosilicate (PVA-PSSA-ZPS) composite membrane was prepared by dispersing ZPS into the polymer matrix. Zirconium based heteropolyacids are extensively studied for their ion exchange properties. We explored ZPS for its efficiency in metal ion exchange and thereby its removal. It is a promising component due to its hygroscopic silicate group alongwith its acidic phosphate group [2,3].

2. MATERIAL AND METHOD

2.1 Chemicals

Polyvinyl alcohol (PVA) (99% hydrolyzed, MW = 115,000, LOBA Chemie, India), polystyrene sulphonic acid sodium salt (MW = 500,000, Alfa Aesar), maleic acid (MW = 116.08, Merck), zirconium oxychloride (MW = 322.25, Merck), sodium dihydrogen orthophosphate (MW = 119.98, Merck) and sodium silicate (MW = 284.20). Demineralized water is used throughout the experiment. Metal ion stock solutions were prepared by dissolving their nitrates in distilled water to give 0.005 M solution.

2.2 Synthesis of zirconium phosphosilicate

The definite concentration of orthophosphoric acid and sodium silicate were mixed and added to the zirconium oxychloride solution with continuous stirring. The white gel obtained was stabilised by adding 1 M HNO_3 and kept for 24 hr at room temperature for digestion. The precipitate obtained was filtered, washed thoroughly with distilled water to remove excess acid. The gel form of precipitate was taken for membranes fabrication. Dried ZPS was used for the determination of ion

Zirconium phospho silicate doped cross-linked PVA-PSSA membrane for the adsorptive removal of methylene blue, Rhodamine B and malachite green dyes from aqueous solutions

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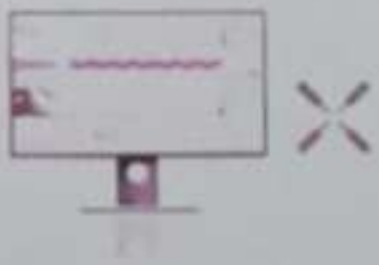

PHYTO-SOCIOLOGICAL ASPECTS OF SACRED GROVES - A CASE STUDY

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Abstract: Sacred groves are forest patches conserved by the local people intertwined with their socio-cultural and religious practices. Sacred Groves, locally called as *Kavus*. It is because of this believes and tradition, most of the sacred groves were protected in the past by local people. A detailed taxonomical and sociological study of the sacred groves *(Kavu)*, namely *Chama kavu* and*Madayi kavu*, lead to the collection of 85 species coming under 77 genera and 47 families, representing 5 endangered, 11 endemic species. It includes 21.51% herbs, 18.81% shrubs, 37.93% trees and 21.75% climbers. Papilionaceae, Moraceae, Euphorbiaceae, Apocynaceae, Rubiaceae, Oleaceae are the dominant families present in these groves. A holistic understanding of the current status and structure is essential for assessing their ecological role and formulating strategies for their conservation. The present study highlights the floral diversity, and conservation strategies which could be a powerful tool for ensuring biodiversity conservation through community participation.To protect and conserve this grove, no necessary steps were taken at present. These sacred groves were rich in plant genetic diversity and were composed of many ethno botanically useful species, including wild edible fruits, medicinal plants etc.

Index Terms: Sacred Groves, *Kavu*,

INTRODUCTION

Sacred groves are forest patches conserved by the local people intertwined with their socio-cultural and religious practices. These groves harbour rich biodiversity and play a significant role in the conservation of biodiversity. Indigenous cultural and rituals practices of the local people in sacred groves serve as a tool for conserving biodiversity .Ancient people were highly attached with their surroundings. They so often weaved themselves into the tapestry of life surrounding them so exquisitely that we can only admire their sensitivity and their wisdom. They had a very special understanding of the places. The ancient generation gave importance to trees and forests and they worshipped and protected them .The sacred conservation practices followed by local people have come into focus, of late, due to their importance for protecting several delicate ecosystems and threatened species, the explicit connections they show between cultural and biological diversity, and their potential of people oriented conservation efforts. Sacred groves are distributed over a wide ecosystem and help in conservation of rare and endemic species. Our ancestors were fully aware that the natural resources that sustained them must be conserved for the sustenance of future generations. (Ashish Anthwal et.al, 2006). Sacred groves are protected areas of forests because of religious beliefs and constitute an important aspect of the cultural life of various communities throughout the world (Waghchure CK et. al. 2006) .The role of sacred groves in the conservation of biodiversity has long been recognized. (Gadgil and Vartak, 1976; Khan et al. 1997). All forms of vegetation in the sacred groves are supposed to be under the protection of the reigning deity of that grove, and the removal of even a small twig is taboo (Vartak and Gadgil, 1973). Forest, mountain peaks, hillocks, rivers, steam beds, ponds and grasslands are left aside or their use strictly regulated, due to the fear associated with the deity.They reflect the value system of communities. The dynamics of the sacred groves can be related to the changes taking place in the socio-cultural realms of the society.But, at present, fast growth of infra-structural facilities and on-farm activities are the prime cause of deteriorating quality status of the groves.In most localities, sacred groves are being increasingly exposed to various kinds of threats leading to either qualitative degradation or total disappearance. The main aim of our study is to conduct present study on floral taxonomy and their diversity, myths, believes, ritual practices, cultural and historic background of Chama kavu and Madayi kavu.

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Phyto-sociological and Ethano-botanical studies of Klaayi Bhagavathikkavu of Kasargod District

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Abstract

Forests have been the lifeline for forest-dwelling communities since ancient times. A major method of conservation of this green resource was the creation of sacred groves, usually dedicated to a local deity. A traditional means of biodiversity conservation, these groves can be considered the ancient equivalent of natural sanctuaries where all forms of living creatures are given shelter and protection by a deity. A detailed taxononical and sociological study of the sacred groves (Kavu) of Kasargod District (12.40° N to 75.17.21° E, AL. 44.32m), namely Klaayi Bhagavathikkavu, lead to the collection of 106 species coming under 52 families, representing 8 endangered, 11 endemic species. It includes 18.51% herbs, 17.81% shrubs, 39.98% trees and 23.85% climbers. Papilionaceae, Moraceae, Euphorbiaceae, Apocynaceae, Rubiaceae are the dominant families present in this Kavu. This kavu is under the protection of a committee of Vengayil family, belonging to Nair community, Mulavannur and Kalliyottu family of Maniyani Community and a group of local people. This sacred grove is a rich source of medicinal plants. To protect and conserve this grove, no necessary steps are taken at present. This is mainly because of lack of knowledge of people on the importance of sacred groves in maintaining microclimatic conditions, ecosystem balance, and biodiversity conservation. Under these circumstances, it is highly important to preserve this sacred grove.

Key words: Biodiversity conservation, Ecosystem balance, Klaayi Bhagavathikkavu, Microclimatic conditions, sacred grove.

Introduction

Every sacred grove carries its own legends, lore, and myths which form the integral part of the sacred grove. A link between present society and past, in terms of biodiversity, culture, religious and ethnic heritage exists in sacred groves (Malhotra,K C 1998). It has been observed that several medicinal plants that are not to be found in the forest are abundant in the sacred groves. Further, rare, endangered, threatened and endemic species are often concentrated in sacred groves (Debel Deb et al. 1997). This paper briefly reviews the studies conducted at, Klaayi Bhagavathikkavu one of the major sacred grove in Kasargod district. The study highlights the traditional practices, floral diversity, and conservation strategies which could be a powerful tool for ensuring biodiversity conservation through community participation. In the study area, various traditional customs associated with sacred groves were in practice. The sacred grove was rich in plant genetic diversity and was composed of many ethno-botanically useful species, including wild edible fruits,

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6.

Phyto-Sociological Aspects of Sacred Grove of Kasargod District: A Case Study

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Abstract

Sacred groves are forest patches conserved by the local people intertwined with their socio-cultural and religious practices. Sacred Groves, locally called as Kavus. It is because of this believes and tradition, most of the sacred groves were protected in the past by local people. A detailed taxonomical and sociological study of the sacred groves (Kavu) of Kasargod District (12.40° N to 75.17.21° E, AL. 44.32m), namely Edayilekkad, lead to the collection of 71 species coming under 66 genera and 42 families, representing 5 endangered, 11 endemic species. It includes 21.51% herbs, 18.81% shrubs, 37.93% trees and 21.75% climbers. Papilionaceae, Moraceae, Euphorbiaceae, Apocynaceae, Rubiaceae, Oleaceae are the dominant families present in this Kavu. Therefore, a holistic understanding of the current status and structure is essential for assessing their ecological role and formulating strategies for their conservation. The study highlights the floral diversity, and conservation strategies which could be a powerful tool for ensuring biodiversity conservation through community participation. The land of Edayilekkad is originally belonging to Udinur Kovilakam of Brahmin community, is managed by a committee of villagers. To protect and conserve this grove, no necessary steps are taken at present. Under these circumstances, it is highly important to preserve this sacred grove.The sacred groves were rich in plant genetic diversity and were composed of many ethnobotanically useful species, including wild edible fruits, medicinal plants etc.

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Ethnobotanical Survey of the Sacred Grove, Sree Oorpazhachi Kavu, Kannur District, Kerala, India

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Abstract Sacred groves are one of the finest examples of traditional in situ conservation practices. These are patches of natural near-climax pristine vegetation of trees and associate groups of organism, managed as a part of local cultural tradition. In order to explore the medicinal values of the sacred groves an ethno-floristic survey in sacred groves was done to identify medicinal plants used by locals for several diseases. It revealed that Sree Oorpazhachi Kavu consist of a total of 86 vascular plants falling under 75 genera and 38 families. Out of which, the angiosperm dominate with 83 members, while 2 were pteridophytes and *Cycas circinalis* is the only gymnosperm. Leguminosae emerges as the largest family that contributes about 12 species. The listed plant species are mainly used to cure the common diseases such as fever and headache, cough, cold, many skin diseases, wound, diabetics, diarrhoea, dysentery, cancer, ulcer, brain haemorrhage, urinary infection, bronchitis, rheumatoid, arthritis, asthma, inflammatory swellings, anemia, vomiting, liver diseases, constipation, high blood pressure, obesity, malaria, muscle pain, stomach ache, irregular menstruation, eye diseases, leprosy, toothache, hair loss, eczema, kidney stone etc. Scared groves remain unexplored and no comprehensive studies in ethno-botanical issues, so the conservation of medicinal plants diversity of these groves is therefore most important.

Keywords: *sacred grove, conservation, diarrhea, rheumatoid, medicinal plants*

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1. Introduction

Biodiversity is the most valuable natural resources without which the overall development of man is not possible. Conservation and management of biodiversity is one of the foremost needs as vast expanses of vegetation continue to be under the threat of denudation and degradation all over the world [1]. Since time immemorial conservation of natural resources has been an integral part of several indigenous communities. Natural worship has been a key force in determining human attitudes towards conservation and sustainable utilization of biodiversity.

In the course of time science and technology developed and industries were established and expanded to meet the increasing demand of people, furthermore habitat alteration, over exploitation, pollution and introduction of exotic species also threatened the global biological resources. This adversely affected the biological balance and socio-economic status of people. Therefore, for the conservation of biodiversity many laws were enacted from time to time. The smallest group often harbours some old and magnificent specimen of trees and climbers [2]. The larger groves are treasure trove for the naturalist, supporting many threatening species in the area and are becoming extinct with deforestation sacred trees such as Banyan, Peepal and other species of *Ficus* supports a variety of life forms.

In India sacred groves are known by several names – Kavu, Nagakkavu, Sarpakkavu in Kerala, Deorais or Deoban in Maharashtra, Orans or Kenri in Rajasthan, Devarakadu, Pavithavana or Sindhravana in Karnataka and Sarara in Bihar. Methods of conservation vary in different states according to their intrinsic nature, distribution and local beliefs [3]. However such sacred groves are not restricted to India alone. They are also found in Afro-Asian countries like Syria, Nigeria and Turkey.

Kerala is one of the states in India where the sacred groves are widely distributed from the West coast to the Eastern high lands. In Kerala there are about 2000 sacred groves [4] of which 352 are in Kannur district [5]. Generally local communities call these natural islands of vegetation-'kavus'. These kavus are still preserved by mythological beliefs. Theyyam is an indigenous ritualistic art performed mainly in these kavus. The practice works on the local beliefs is that residing deities from these sacred groves are summoned to the performing mans body. The sacred art form has for centuries secured the groves from destruction. At present most of the sacred groves are on a path of gradual decline in owing to various socio-

FLORISTIC DIVERSITY AND PHYTOSOCIOLOGICAL ANALYSIS OF A SACRED GROVE, KAYYALAKATH MARIYAMMAN KAVU, ALAVIL, KANNUR DISTRICT, KERALA

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Abstract

Sacred groves are more or less pockets of climax vegetation preserved on religious grounds. These forests are the true indicators of the type of vegetation that once existed here before the dawn of modern civilization. Their existence is mostly due to certain taboos, strong belief, and supplemented mystic folklores. Sacred groves are characterized by rare species preserved on isolated land with social and religious beliefs of people .Therefore, the biodiversity-rich sacred groves are of immense ecological significance. They also play an important role in the conservation of flora and fauna. The present study deals with floristic diversity and phytosociological analysis of plants recorded in a sacred grove Kayyalakath Mariyamman Kavu, Alavil, Kannur district, Kerala. A total of 62 vascular plants falling under 60 genera and 42 families were documented. Out of which, the angiosperms dominate with 57 members, while 4 were Pteridophytes and Cycas revoluta the lone gymnosperm. With respect to their habit, there are 13 herbs, 18 shrubs, 19 trees, 11 climbers and one woody climber.

Key words: *Sacred groves, climax vegetation, phytosociology, biodiversity.*

Introduction

Assessment of regional biological diversity is a widely accepted new trend in life sciences. Exploring the floristic diversity as an resources for conservation priorities is an essential part of this venture. In addition to the qualitative surveys, approach for quantitative analysis can be equally helpful for identifying genetic diversity of various plant groups. Further this resource can be understood with the perception of its richness, distribution, threat, endemism, commercial utilization etc. Sacred groves are characterized by rare species preserved on isolated land with social and religious beliefs of people (Kulkarni and Shindikar, 2005). The way of conserving natural biodiversity through preservation plots in forest areas or sacred groves is a unique feature in Indian culture. According to Malhotra *et al.,* (2001) groves are those area dedicated by local communities to their ancestral spirits or deities. There have immense value from genetic diversity as well as ecological point of view and rich in flora. They are repository of several medicinal and economically important plants. Attached with socio-cultural and religious sentiments there exists has undisturbed islands. But today these are adversely affected by human activities. Due to urbanization, industrialization and rationalization, scarcity of land leading to the

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Norileca indica (Crustacea: Isopoda, Cymothoidae) Infects *Rastrelliger kanagurta* Along the Malabar Coast of India – Seasonal Variation in the Prevalence and Aspects of Host-parasite Interactions

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This paper reports seasonal variations in the prevalence of host-parasite associations between *Norileca indica*, a cymothoid, and the Indian mackerel *Rastrelliger kanagurta* along the Malabar Coast of India. Eighty-eight marine fish species belonging to diverse families were examined, and only *R. kanagurta* was shown to be parasitized by *N. indica*, indicating a narrow host specificity. The prevalence, mean intensity, and abundance were 30.70, 1.71, and 0.52%, respectively. Different life cycle of this parasite, from larva to adult, infect the host fish. In most instances, a pair of *N. indica* infected the host, and in these instances a male-female combination was the most common (89.17%). The monthly occurrence of *N. indica* was charted for a period of 38 months (July 2012 to July 2014; March 2017 to March 2018), and statistical comparison of the data showed a significant difference ($p < 0.001$) among seasons. A positive correlation ($r = 0.40$) was observed between the size of female parasites and that of their respective host fish. There was a positive correlation ($r = 0.78$) between the size of female parasites and their fecundity. In all instances, adult *N. indica* individuals were found to specifically attach to the mucus membrane of branchial operculum, causing visible physical damage, including atrophy (reduced length) of the gill filaments and overall loss of gill normalcy. Furthermore, permanent occupancy by female *N. indica* resulted in the formation of a deep pit in the gill chamber floor and also caused atrophy of gill filaments. Overall, our findings yielded a greater understanding of the occurrence, season-wise prevalence, and potential host-parasite associations of *N. indica*.

Key words: Parasitic cymothoid, Prevalence, Seasonal variation, Host-parasite association, India.

BACKGROUND

Cymothoids are obligate ectoparasitic isopods comprising 40 recognized genera and more than 380 species, which infect a wide range of marine and freshwater fishes worldwide (Ahyong et al. 2011; Trilles 1969 1994; Smit et al. 2014 in review; Aneesh et al. 2015, 2018; Panakkool-Thamban et al. 2016). They have attracted the attention of researchers worldwide as they have deleterious impacts on the health of host fishes and thereby seriously limit aquaculture productivity and economic viability (Adlard and Lester 1994; Bunkley-

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BRILL

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CRUSTACEANA

CHARACTERIZATION OF A PROTANDROUS HERMAPHRODITIC REPRODUCTIVE SYSTEM IN TRANSITIONAL AND FEMALE PHASES OF *NORILECA INDICA* — MORPHOLOGICAL, HISTOLOGICAL AND ULTRASTRUCTURAL APPROACH

BY

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ABSTRACT

The present study explores the reproductive system of *Norileca indica* during its transitional and female phase at morphological, histological, ultrastructural and histochemical levels. The paired and symmetrical hermaphroditic reproductive system of *N. indica* in the transitional and female phases lies dorsally in the thorax on either side of the gut, each consisting of a three-lobed testis (with lobes t_1, t_2 and t_3) followed by an ovary and then a vas deferens, which opens into the paired penes located at sternite 7; the oviduct, arising laterally from the ovarian lobe, opens into the gonopore located on the 6th pereonite. In the transitional phase, the gonads show a presence of germ cells at different maturation stages; spermiogenesis in the testes has already halted, while the ovary undergoes active

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Reproductive System in the Male Phase of a Parasitic Isopod (Crustacea) – Morphological, Histological and Ultrastructural Evidence for Sequential Protandrous Hermaphroditic Changes

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This paper reports the protandric hermaphroditic changes in the reproductive system of the male-phased *Norileca indica*, a cymothoid that parasitizes the scombrid fish *Rastrelliger kanagurta*. Each part of *N. indica*'s paired reproductive system lies on either side of the gut. This study considers the three successive size classes of the male phase – designated as M1, M2 and M3 – using light microscopy and ultrastructural methods. The testis comprises of three bulged sac-like lobes labelled t_1, t_2 and t_3, all of which open into the ovary of their respective side. The vas deferens, which emerges as a posterior extension of the ovary, opens into the penis and the distal end of each oviduct leads to a sealed gonopore on their respective sides. Each testis lobe (t_1/t_2/t_3) displays clusters of germ cells undergoing stage-specific differentiation. Spermatids undergoing sequential changes associated with spermiogenesis keep close proximity to somatic accessory cells. The characteristic histological changes associated with protandric hermaphroditism are visible in the ovaries of sequential size classes (M1, M2 and M3). In early M1, besides spermatophores, the ovary has abundant polymorphic nuclei; in the mid/late M1, the posterior ovary has abundant spermatophores, anterior displayed oogonia, previtellogenic oocytes and two distinct forms of follicle cells. In M2, the anterior ovary shows compactly arranged oocytes while the posterior region accommodates spermatophores – fewer, however, than during M1. The entire ovary during M3 is crowded with previtellogenic oocytes, which marginalize the spermatophore passage. The vas deferens of the smallest M1 lack spermatophores. As the size class progresses through late M1 into M2 and M3, the posterior vas deferens is filled with spermatophores, which closely associate with the glandular epithelial lining.

Key words: *Norelica indica*, Protandric hermaphroditism, Male reproductive system, Testis, Ovary, Spermatogenesis, Spermiogenesis.

BACKGROUND

Cymothoids, the parasitic isopod crustaceans, are known to be obligatory parasites of fishes from diverse ecosystems and cause deleterious impacts on them (Trilles et al. 2011 2012; Elshahawy and

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Short Communication

Copepod (Crustacea) infection on Oil sardine, *Sardinella longiceps* Valenciennes, 1847 (Actinopterygii; Clupeidae) - First report

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Among the Clupeidae, the oil sardine, *Sardinella longiceps,* Valenciennes, 1847 dominates the catches of commercial boats in India. Despite two reports on isopod infection, no further information on parasitic crustacean infection on this fish species was available to date. Between June 2014 and April 2018, we examined 1513 specimens of *S. longiceps,* obtained from Cochin and Malabar Coast (Kerala, India) where we report for the first time the exclusive infection of this fish by the Lernaeopodid copepod, *Clavellisa ilishae.* This parasitic copepod was observed on the gill arches of the host collected from Malabar Coast; the specimens were all sexually mature females bearing egg sacs. Curiously, this copepod parasite was recovered only in a period of three months from October to December in the year 2017 even though the observation was continued for a total of 4 years from 2014-2018. This observation must be addressed further in terms of ecological impacts.

[**Keywords:** *Clavellisa ilishae, First report, India, Parasitic copepod*, *Parasitic parameters, Sardinella longiceps*]

Introduction

Clupeids, representing the significant proportion of the marine fish biomass are highly vulnerable for infection by parasitic crustaceans and in several cases it leads to the economic losses in fisheries[1-8]. Among them all *Sardinella* sp. in general and *Sardinella longiceps* (oil sardine) in particular dominate the commercial catches landed in India[9,10]. Surveying through the literature, only two reports are available on the parasitic crustacean infection on *S. longiceps* and in both cases it was by the isopods[11,12]. Although a few reports of parasitic copepod infection in some *Sardinella* species (*Sardinella fimbriata*, *S. aurita, S. albella, S. gibbosa*)[13-19] are available, such reports in *S. longiceps* are nil to date. In this context, the present paper is relevant as it appears the first report on the parasitic copepod infection on *S. longiceps*.

Material and Methods

The present study was conducted during June 2014 to May 2018. Marine fishes were collected afresh directly from the local fishing boat harbored at Ayyikkara (11°51' N, 75°22' E), Azhikkal (11°56'00" N, 75°18'00" E), Chombala (11°39' N, 75°33' E) of Malabar and Toppumpadi harbour in Cochin (10°18'00" N, 76°17' E). Immediately after collection, the fish body parts including body surface, buccal cavity, branchial cavity, lateral line region, cornea, inner wall of the operculum, fin rays, caudal lobes and gill filaments were closely examined for infection by the parasitic crustacean with the help of magnifying lens. The recovered *Clavellisa sp.* were immediately removed from the gill arches and preserved in 70 % ethanol[20] for further observation to identify the parasite at species level. The parasite along with the infected host fish was brought to the laboratory in order to have a close examination of the site of infection for further study on host fish and parasite. The parasite and its site of infection on the host fish were observed under dissection microscope and stereo microscope (Leica- S6D; 4X) as well.

The taxonomic identification of the recovered parasitic copepod was performed according to Pillai[17]. Photography of the host fish and the parasite was done using both Olympus (μTOUGH- 3000) and camera attached with stereo microscope Leica- S6D. Parasitological parameters [Prevalence (P %) = the number of infected hosts / the number of examined hosts x 100; Mean Intensity (I) = the number of parasites recovered/ number of fishes infected] were calculated according to Bush *et al*[21]. Host nomenclature and fish taxonomy were performed based on Fish Base (Froese and Pauly[22]). Voucher specimens of *C. ilishae* (accession no. CI- 01F, CI-02F, CI-03F) were deposited in the Parasitic Crustacean Museum, Crustacean Biology Research Laboratory, Sree Narayana College, Kannur, Kerala, India.

Results and Discussion

A total of 1513 specimens of *Sardinella longiceps* were observed during the study period (Table 1).

Occurrence of Life Cycle Dependent Monophasic and Biphasic Molting in a Parasitic Isopod, Mothocya renardi

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Abstract

This paper reports the occurrence of life cycle dependent monophasic and biphasic molting in Mothocya renardi (Bleeker, 1857), a protandrous hermaphroditic cymothoid parasitizing the banded needle fish, Strongylura leiura. Although the molting in manca I is monophasic, the infective manca II, juvenile and adult stages including male, transitional, and female opt biphasic molting in which the posterior half of the body molts first, followed by the anterior half. The molt cycle (monophasic and biphasic) in M. renardi is broadly divided in to four sequential stages, premolt, molt, postmolt and intermolt. Five distinct premolt stages (D0-D4) were also identified through the microscopic observation of characteristic changes reflected in different appendages of manca stages and adult infective stages. Pleotelson, uropod rami and dactylus of the first pereopod and antennae were used for the identification of stages of monophasic molt cycle. By undergoing monophasic molting, the manca I was transformed into the manca II which then undergoes biphasic molt. The characteristic changes related to biphasic molting were well reflected in the maxillule. When the maxillule showed characters of the

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Evaluation of Algal Biodiversity along Western Coasts of India; A Review

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Abstract

Assessment of regional diversity of marine algae is the preliminary step of phycological researches. Current paper reviews various works that have been undertaken for the examination of algal biodiversity at different states (Gujarat, Maharashtra and Goa) of southern coast of India. The commonness and variations among different states of the same coast has been studied and indexed.

Keywords: Biodiversity, Algae, Phycological.

Introduction

Algae, the simplest groups of plant kingdom have recently become a main attraction of biological and medical research for their potential constituent phytochemicals are known to contain various nutritive and medicinal compounds. In medicine itself algae are being tested for its suitability in manufacturing various pharmaceuticals, while in biological researches, its nutritional assay, extraction and separation have already been shown their miscellaneous content of beneficial minerals and nutrients. As all these properties of algae make them an interested field of botanical researches, it is important to primarily assess the biodiversity and richness of these groups. Current paper reviews the algal survey works undertaken by various authors along the western coasts of India, i.e., along the selected coastal areas of Gujarat, Maharashtra and Goa (Figure 1).

Figure 1: India Map showing Western coast

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Algal Biodiversity along Southern Coasts of India: A Review

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Abstract

Recent studies of phycological researches have shown that marine algae should be given with the equal consideration like any other groups of plant kingdom, primarily because these groups of plants also play or can also play a great role in human life when used in a sustainable manner. Thereby, finding of algal resources has evolved to be a chief necessity for phycological research. Along with the biodiversity assessment, comparing those survey works that has already undertaken can provide more information regarding with the establishment of new species, vanishing off of existed species, migration or invasion of species etc. Current paper reviews marine algal wealth along southern coasts of India and the comparative analysis of distribution, occurrence and richness of species along the different coastal areas of the southern coast.

Keywords: Phycological, Marine alga, Invasion

Introduction

India has a coastline of about 7500 km including those of islands of Andaman & Nicobar and Lakshadweep. It harbors unique marine habitats which display a wide variety of marine biological diversity. The variety of coastal ecosystems along the Indian coastline includes estuaries, lagoons, mangroves, backwaters, salt marshes, rocky coasts, sandy stretches and coral reefs. These marine habitats play very significant role in ecological and economical stability of the country. It has an Exclusive Economic Zone (EEZ) of around 2.5 million sq km and accounts for about 8% of the global biodiversity (Oza, 2005).

Among the various marine organisms, seaweed plays ecologically and economically important role as they exhibit various properties which make them suitable to be used in many economic purposes like medicine, food, industry etc. Thereby Phycology or study of algae has become an interested field in botanical researches. It is important to primarily assess the biodiversity and richness of these groups as a preliminary step of phycological researches. Current paper reviews the algal survey works undertaken by various authors along the southern coasts of India, i.e., along the selected coastal areas of Kerala, Tamil Nadu, and Karnataka (Figure 1).

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Jacaranda Mimosifolia. D.Don.; – a powerful solution for environmental degradation caused by urbanization in urban greening

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Abstract: ***Urbanization is a process that leads to the growth of cities due to industrialization and economic development, and that leads to urban- specific changes in specialization, labor division and human behaviors. Most part of the environment destroyed by the urbanization. It leads to environment become changed their properties. Changes in Air Quality: Human activities release a wide range of emissions into the environment including carbon dioxide, carbon monoxide, ozone, sulfur oxides, nitrogen oxides, lead, and many other pollutants. Changes in Patterns of Precipitation Cities often receive more rain than the surrounding countryside since dust can provoke the condensation of water vapor into rain droplets. Erosion and other changes in land quality: Rapid development can result in very high levels of erosion and sedimentation in river channels. The blue jacaranda has been cultivated in almost every part of the world where there is no risk of frost; established trees can however tolerate brief spells of temperatures. Urban greening controls the environmental changes due to the urbanization.***
This paper focuses mainly on the role of Jacaranda mimosifolia one of the main urban forestry crop, in urban greening and its impact on the mineralization of urban soil.

I. INTRODUCTION

The population of India is growing at the rate of about 17 million annually which means a staggering 45,000 births per day and 31 births per minutes. If the current trend continues, by the year 2050, India would have 1620 million populations. Due to uncontrolled urbanization in India, environmental degradation has been occurring very rapidly and causing many problems like shortages of housing, worsening water quality, excessive air pollution, noise, dust and heat, and the problems of disposal of solid wastes and hazardous wastes (Uthara *et al.*, 2012).

1) *Pollution:* Pollutants are often dispersed across cities or concentrated in industrial areas or waste sites. Lead- based paint used on roads and highways and on buildings is one such example of a widely dispersed pollutant that found its way into soil. Burying tremendous amounts of waste in the ground at municipal and industrial dumps.
2) *Degraded Water Quality:* The water quality has degraded with time due to urbanization that ultimately leads to increased sedimentation there by also increasing the pollutant in run-off. Modification of Habitats: The fertilizers that spread across lawns find its way into water channels where it promotes the growth of plants at the expense of fish. The waste dumped into streams lowers oxygen levels during its decay and cause the die-off of plants and animals.
3) *Pollution Control:* Pollution in cities as a form of pollutants includes chemicals, particulate matter and biological materials, which occur in the form of solid particles, liquid droplets or gases. Air and noise pollution is common phenomenon in urban areas. The presence of many motor vehicles in urban areas produces noise and air pollutants such as carbon dioxide and carbon monoxide. Emissions from factories such as Sulphur dioxide and nitrogen oxides are very toxic to both human beings and environment. The most affected by such detrimental contaminants are children, the elderly and people with respiratory problems. Urban greening can reduce air pollutants directly when dust and smoke particles are trapped by vegetation. Re-search has shown that in average, 85% of air pollution in a park can be filtered (Sorensen, 1997).

II. MATERIALS AND METHODS

Using standard methods dried powders of both the fresh leaf sample and leaf litter sample are tested for their mineral content. 100 grams of each sample were tested and monitored. Then the estimated values are compared to find weather the fresh leaf or leaf litter contain more minerals.

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Clupeid fish hosts a *Peniculus* sp. (Pennellidae, Siphonostomatoida, Copepoda)—First report on new host and season dependent prevalence

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Abstract

Pennellid copepod *Peniculus fistula fistula* (Nordmann, 1832) (Synonym: *Peniculus fistula* Nordmann, 1832, Aphia ID: 745880), a worldwide distributed species, has been recovered from at least 19 teleost families. The present paper reports for the first time from the Malabar coast (South India), not only the existence of a new host family, Clupeidae, hosting this parasitic copepod species (*P. fistula fistula*) but also their season dependent hosting. A total of 123 marine fish species, belonging to 77 genera and 38 families surveyed along the Malabar coast, only the clupeid, *Anadontostoma chacunda* (Hamilton, 1822) was shown to be infected by this copepod species; all the recovered (copepod) parasites were invariably found attached at the mid portion of the caudal fin lobes and lying parallel to the host body, indicating the strict site-specific parasitisation. There is a discrete seasonality in the prevalence (P<0.05) as the sign of infection was noticed during the period from September to May with relatively high prevalence during winter months (November–January). During the monsoon months (June–August), the host fish was found completely free from *Peniculus* infection. Interestingly, all the 229 recovered specimens (*P. fistula fistula*) were gravid females having paired uniserrate egg sacs with the length more than its own body length.

Key words: clupeid fish, *Peniculus fistula fistula*, host specificity, seasonality, prevalence

Citation: Kattambally Rijin, TMV Mumthaz, Kappalli Sudha, Anilkumar Gopinathan. 2019. Clupeid fish hosts a *Peniculus* sp. (Pennellidae, Siphonostomatoida, Copepoda)—First report on new host and season dependent prevalence. Acta Oceanologica Sinica, 38(12): 118–125, doi: 10.1007/s13131-019-1517-0

1 Introduction

Copepods are known to be one of the most recognized crustaceans that parasitize on fishes. More than 2 000 species of copepods are known to infect the marine and the freshwater fishes. They are found all over the external body surface of the host as well as in more sheltered microhabitats (Arnal and Morand, 2001; Nagasawa, 2015; Youssef et al., 2016; Abdel-Gaber et al., 2017). These parasitic copepods draw considerable attention of researchers worldwide, on account of their economical, ecological and evolutionary impacts (Bunkley-Williams and Williams, 2009). Pennellidae, one of the major families of parasitic copepods, comprises 140 species belonging to 20 genera and most of them appears to be mesoparasites of marine fishes and aquatic mammals (Boxshall and Halsey, 2004; Ho et al., 2007; Uyeno and Nagasawa, 2010; Ismail et al., 2013; Moon and Choi, 2014). Among them (Pennellidae) *Peniculus* forms the largest of all genera, comprising 14 valid species (Maran et al., 2012). Their members are highly transformed ectoparasites which generally prefer to infect the body surface and fin rays of actinopterygian fishes (Ismail et al., 2013; Moon and Choi, 2014). The fishes, *Terapon jarbua* (Terapontidae) and *Daysciaena albida* (Sciaenidae) from Indian waters host *P. teraponi* and *P. sciaenae* respectively (Gnanamuthu, 1951). *Peniculus ostraciontis* was found to parasitize the fins of rock fish, *Sebastes schlegeli* (Sebastidae) along the Korean coast, humpback turretfish, *Ostacion gibbosum* (Ostraciidae) and *Lactophrys* sp. (Ostraciidae) along the Japan coast (Choi et al., 1996). *Peniculus truncatus* infects the dorsal fin of Korean rock fishes such as *Sebastes schledge* and *S. oblongus* (Maran et al., 2012). *Peniculus minuticaudae*is shown to infect four species of Monocanthid fishes *Stephanolepis cirrhifer, Thamnaconus modestus, Aluterus monoceros* and *Paramonocanthus japonicas* and a Chaetodontid fish *Roa modesta* from Japan (Alexander, 1983; Okawachi et al., 2012). *Peniculus fistula fistula* von Nordmann, 1832 (Synonym-*Peniculus fistula* von Nordmann, 1832) which appears as more or less widely distributed parasitic copepod being recovered from at least 19 teleost families (Vidjak et al., 2008; Bunkley-Williams and Williams, 2009). However, surveying through the literature, not even a single report showing the instance of clupeid fish being parasitized by any species of *Peniculus*. It is at this context, the present paper reports for the first time from the Malabar coast (South India), not only the existence of a new host family, Clupeidae, host-

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Arthropoda Selecta 28(4): 529–544

Copepod crustaceans parasitizing marine fish of the Kerala coast, India

Веслоногие ракообразные, паразитирующие на рыбе прибрежья штата Керала, Индия

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KEY WORDS: parasitic copepod, Siphonostomatoida, Cyclopoida, fish, Kerala, India.

КЛЮЧЕВЫЕ СЛОВА: паразитические веслоногие ракообразные, сифоностоматоиды, циклопоиды, рыбы, Керала, Индия.

ABSTRACT: Copepods parasitizing marine fish were collected along the Cochin and Malabar coasts (Kerala, India) of the Indian Ocean from July 2013 through February 2019. One hundred species of copepods from 31 genera in eight families, were found living on 85 species fish represented 65 genera in 34 families. Copepods of the order Siphonostomatoida were the dominant parasites; they belonged to five families (Caligidae, Lernaeopodidae, Lernanthropidae, Pennellidae, and Pseudocycnidae), of which Caligidae and Lernanthropidae were the most diverse, comprising 29 species each (in eight and five genera, respectively). The genera *Caligus* and *Lernanthropus*, with 20 and 21 species, respectively, are the most diverse genera of siphonostomatoid copepods. All 26 species in nine genera of the poecilostome cyclopoids belong to the families Bomolochidae, Chondracanthidae and Ergasilidae. The great diversity of parasitic copepods living on fish suggests a need for a more thorough integrative study of the diversity, host specificity and ecology of these copepods, not only from fish along the Kerala coasts, but also along the other coasts of India.

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РЕЗЮМЕ: Копеподы, паразитирующие на морской рыбе, собирали в Индийском океане вдоль побережья Малабар и Кочин (штат Керала, Индия) с июля 2013 г. по февраль 2019 г. Выявлено сто видов копепод, относящихся к 31 роду восьми семейств, обитающих на 85 видах рыб, относящихся к 65 родами 34 семейств. Копеподы отряда Siphonostomatoida — преобладающие паразиты, относящиеся к пяти семействам: Caligidae, Lernaeopodidae, Lernanthropidae, Pennellidae и Pseudocycnidae. Семейства Caligidae и Lernanthropidae — наиболее разнообразные семейства, каждое из которых включает 29 видов и относящихся к восьми и пяти родам, соответственно. Роды *Caligus* и *Lernanthropus*, насчитывающие 20 и 21 видов — самые разнообразные рода сифоностоматоидных копепод. Все 26 видов девяти родов поецилостомовых циклопоид относятся к семействам Bomolochidae, Chondracanthidae и Ergasilidae. Большое разнообразие копепод, паразитирующих на рыбах, указывает на необходимость проведение тщательного комплексного исследования разнообразия, специфичности к хозяевам и экологии копепод не только вдоль побережья Кералы, но и у берегов других районов Индии.

Introduction

Marine fish host a great diversity of parasitic invertebrates, among which copepods are significant [Tripathi, 1960, 1962a,b; Silas, Ummerkutty, 1967; Kabata, 1985; Pillai, 1985]. However, a comprehensive account of this crustacean group along the coasts of India is still in its infancy despite the important initial work on parasitic copepods carried out by [illegible]. The first records of copepods parasitizing fish in Indi

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BUY NOW, PAY LATER: THE NEW BUZZWORD IN THE WORLD OF DIGITAL FINANCE AND E-COMMERCE

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ABSTRACT

In India, Buy Now Pay Later (BNPL) services or schemes have not only become popular recently but are also dominating headlines as the new 'buzzword' of digital finance. This study attempts to investigate the factors that influence the consumers in the Kannur District of Kerala to make transactions and purchase products by making use of this mode of payment. This study also deals with the customer's perception towards the BNPL schemes and services. Data for the study were collected primarily from the users of BNPL services and the collected data were analysed and interpreted with the help of statistical tools such as the Mann-Whitney U test, Kruskal-Wallis H test, etc. The results of the analysis show that that there exists no significant difference between males and females in their perception towards the BNPL mechanism. It also revealed that different income groups have no difference in their perception level. The study also tried to understand the spending patterns of BNPL users and found there is no association between income of the customers and their spending pattern.

Keywords: Buy Now-Pay Later, BNPL, FinTech, EMIs, Consumer Credit

1. INTRODUCTION

Buy now, pay later (BNPL) has become a hot topic in the financial world and it were in usage in western countries for the past few years. According to Worldpay, Inc. BNPL is the fastest-growing e-commerce payment method and is projected to triple its market share in North America by 2023. According to Marketing Week, a recent Thisismoney.co.uk survey found nearly one in five consumers say that they wouldn't shop with a retailer who didn't offer some sort of BNPL scheme. In India too, the BNPL has become the latest trend in consumer financing as well as an instant hit.

As the name suggests, BNPL schemes allow consumers to buy a product or use a service and make payments later at the end of a stipulated time period. A BNPL service or scheme allows a customer to buy products from its partner merchants online or offline and pay back its price within a pre-determined time period of say 15-30 days. In short, the BNPL facility allows consumers to buy an item and pay later in interest-free instalments. BNPL schemes are growing fast across the country since customers find such schemes not only interesting and convenient but also they find such services affordable.

Several FinTech companies, as well as e-commerce sites, are offering BNPL schemes as a mode of payment in various online transactions as well as offline purchases. Recently, even India Post has come up with an idea, Book Now, Pay Later. Reliance JIO, the largest telecom company in India, introduced "Recharge Now, Pay Later facility", an Emergency Data Loan facility that allows users to purchase a data pack and pay for it later. MakeMyTrip, one of the popular online travel companies in India, has been offering a scheme named "Travel Now, Pay Later" to selected customers whereby a customer can book a hotel or tickets by just paying a small amount and the remaining balance can be paid later in instalments. All these show the ever-increasing popularity of BNPL schemes. In fact, such schemes are becoming popular among the customers belonging to the millennials and Generation Z categories. Some of the companies offering BNPL services include PayTM (PostPaid), Flipkart (PayLater), Amazon (Amazon Pay), LazyPay, Simpl, Slice, MobiKwik (Zip). BNPL service providers typically target millennials who do not have credit cards. Some of these services even offer a micro-credit limit from Rs 100 to Rs 50,000 depending on the customer's credit profile.

2. REVIEW OF LITERATURE

Madiha Khan and Shejuti Haque (2020) conducted a study to identify the factors that influence the consumers in Dhaka city to make transactions and purchase products using BNPL mechanism. They found out that education, increase in the demand for luxury goods and improvement in the standard of living availing this payment mode have a significant impact on increasing the value of yearly purchase of products through buy now-pay later mechanism. This increase in the expenditure also revealed the impulsive purchase decision of the consumers.

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Digital Financial Inclusion among Tribes: A Post Covid Pandemic Scenario

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ABSTRACT

Digital financial inclusion ensures that the marginalized and underserved population has digital access to and use of formal financial services. Such services should be personalized to the needs of consumers and delivered responsibly, at a cost that is both affordable consumers and fair for suppliers. For both individuals and companies, the digitalization of finance can reduce costs and open up new market and livelihood opportunities to help nations rebuild better after Covid-19. This study assesses the extent of digital financial inclusion and measures the awareness and usage level of digital financial services among tribal people in Kasaragod district, Kerala. The results showed that there is association between age of the respondents and the period of using digital financial services and also there is no significant difference between males and females in usage of digital financial services. The study reveals that people having different educational group have different level of awareness about digital financial services.

KEYWORDS: *Digital financial inclusion, digital financial services, Covid-19, Tribal People*

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IJTSRD43815

INTRODUCTION

The covid-19 global health crisis, which has quickly become an economic crisis, is seriously threatening people's livelihoods around the world. Financial inclusion implies the provision of financial goods and services at an affordable cost to low-income and marginalized communities in order to enhance their access to financial services and to grow their investment habits. Digital financial inclusion requires the introduction of digital means of cost reduction to access the already financially excluded and underserved population with a variety of formal financial services that are provided responsibly at a cost that accessible for consumers and sustainable for suppliers.

Cash transfer digitalization connects more users to transaction accounts, and mobile based financial services offer easy access even remote areas. All these developments add up to the rate of the poorest segment of society's inclusion in the formal financial channel. The use of digital technology to reach the unbanked population is one of the most recent initiatives adopted by the RBI in the field of financial inclusion, bringing up great potential for financial services. In this context, digital platforms are expected to deliver low-cost financial services to both the poor and rural people, particularly in rural or distant locations, increasing digital financial access and therefore providing high-quality, accessible financial services. Digital technology continues to penetrate every nook and cranny of the country, transforming people's lives. However, it is unclear if these stages reach the bottom of the pyramid, and whether the general public is familiar with disadvantaged populations, such as tribal people, and digital innovation.

REVIEW OF LITERATUREs

Dr. Shafeer P S (2019) conducted a study on usage of digital financial services among youth form the college campus in Kerala by using purposive sampling method for data collection. The study concluded that most young people use mobile banking services at a moderate level, so the level of

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FINANCIAL LITERACY AND ITS IMPACT ON INVESTMENT BEHAVIOUR OF INVESTORS IN INDIA: A REVIEW OF LITERATURE

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ABSTRACT

In recent years, the range of financial products and services have risen tremendously owing to the development of financial markets and due to the improvements in technology. The ever-increasing number of investment options, along with an abundance of information, makes it challenging for investors to make sound investment decisions. This emphasizes the relevance of being financially literate, which will help the investors in improving their understanding about financial matters. Financial literacy will assist an investor in managing personal finances, provide familiarity regarding the various financial products, risk and returns associated with them, and assist in making the most use of their financial resources. Financial literacy has received a great deal of attention in recent decades, since it enhances self-reliance and empowers individuals. It also helps in improving the quality of financial services and contributes to a country's economic growth and development. Considering the growing relevance of financial literacy, an attempt is made through this paper to evaluate the level of financial literacy in India and its impact on investment behaviour of investors by conducting an analysis based on the available literature. Data for this purpose was collected from various secondary sources like websites, research papers and articles. It was found that financial literacy in India is comparatively low. Hence it is recommended to enhance financial literacy level of individuals by providing them with financial knowledge and education.

Keywords: Financial Literacy, Financial Knowledge, Investment preference, Investment Behavior.

INTRODUCTION

In recent years, the range of financial products and services have risen tremendously owing to the development of financial markets and due to the improvements in technology. The ever-increasing number of investment options, along with an abundance of information, makes it challenging for investors to make sound investment decisions. This emphasizes the relevance of being financially literate, which will help the investors in improving their understanding about financial matters.

Financial literacy is the combination of awareness, attitude, skills, knowledge and behaviour needed to make informed financial choices and ultimately, accomplish one's financial objectives. It involves providing familiarity of financial products, managing personal finance and assisting in the effective use of financial resources. Being financially literate enables an individual to understand his current financial conditions and as well as strategies for improving it. This will improve their financial wellbeing. Financial literacy enhances self-reliance and empowers individuals. It also helps in improving the quality of financial services and contributes to a country's economic growth and development. Thus, financial literacy is seen as a crucial component in fostering financial inclusion and eventually, financial stability.

OBJECTIVE OF THE STUDY

- To evaluate the level of financial literacy in India and its impact on investment behaviour of investors.

IMPACT OF COVID 19 ON SECTORAL INDICES OF NSE: AN EVENT STUDY

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ABSTRACT

Covid19 have been making drastic changes in the entire world even in all the spheres of life. All the nook and corners of economy is affected by this novel corona virus and Indian economy has been in phase of recovery. In this study the impact of Covid 19 on sectoral indices of NSE along with the benchmark index Nifty 50 is analyzed in relation to the major events happened in India. A short term event windows of all events are created and based on the closing price of indices Matched Pair's t- test is used to analyze the data. Pearson's correlation is also used to know the short term movement of market. It's identified that Nifty 50 always showed a tendency to minimize the decline and all the sectoral indices followed the same except Nifty pharma and Nifty IT. The increasing number of Covid 19 positive cases and fatality rate showed an impact of decline in the market.

Keywords: Covid 19, NSE Sectoral indices, Major events

1. Main text

As Sir John Templeton said "The four most dangerous words in investing are: 'this time it's different.'". The minuscule chance of changing the nature of stock prices is evident from the stock market all the time. Even in the current situation we have been facing such a different time. Novel Corona Virus is the ruling authority today. Every facets of world has influenced by its mutation. Covid 19 has its importance on all the spheres of life. World economy has faced a crucial time and there isn't any

Chapter –V

05

Impact of COVID-19 on the Savings and Investment Patterns of Individual Investors of Kerala

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ABSTRACT

The outbreak of Covid-19 and the consequent lockdown have affected almost all kinds of human activities. It has not only caused a massive health catastrophe, but also left the world economy in shambles. Savings and investments have always been the foundations of a strong economy. Hence in the current scenario, they can serve as the pillars to support the economies to survive the global economic crisis. This study is proposed to evaluate the

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Impact of Demographic Traits and Personality Traits of Investors on Their Risk-Bearing Capacity: A Study with Special Reference to Investors of Kerala

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Abstract
Investment decisions form a major part of every individual's life. Behavioral finance which puts forward a new dimension in the field of finance recognizes that investment decisions are made after considering numerous psychological, economical and social factors. One of the important criteria considered while making any such decision is the risk. It includes uncertainties associated with the investment opportunity as well as the investors' risk-bearing capacity. Investors' risk-bearing capacity is in turn determined by numerous other aspects. An effort is made here to determine whether the risk-bearing capacities of investors are influenced by the demographic factors and personality traits. 120 investors of Kerala State were selected as the sample for this purpose. Analytical results indicated that the risk-bearing capacity is dependent on gender, occupation, and monthly income of the investors. Further, it was noticed that those who have low neuroticism scores and high scores in agreeableness, extraversion, and conscientiousness took higher risks compared to others. This indicated that neuroticism trait was found to have a negative correlation with risk-bearing capacity whereas; agreeableness, extraversion, and conscientiousness were found to have a positive relation. The study concluded that factors like demography and personality have a strong influence on an investor's risk-bearing capacity.

Keywords: Demographic Traits, Investment Pattern, Personality Traits, Risk-Bearing Capacity.

I. Introduction
In everyday life, people take a variety of decisions considering their pros and cons. All these decisions are based on their understanding level, age, moral values they hold, their personality, the urgency of the situation, etc. The basic idea behind every decision is what will its consequences be, whether negative or positive. Similarly, when one makes an investment decision, they consider what returns they will get from investing in that particular product and what will be the risk they would be taking while investing. Many factors influence investors' decisions. Risk is a major component of investment, understanding the nature of risk, and the capacity to take risks becomes a very essential part of investors' decisions. Risk is perceived as "an exposure to a proposition of which one is uncertain" (Holton, 2004). The risk associated with an asset includes the features of the asset, maturity period, amount to invest, mode of investing, and many more. Hence, at the time of decision making regarding any investment opportunity, risk accompanying that product becomes a major constituent of that decision (Dhiman & Raheja, 2018).

Though traditional finance theories assume investors' decisions are based on rationality, in actual practice, this is not the case. Emotions, personality, personal beliefs, and many other factors influence a person's decision. Durand, Newby, Peggs, and Siekierka (2013) remarked that decision regarding formation of a portfolio is made by giving more importance to the risk involved than the price of the securities and returns that will be obtained from them. Another aspect considered by investors is the availability of information regarding the securities. These aspects are explained better by the advent of behavioral finance, which describes why and how people make investment choices. The investment decisions of a person are

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Insights Into Work-Family Conflict among Working Mothers: Does Occupation Status Matter?

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ABSTRACT

Working mothers provide a remarkable contribution to the development of our country's economy. There are many changes in women's lives in the modern era. The present life of working mothers is extremely challenging. The work-family conflict has now evolved as an essential and universal problem for working mothers in today's world. This study set out to research significant differences in work-family conflict across the occupation status of working mothers. The sample comprises 210 working mothers from the north Kerala region. Data was collected through a field survey by using a structured questionnaire. Collected data has been analyzed by using various statistical tools like one-way ANOVA and Bonferroni Post hoc test. The research has revealed that the occupation status of working mothers had a significant difference in work-family conflict. The Research also revealed that the working mothers in the private sector have a greater work-family conflict than others. This result validates earlier research findings, where the occupation status had a significant influence on work-family conflict among working mothers.

KEYWORDS: *Work-family conflict, Working women, Occupation, Home Responsibility*

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IJTSRD43909

1.0 Introduction

The rise in the number of women in the workforce is a worldwide phenomenon, and India is no exception. In recent days, working mothers experience acute stress in balancing between the workplace and home. Flexible learning through the use of IT has increased their working time and is still engaged in managing and administrating along with other related jobs like record keeping, office work, conducting the meeting, accounting, etc. This has increased working hours from early morning to late evening and has affected the personal lives of workers in the field.

In recent decades, the profiles of women's employees have changed considerably. Families have changed from the traditional position of male breadwinner to the position of dual-earning couples (Choudhary & Singh, 2016). Women in the pre-centuries were restricted to their homes and very few were allowed to work in the factories/business/farm sectors/petty shops. Rarely some women were permitted to get higher education and permission to this was fully dependent upon the permission of their parents/guardians. As the economy grows rapidly, women secure more space to get more information, education, and jobs. Women practically enter every sector/branch of industry. This situation has provided an important challenge for working women, to play an enhanced role in their homes and to fulfill their obligations towards children, parents, husband, family, and social societies with satisfaction altogether.

Sometimes, she has to take care of her extended family member and as a result, she encounters significant stress to maintain a balance between her career and family life. Working women are so obliged to handle simultaneously many activities and increased duties for a balanced professional and personal life. With the increased workload, they have to encounter significant pressure and strain upon their health also. Working mothers have to discharge various roles and responsibilities throughout their life. When they are unable to balance between professional and personal life; conflict takes place.

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Moving towards Better Corporate Governance in India: An Analysis of the Uday Kotak Committee on Corporate Governance

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ABSTRACT

Corporate governance is the involvement of different stakeholders such as shareholders, the board of directors, and the company's management in determining the performance of the company and direction. In a business, the relationship between the owners and, as a result, the managers must be strong, and there should be no conflict between the two. This paper seeks to summarize the recommendations of the report submitted by the committee on corporate governance to SEBI. The committee's report nominated by the Securities and Exchange Board of India under Uday Kotak's chairmanship represents a significant milestone in Indian corporate governance. On 5 October 2017, the SEBI Committee on Corporate Governance, headed by Mr. Uday Kotak, formed on 2 June 2017, recommended major changes to existing regulations. Coming almost two decades after India's first corporate governance initiative, in the form of the CII Code released in 1998, the committee's recommendations have upped the governance ante. They also built on the strong foundation laid by the efforts of previous committees entrusted with the issue, as well as the legislative and regulatory changes that resulted. The primary objective of this paper is to analyze the Uday Kotak Committee Report on Corporate Governance in India. For the purpose of the research work, secondary data was used to explain the committee report on corporate governance. This paper also explains the basis concept of corporate governance. The board's composition, its independence and functioning, the involvement of auditors, shareholder engagement and improvement of corporate reporting are the subject of several recommendations. Some of the most important reforms include an increase in the size of the board of listed companies to six members, ensuring that at least half of the listed boards of directors be independent.

KEYWORDS: *Corporate Governance, Uday Kotak Committee, Independent Directors, Stakeholders, Board of Directors, Sarbanes-Oxley Act*

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I. INTRODUCTION

Corporate governance is the system of laws, procedures, and processes that guide and regulate an organization (Li, S., & Nair, A. 2007). Corporate governance includes effectively balancing the needs of the many stakeholders of a business, such as shareholders, management, consumers, suppliers, financiers, government, and society (Singh. 2013). Since corporate governance also provides the mechanism for achieving a company's goals, it covers almost every management domain, from action plans and internal controls to performance assessment and corporate disclosure (Bhasin, M. 2012).

Upon the development of corporate organizational structure, the corporate governance framework gained broad acceptance and, very peculiarly, it was prevalent throughout the world in various manifestations (Bhardwaj, MN., & Rao. 2014). The concept of corporate governance has been recognized through the establishment and creation of various committees and the formulation of various regulations throughout the world. As for India, after the 1991 economic reforms, the Govt. India found it fit to respond to changes taking place around the world, and the initiatives suggested by the Cadbury Committee Report became popular accordingly. To give due prominence to the Confederation of Indian Industry (CII), the Associated Chambers of Commerce and Industry (ASSOCHAM) and the Securities and Exchange Board of India (SEBI) set up committees to suggest corporate governance measures (Bhardwaj, MN., & Rao. 2014) (Sanan, N., & Yadav, S. 2011). The study of different committees helped a lot to streamline the organization worldwide.

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Payment Banks in India: A comprehensive Analysis

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Abstract

One of the greatest difficulties facing the Indian economy today is the banking sector's non-inclusion in rural India. Any traditional bank would find it unprofitable to open a new branch in every village. A payments bank, as defined by the Reserve Bank of India, is a new type of bank that works on a smaller scale than a traditional bank and does not carry any credit risk. It can perform the majority of banking functions, but it cannot make loans or issue credit cards. The goal of establishing payments banks is to increase financial inclusion by providing small savings accounts and payments/remittance services to migratory workers, low-income families, small enterprises, other unorganised sector firms, and other users. Rather than having physical branches, these banks operate digitally (via mobile phones and other internet-connected devices). Through this study, the researcher is seeking to make a detailed investigation to the payment banks in India.

Key words: Payment banks, financial inclusion, revenue stream

Introduction

The Indian government wants its digital India plan to reach every Indian citizen. To realise the goal of digital India and to promote financial inclusion in the country, the Reserve Bank of India envisioned the notion of payments banks, which will boost financial service penetration by reaching regions where traditional banks cannot. The purpose is to give financial services to workers, low-income families, small enterprises, and others who do not have (or have restricted access to) them. Commercial banks' fundamental drawback is that they have a limited geographic reach. By opening a payments bank, this restriction is abolished. A payment bank is a public limited company that has been registered under the Companies Act of 2013 and has been granted a licence under Section 22 of the Banking Regulation Act of 1949 as well as a special authorization by the RBI to operate as a payments bank. Only 11 of the 41 companies that filed for a payments bank licence were granted. RBI took into account the company's network and reach as one of the most important elements. As a result, payment bank licences have been issued to companies that provide mobile telecommunications services, supermarket services, prepaid wallet services, and other similar services in order to serve consumers and small businesses who would otherwise have limited or no access to banks. Payments Banks will augment the potential of financial inclusion in the Indian economy. It will allow those citizens who have only transacted in cash, to head towards formal banking. Traditional banks may be reluctant to open branches in every village due to its uneconomic returns, but simple mobile phone coverage is all that is required now. India also serves as a big remittance market and with money transfers possible through mobile phones, workers and migrant labours could simply shift to Payments Bank and send their money home.

Literature Review

Thushara T.K. (2020) in the study "Role of Payment Banks in Financial Inclusion," argued that financial inclusion aims to remove the barriers that prevent people from participating in the financial sector and benefiting from its services. Payment banks' savings and remittance services are aimed at persons who live in rural regions or who have little or no bank access. Currently, the RBI has awarded licences to corporations that operate supermarket chains (with a significant distribution network), mobile operators (with a large client base), and postal services which tap in a large number of customers. . Because these firms have a wide distribution network or client base, they aid financial penetration by ensuring that financial and banking services are available to everyone in the country. This encourages citizens to save money. **Dr. Prasanna Kumar T M and Mr.Arjun J (2020)** in their study reveals that there are various RBI restrictions on this payment banks. Deposit collection for payments banks is capped at Rs 1 lakh per customer, and they are not allowed to lend. The money collected as deposits has to be parked in government securities and larger banks. Payments banks are proving to be nothing more than aggregators. Payment banks were established with the primary goal of boosting the effect of the financial inclusion movement. There are numerous bottlenecks that need to be addressed before the real benefits of payment banks. Hundreds of millions of Indians lack access to financial services. They are unable to get government benefits, loans, insurance and even interest on savings. **Bhansali Shrey and Iyer Geeth (2018)** investigated the views of various groups of the Indian people on the RBI and Government of India's payment banks initiative. Persons are aware of the payment banks being launched in our nation by the RBI, and the payment banks' target market, namely small company owners, migrant workers, and other people from low-income categories, are eager to utilise payment banks, according to the survey. According to **Dr. G. Sabitha**

Social Media Marketing; Growth and Reflection in Business

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Abstrac**t**

We live in a society which continuously interact within. Social media platforms are the largest community in the world. Through these we can share not only information and knowledge, but also we can share our feelings and emotions. Nowaday'smoreandmorebusinessesarestartingusingthisplatformformarketing. Compared to the traditional marketing, social media marketing is becoming fast growingwidelyacceptableamongthepublicandbusinessfirms.Increasingnumber of social media users is being reflected in the fast growth of social mediamarketing inIndia.Inthispapertheresearcher triestoanalyzetheconceptofsocialmediaand social media marketing and also proposes to discuss the growth of social media platforms in India. How the growth of social media platforms and social media marketing are helping the business firms is also analyzed through different perspectives.

*Key words:*social media, social media marketing, traditional media marketing, social media platforms

Introduction

We are living in a world where moments are made by posting everything through a clickin the social media platforms. Social media platforms are becoming the main communities. People are sharing their feelings and emotions endlessly in social media. One of the important features of social media is that the community has no physical barrier. It helps everyone to share anything without any limit from anywhere.

The limit less scope of social media platform makes it aneye-catching place of the marketers. Business firms starts making use of this place for marketing. It helpsin growthof the social media marketing concept. Today it became mandatory for business to maintain a social media account to be in touch with their targeted consumers for communication or for makingannouncement. On the other side social media marketing also helps the business firms in making acompetitive advantage. Through social media, business firms can get easy response from their customers. That's why many of the firms are introducing their product through social Media like

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Tax Planning Measures among Individual Taxable Assessees: An Exploration of the Age Effect

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ABSTRACT

Tax planning allows investors to reduce their tax liability on investment profits. To take advantage of tax planning, the assessees must be aware of the various provisions of tax saving plans that are available under the statute. The purpose of this research is to examine the level of awareness on tax planning of individual taxpayers in the state of Kerala. It also aims to determine if the age of the respondents has any major impact on this level of awareness towards tax planning. This research study was carried out by gathering data from various individual taxpayers in the state of Kerala utilizing a well-structured questionnaire. The main findings of the study are that the majority of individual taxpayers are aware of various tax planning measures available under the statute. The findings also confirm that there is a statistically significant difference in awareness of tax planning among the various age categories.

Keywords: *Tax planning; Tax awareness; Individual assessees; Age.*

1.0 Introduction

The government plays a key role in fostering economic growth and development (Frederick *et al.,* 2017; Dey & Varma, 2016). Resources are required for the country's economic growth and development (Vyas & Gondaliya, 2020). Finance is a valuable resource and is derived from a number of sources and then deployed by the government. Taxation is one method of raising revenue wherein to raise funds, the government applies many types of taxes.

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Floral Diversity and Phytosociological Analysis of Sree Narayana College Campus, Thottada, Kannur

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Abstract

The present study is regarding the diversity of flora in the Sree Narayana College, Kannur. To understand and assess richness of the species diversity a taxonomic study of the flora is very much essential. Floristic surveys are the only means by which can achieve this goal. The floristic studies are considered as the backbone of the assessment of phytodiversity, conservation management and sustainable utilization. The flora of Sree Narayana College, Kannur is not yet documented and the present paper is on the floristic survey and phytosociological analysis. A total of 213 vascular plants falling under 181 genera and 72 families were documented. Out of which, the angiosperms dominate with 210 members, while two were Pteridophytes and only one gymnosperm. With respect to their habit, there are 92 herbs, 40 shrubs, 54 trees, 21 climbers, 1 epiphyte, 1 climbing fern, 4 creepers and 1 climbing shrub. Most of them are of medicinal value.

Keywords: Floristic survey, phytodiversity, phytosociological analysis, medicinal value.

Introduction

Flora is the plant life in an ecosystem and make a foundation for all other life in area. They make their own food from sunlight and provide energy for the rest of the ecosystem and it is a true fact that flora thrives in even the most harsh environment in the world. Campus flora maps the location of individual plants that provides botanical information on each species. For enumeration and quantification of plant diversity, in-depth studies are to be conducted in these region considering the potential impact of development on biodiversity. This need to be assessed from a biodiversity view point to indicate the extent to which the disturbance will have impact on biodiversity.

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Ethnobotanical Survey of the Sacred Grove, Sree Oorpazhachi Kavu, Kannur District, Kerala, India

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Abstract Sacred groves are one of the finest examples of traditional in situ conservation practices. These are patches of natural near-climax pristine vegetation of trees and associate groups of organism, managed as a part of local cultural tradition. In order to explore the medicinal values of the sacred groves an ethno-floristic survey in sacred groves was done to identify medicinal plants used by locals for several diseases. It revealed that Sree Oorpazhachi Kavu consist of a total of 86 vascular plants falling under 75 genera and 38 families. Out of which, the angiosperm dominate with 83 members, while 2 were pteridophytes and *Cycas circinalis* is the only gymnosperm. Leguminosae emerges as the largest family that contributes about 12 species. The listed plant species are mainly used to cure the common diseases such as fever and headache, cough, cold, many skin diseases, wound, diabetics, diarrhoea, dysentery, cancer, ulcer, brain haemorrhage, urinary infection, bronchitis, rheumatoid, arthritis, asthma, inflammatory swellings, anemia, vomiting, liver diseases, constipation, high blood pressure, obesity, malaria, muscle pain, stomach ache, irregular menstruation, eye diseases, leprosy, toothache, hair loss, eczema, kidney stone etc. Scared groves remain unexplored and no comprehensive studies in ethno-botanical issues, so the conservation of medicinal plants diversity of these groves is therefore most important.

Keywords: *sacred grove, conservation, diarrhea, rheumatoid, medicinal plants*

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1. Introduction

Biodiversity is the most valuable natural resources without which the overall development of man is not possible. Conservation and management of biodiversity is one of the foremost needs as vast expanses of vegetation continue to be under the threat of denudation and degradation all over the world [1]. Since time immemorial conservation of natural resources has been an integral part of several indigenous communities. Natural worship has been a key force in determining human attitudes towards conservation and sustainable utilization of biodiversity.

In the course of time science and technology developed and industries were established and expanded to meet the increasing demand of people, furthermore habitat alteration, over exploitation, pollution and introduction of exotic species also threatened the global biological resources. This adversely affected the biological balance and socio-economic status of people. Therefore, for the conservation of biodiversity many laws were enacted from time to time. The smallest group often harbours some old and magnificent specimen of trees and climbers [2]. The larger groves are treasure trove for the naturalist, supporting many threatening species in the area and are becoming extinct with deforestation sacred trees such as Banyan, Peepal and other species of *Ficus* supports a variety of life forms.

In India sacred groves are known by several names – Kavu, Nagakkavu, Sarpakkavu in Kerala, Deorais or Deoban in Maharashtra, Orans or Kenri in Rajasthan, Devarakadu, Pavithavana or Sindhuvana in Karnataka and Sarana in Bihar. Methods of conservation vary in different states according to their intrinsic nature, distribution and local beliefs [3]. However such sacred groves are not restricted to India alone. They are also found in Afro-Asian countries like Syria, Nigeria and Turkey.

Kerala is one of the states in India where the sacred groves are widely distributed from the West coast to the Eastern high lands. In Kerala there are about 2000 sacred groves [4] of which 352 are in Kannur district [5]. Generally local communities call these natural islands of vegetation-'kavus'. These kavus are still preserved by mythological beliefs. Theyyam is an indigenous ritualistic art performed mainly in these kavus. The practice works on the local beliefs is that residing deities from these sacred groves are summoned to the performing mana body. The sacred art form has for centuries secured the groves from destruction. At present most of the sacred groves are on a path of gradual decline in occurring various socio-

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Phytosociological and Floristic Survey of the Sacred Grove Thekkumbhad Thazhe Kavu, Kannur District, Kerala, India

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Abstract Conservation of nature and natural resources has been an important part of cultural ethos, especially in remote rural and indigenous communities in many parts of the world, including India. These communities consider themselves connected with their biophysical environment in a web of spiritual relationships. Sacred groves are the relic forest segments preserved in the name of religion and culture. These groves are mostly associated with temples and are also culturally important. They manifest the spiritual and ecological ethos of rural indigenous communities. Many taboos are associated with sacred grove which helps in managing resources well through ritual representation. Different festivals are organized, where the local communities reaffirm their commitment to the forest and the deity. Sacred groves, in general, are a valuable tool of biodiversity conservation. The sacred groves as the treasure of repositories of a variety of plant species, the present study is conducted to find out the plant diversity in the sacred grove, Thekkumbad Thazhe Kavu in Kannur district, Kerala. 15 species present in this Kavu are least concerned, and they are *Acanthus ilicifolius, Achrosticum aureum, Aegicera scorniculatum, Bruguiera cylindrica, Caryota urens, Cyperus ratundas, Fimbristilis ferrugenea, Kandelia candel, Lindernia crustacea, Lindernia tenuifolia, Ludwiga hyssopifolia, Pandanus odorifer, Panicum repens, Rhizophora apiculata* and *Rhizophoram ucronata*. The species *Caryota urens* securing higher IVI of 38.835. The species of least significance (lowest IVI) were shown by *Derris trifoliate, Emilia sonchifolia* and *Rhizophora apiculata*. Based on IVI score made by this species it is understood that these are poorly established species in the communities of the study site.

Keywords: *indigenous, spiritual, ecological ethos, taboos, biodiversity*

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1. Introduction

Sacred groves are the relic forest segments preserved in the name of religion and culture. These groves are mostly associated with temples and are also culturally important. They manifest the spiritual and ecological ethos of rural indigenous communities. Various cultural and religious festivals are often arranged by local people within these patches, which they call 'Mela.' As a way of conservation of nature, sacred groves have proven to be a well-tried and tested method over thousands of years [1]. Sacred groves help in the protection of many rare, threatened, and endemic species of plants and animals found in an area. The process of deforestation is strictly prohibited in this region by tribal. Sacred groves did not enjoy protection via federal legislation in India.

They are repository of several medicinal and economically important plants attached with socio-cultural and religious sentiments there exist has undisturbed islands. But today these are adversely affected by human activities. However, such sacred groves are not restricted to India alone. These sacred groves may range in size from a group of few trees to a forest of trees [2,3]. Even the smallest groves often harbor some olden magnificent specimens of trees and climbers [4]. The larger groves are a treasure-trove for the naturalist, supporting many threatening species in the area and becoming extinct with deforestation. As an ecosystem sacred groves help in soil and water conservation besides preserving biological wealth. Preservation of these groves is a crucial need to this era. Assessment of biodiversity proves extremely practical for determining decreasing natural diversity, the effect of exotic species, migration,- and threat to the species.

The ecological processes are well balanced by the influence of biodiversity, which is necessary for human survival. Therefore, the biodiversity-rich sacred groves are of immense ecological significance. They also play an important role in the conservation of flora and fauna. Keeping in view the role of the sacred groves as the treasure of repositories of a variety of plant species, the present study is conducted to find out the plant diversity in

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Floristic and Phytosociological Studies of the Sacred Grove, Kayyath Nagam Kavu, Kannur District Kerala, India

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Abstract Religious and traditional beliefs, cultural mores, and practices play a crucial role in the conservation of environment and biodiversity. Sacred groves are patches of land that are communally protected with religious zeal. Kerala is one of the states in India, where the sacred Groves are widely distributed from the West Coast to the Eastern high lands. Most of the sacred groves in Kerala are associated with water tanks, ponds, springs or streams. Many sacred groves are located in catchments near the origins are springs or streams. The present investigation reveals the ethanobotanical and phytosociological attributes of various plant species present in the sacred grove, Kayyath Nagam Kavu, Thaliparamba. 50 vascular plant species were enumerated from the sacred grove. Based on the calculations of frequency, density and abundance, IVI of each species was calculated. Of the various plant species available in the study area, the species *Hopea ponga* secured highest IVI of 32.612. The other species like *Canthium rheedi*, *Scleria lithosperma* were also showing highest IVI. In this site lowest IVI was shown by *Rungia pectinate*, *Justicia nagpurensis*, *Jasminum malabaricum*, *Pongamia pinnata*, *Mallotus philippensis*, *Olderlandia auriculata* and *Piper nigrum*.

Keywords: *phytosociological, ethanobotanical, sacred groves, biodiversity, conservation*

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1. Introduction

Conservation of nature and natural resources has been an important part of cultural ethos, especially in remote rural and indigenous communities in many part of the world, including India. These communities consider themselves connected with their biophysical environment in a web of spiritual relationship. These rural communities consider plant, animals or even rivers and mountains as their ancestors and protect them. The sacred groves are the relic forest segments preserved in the name of religion and culture. These groves are mostly associated with temples and are also culturally important. They manifest the spiritual and ecological ethos of rural indigenous communities. Various cultural and religious festivals are often arranged by local people within these patches, which they call 'Mela.' As a way of conservation of nature, sacred groves have proven to be a well-tried and tested method over thousands of years [1].

According to Malhotra *et al.*, [2] groves are those area dedicated by local communities to their ancestral spirits or deities. They have immense value from genetic diversity as well as ecological point of view and rich in flora. They are repository of several medicinal and economically important plants attached with socio-cultural and religious sentiments there exist has undisturbed islands. But today these are adversely affected by human activities. However, such sacred groves are not restricted to India alone. These sacred groves may range in size from a group of few trees to a forest of trees [3]. Groves are important reservoirs of biodiversity, preserving indigenous plant species and serving as asylum of Rare, Endangered and Threatened (RET) species [4]. Even the smallest groves often harbor some olden magnificent specimens of trees and climbers [5]. The larger groves are treasure-trove for the naturalist, supporting many threatening species in the area and the becoming extinct with deforestation. As an ecosystem sacred groves help in soil and water conservation besides preserving biological wealth. But tragically they are slow disappearing under the influence of modernization [6]. There is a recent awakening among the environmentalists to preserve these groves. Some of the sacred groves need immediate attentions; they contain rare and threatening plants. Preservation of these groves is crucial need to this era. Assessment of biodiversity proves extremely practical for determining decreasing natural diversity, effect of exotic species, migration and threat to the species. Many taboos are associated with both the SGs, which help in managing resources well through ritual representation. Sacred groves, in general, are a valuable tool of

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Healthcare management through mitigation of COVID-19 pandemic with leafy vegetables

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Abstract

COVID-19 pandemic becomes one of the leading challenges across the world. To fight against the virus, compulsory maintenance of nutritional status is very important. Age, sex, health status, medications and lifestyles are the important factors affecting individuals regarding their nutritional status. Due to the COVID-19 pandemic, the nutritional status of individuals is destabilized. To survive the current situation, a sustainable nutritional dietary should be maintained for strengthening the immune system. One of the most important ways to maintain the immune system is to supplement enough vitamin C. A spectrum of viruses that belongs to the coronavirus in humans usually causes the common cold, which is recently severe acute respiratory syndrome (SARS). SARS considered a major threat to public health, which is an emerging infectious disease. According to WHO, COVID-19 caused by the coronavirus, in which most people probably have low immunity. Eighty-five per cent of the immune system has been made by plant-based food supplements, which increase beneficial intestinal bacteria. Minerals like zinc, magnesium, micronutrients, herbal foods and vitamins C, D and E and plenty of water promote health, which is highly helpful to overcome the infection. Many studies revealed that COVID-19 infection prevented by the powerful antioxidant glutathione and bioflavonoid quercetin; to control COVID-19, plant-based foods playing a very important role to increase the immunity of people. Leafy greens and vegetables play a very important role in food and nutritional safety. Green leafy vegetables are an excellent source of vitamins, phenolic compounds and minerals. Calcium and iron are rich in leafy vegetables than that of staple food grains. Folic acid is also present in leafy vegetables. Different leafy greens, especially *Moringa oleifera* leaves, contain a high amount of folic acid compared to other leafy and non-leafy vegetable plants. This review paper aims to explore the nutritional and antinutritional factors of some important leafy vegetables. The content of nutritional and antinutritional factors varies among the genera and species of most of the edible leafy vegetables. Antinutritional factors are considered the important compound in the plant, in which they determine the absorption capacity of nutrients in human beings. Important dietary factors such as phytates, oxalates, nitrates, glycosides and cyanogenic are fruitful in many health-related problems. This article mainly explores the significance of nutrition and the use of leafy vegetables to boost up the immunity system in human beings and provide valuable dietary strategies about food safety and nutrition to survive COVID-19 pandemic around the world, especially in India.

1. Introduction

The COVID-19 disease attacked the people with a low immune system, in which people were coming under averages. Due to the inadequate responses of the immune system, it will be an open invitation for different diseases, mainly heart disease, diabetes, cancer, etc. To increase the body's immune system, plant-based food support and help intestinal beneficial bacteria and the gut microbiome (Casanova, 2006; Chan *et al.*, 2020). Corona patients need plenty of water which will help to keep their mucous membrane moist, which help to lower the chances of affecting flue and cold. Natural preparations like coconut water, homemade fruit juice, green tea are helpful to stress thirst and smell. The morphological and chemical composition of the COVID-19 virus is similar to human surrogate coronaviruses (Liang, 2020; Chan *et al.*, 2020). Data are available to both sustainability in the environment and effective coagulation methods regarding the COVID-19 pandemic (Baudoin and Frosco, 2002; Aguilar *et al.*, 2017; Ahern *et al.*, 2020; WHO, 2020). World Health Organization (WHO) and CDC (Centers for Disease Control) states that elderly people having health problem, especially diabetes, lung disease and heart disease are more susceptible to COVID-19 disease. Such people are very difficult to fight against this deseases. Precautions must be taken youth and healthy individuals since this disease is easy to spread. Important symptoms of COVID-19 disease are cough, breath and brevity. Proper nutrition and hydration are vitally important in this

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Density and Diversity of Zooplankton in Ashtamudi estuary of Kerala, India

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Abstract-- The Thekkumbhagam creek of Ashtamudi estuary is facing the problem of degradation due to increasing eco-tourism ,domestic wastes industrial effluents, organic and agricultural wastes. The purpose of this work was to document the seasonal availability of the zooplankton population encountered in this creek during a study period of two years. The plankton samples were collected from selected four stations of the creek and were analysed following standard methods. The present analysis revealed that the Cladocerans exhibited the highest mean value during the monsoon period in station 1. Copepods attained its peak in station 1 during the pre-monsoon period. Station 3 exhibited the Rotifer peak during post monsoon period. Station 4 was dominated by Crustacean larvae during the pre- monsoon period. Protozoa exhibited its highest mean value during the post-monsoon period. Molluscs reached its maximum value during pre-monsoon period in station 4. Station 2 recorded the maximum mean value of Ostracods during pre-monsoon period. The evaluation of the dynamics of zooplankton population with remarkable seasonal variations is an effective and appropriate method of estimating the fishery potential of an area .So, there is an urgent need of first educating the people of the importance of the estuary than the laws could be effectively implemented.

Key words - Cladocerans, Copepods, Rotifers, Protozoa, Ostracods

I. Introduction

Planktons are small organisms that constitute the basic link of the food chain of the aquatic system. Zooplanktons provides fish with nutrients, since fish requires proteins, fats, carbohydrates, mineral salts and water in the right proportion as they make up an invaluable source of protein, amino acids, lipids, fatty acids, minerals and enzymes and are therefore an inexpensive ingredient to replace fish meal for cultured fish (Fernando, 1994 and Kibria *et al.*, 1997). The zooplankton study is of necessity in fisheries, aquaculture and paleolimnological research. They are also globally recognized as pollution indicator organisms in the aquatic environment. Therefore, plankton population observation may be used as a reliable tool for biomonitoring studies to assess the pollution status of aquatic bodies.

Zooplankton encompasses an array of macro and microscopic animals and comprises representatives of almost all major taxa particularly the invertebrates. They play a vital role in the marine food chain. The herbivores zooplankton feed on phytoplankton and in turn constitute an important food items to animals in higher trophic levels including fish. Zooplankton supports the economically important fish populations. They are the major mode of energy transfer between phytoplankton and fish. (Hrovick and Wilhm, 1984). The zooplankton in the surface water of a fresh water lake is those which are caught in a fine meshed net towed slowly through the water column and consists mainly of Protozoans, Rotifers, Cladocerans, Copepods and a great variety of larval forms(Odum,1971). Although zooplanktons are usually considered to be good indicators of environmental changes and have a fundamental role in energy flow and nutrient cycling in aquatic ecosystem. Zooplankton study is a prerequisite for water quality study since it forces for scientific research on the mechanism of eutrophication and its adverse impact on an aquatic ecosystem.

The nature and distribution of plankton varies considerably with respect to seasons and alterations in water quality. Their dominance also leads to qualitative changes of aquatic systems. Information pertaining to the nature, type and distribution of these organisms, provide clues regarding the prediction of water quality and the environmental conditions

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Estimation of the plankton population, diversity and correlation analysis with sustainable fishery of the Ashtamudi estuary and Thekkumbhagam creek, Kerala India

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***Abstract*– The Thekkumbhagam creek of Ashtamudi estuary is having a high potential for fishery development and as per the available records no scientific study on availability of the commercial fauna pertaining to the Thekkumbhagam creek alone has been conducted so far. The present study deals with the evaluation of the impact of eco-touristic activities on the availability of commercial fauna of the creek. For adequate information the study focuses on the four selected stations of Thekkumbhagam creek namely Pallikodi (station 1), Kaadanmoola (station 2), Munambathukadavu (station 3), Sankaravilasam kadavu (station 4). Around 51 species of fishes, 7species of shrimps, 2 species of crabs, 5 species of bivalves and a single species of oyster were encountered from the selected four stations. In station 1, the Shannon Diversity index and species richness of fishes and shrimps were comparatively higher than other stations. In station 2, the evenness index was greater than that of station1. Station 3, diversity indices and species richness were much lower than that of station 1 and station 2 but greater than station4.Study point out that many species in the study area are being threatened by various human activities. Correlation analysis between phytoplankton and diversity indices revealed that a significant positive relationship existed between species richness and diatoms in all stations except station 4. A significant positive correlation between rotifer and dominance index was noted. From the present study it is concluded that the best approach to the conservation of this species is to disseminate conservation information, education and practices to fisherman and stake holders about the danger of extinction of species. It is important to adopt measures for the rehabilitation of fishery stocks that shows symptoms of depletion.**

Key words - Dominance, evenness, richness, shell fishes, bivalves

I. Introduction

Fishes have a great significance in the life of mankind, being an important natural source of protein since time immemorial. Marine fisheries sector had undergone vast structural changes during the last few years. The shift from traditional fishing methods to motorized and mechanized fishing is a major one. Throughout the world, estuaries and associated coastal waters support numerous essential fisheries, but estuaries in particular are among the most modified and threatened of aquatic environments. Due to irrational fishing practices, environmental aberrations like reduction in water volume, increased sedimentation, water abstraction and pollution over the years, led to the decline of fish diversity and few species had been lost from the aquatic ecosystems of India and they may be categorized in to endemic, endangered and threatened category. Unbridled sand mining in most of the rivers in the state had resulted in changes in the aquatic system and dwindling of fish wealth. This has also led to the endangering of certain endemic and endangered fish species of the state.

Neendakara harbour adjacent to the Thekkumbhagam creek of Ashtamudi estuary was one of the foremost centres of marine fish production and landings across the Kerala coast (Thomsiams & Nair, 1980) and receives much attention due to its varied fishery resources (Kurup and Thomas,2004).Gill nets, cast nets, pole and line, hook and line, seine, driving and dredging are the major types of fishing methods used in this area. Stake nets are also another

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A SYSTEMATIC APPRAISAL ON THE COMPARATIVE ACCOUNT ON THE SALINITY LEVELS IN THE THREE RIVERINE ECOSYSTEMS OF KANNUR DISTRICT, KERALA, INDIA

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AUTHOR'S CONTRIBUTION

The sole author designed, analyzed, interpreted and prepared the manuscript.

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ABSTRACT

The world's ecosystems are being threatened by many factors, that entail the urgent need for research and education programs to create awareness in the society for their protection and conservation. The main objectives of the study were to investigate the salinity intrusion and the seasonal variations of various physico-chemical parameters such as temperature, pH, transparency, carbon dioxide, dissolved oxygen, biological oxygen demand of the three riverine ecosystems of Kannur district namely Kakkad, Kattampally and Pullooppi. Water samples were collected during the year 2019-2020 from the study area and the physico-chemical parameters were analyzed with respect to the seasons following standard methods. The study indicates that there was a pronounced variation of most of the water quality parameters with variations in season and remarkably higher level of salinity intrusion was also noticed with respect to seasons. In the present study it has been observed that salinity range from 14.2mg/l to 339 mg/l. Maximum salinity was recorded in site 3 during post monsoon season and the minimum salinity was recorded in site 1 during Pre-monsoon season. Water with high salinity is not suitable for drinking as well as for irrigation purpose. Biological Oxygen Demand values ranged from 0.48 to 9.92 mg/l. The maximum value of BOD was noticed in site 3 (9.92 mg/l) during monsoon season. The results may provide an early warning signal about the degradation of these precious ecosystems. The findings of the present study also provide a better understanding for the need for the restoration of these natural pristine ecosystems.

Keywords: Physico-chemical parameters; salinity; transparency; BOD; dissolved oxygen; pH.

1. INTRODUCTION

A river is a natural flowing water source, usually fresh water flowing towards the ocean, sea, lake or another river. Rivers provide excellent habitat and food for many of the earth's organisms. They contribute more to biodiversity. Rivers are easily disrupted by man's activity's river water is polluted mainly due to the discharge of waste materials from neighbouring areas, factories, sewage outlets, solid wastes, detergents, chemical pesticides used in agriculture, automobile oil wastes etc. Physico-chemical parameter analysis of any aquatic ecosystem is necessary, because any alterations in the hydrography affects the biota to a

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COMPARATIVE ASSESSMENT ON THE ECOLOGICAL HEALTH OF FOUR DIFFERENT PONDS IN MANATHANA REGION OF KANNUR DISTRICT, INDIA

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Freshwater is one of the basic needs of mankind and is essential for the existence of all forms of life. Ponds are an integral component of the hydrological system and perform diverse role in biosphere. Ponds are of immense significance to human civilization as they are sources of water for domestic, agriculture and industrial purposes etc. Now a days we can see that the world's pond ecosystem is in danger. It is threatened by many factors .These include a variety of anthropogenic activities, which entail urgent need for research and education programs to create awareness in the society for their protection and conservation. In the present study physico-chemical parameters of four different ponds in Manathana region of Peravoor panchayat, Kannur district in Kerala, India was determined. Manathana is located in Thalassery tehsil of Kannur district in Kerala, India. It is situated 50km away from sub-district headquarter Kannur and situated in Peravoor grama panchayat. More than six ponds are situated in Manathana village. The present study was conducted over the selected four ponds in Manathana village namely, Manathana pond, Karimbanackal pond, Kunden Temple pond and Madappurachal pond. The objectives of the study were to investigate the seasonal variations of physico-chemical parameters such as temperature, pH, transparency, salinity, ammonia, carbon dioxide, dissolved oxygen, Chemical Oxygen Demand. Water samples were collected during the year 2020-2021 from the study area and the physico-chemical parameters were analysed with respect to the seasons following standard methods. The major objective of this study was to collect information about pond water quality and importance for their conservation against anthropogenic activities. Because of their small size, ponds are much more vulnerable to degradation. Ecological assessment and monitoring of ponds are a major topic in their conservation and management. The improper management of water system causes serious problems in availability and quality of water, since water quality and human health are closely related, water analysis before usage is of prime importance. The study highlights the point that anthropogenic pressure makes responsible for causing destructive nature of pond ecosystems.

Keywords: Dissolved oxygen; chemical oxygen demand; management; anthropogenic; physico-chemical.

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Environmental Perspectives of the Hydrographical Features of Three Different Ponds in Kokkallur Region of Balussery Panchayat, Kozhikode District

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Abstract: **The world's pond ecosystems are being threatened by many factors. These include a variety of anthropogenic activities, which entail urgent need of research and education programs to create awareness in the society for their protection and conservation. In the present work, hydrographical features of three different ponds in Kokkallur region of Balussery panchayath of Kozhikode district was monitored. The study was conducted on three ponds in Kokkallur village namely, Chenery pond, Parakalam pond, Muryankalangara pond. The objectives of the study were to investigate the seasonal variations of hydrographical features such as temperature, pH, transparency, salinity, carbon dioxide, dissolved oxygen, Biological Oxygen Demand and primary productivity of the selected ponds. Water samples were collected during the year 2019-2020 from the study area and the hydrographical features were analysed with respect to the seasons following standard methods. The study indicated that there is a pronounced variation of most of the water quality parameters with variations in season. The alteration of these water quality parameters may provide an early warning signal about the degradation of these pristine ecosystems. The pond water quality is degraded mainly due to discharge of wastes from residential area, sewage outlets, oil wastes, detergents and automobile oil wastes. The findings of the present study also provide a better understanding of this damaged ecosystem and remind the need for the rejuvenation of these natural paradise for enhancing the fishery potential and maintaining the ecological sustenance of this fresh water ecosystem. The main objective of this study is to disseminate information on importance of ponds for their effective conservation and management strategies, especially in India's current scenario. The available studies show that the ponds in India are under threat due to increase in pollution rates and encroachment.**

Keywords: **Hydrographical features, salinity, DO,BOD,COD**

OBJECTIVES OF THE STUDY

- The purpose of the work is to remind the need for the rejuvenation of pond ecosystems for enhancing the fishery potential and maintaining the ecological sustenance of this fresh water ecosystem.
- The main objective of this study is to disseminate information on importance of ponds for their effective conservation and management strategies, especially in India's current scenario.
- The study indicated that there is a pronounced variation of most of the water quality parameters with variations in season. The alteration of these water quality parameters may provide an early warning signal about the degradation of these pristine ecosystems.
- The study highlights the point that anthropogenic pressure is responsible for the degradation of pond ecosystems and found that the pond water is unsuitable for drinking and other domestic purposes.
- Water quality is the most important factor affecting fish health and performance in aqua culture production system, through providing good water quality, ponds can be used for fish culture and also for irrigation.

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A HYDROLOGICAL STUDY ON THE IMPACT OF SEASONAL VARIATIONS OF ENVIRONMENTAL PARAMETERS ON THE PLANKTON POPULATION OF ASHTAMUDI ESTUARY, KERALA

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Original Research Article

ABSTRACT

The Ashtamudi lake, a Ramsar site on the south west coast of Kerala located in Kollam district is the second largest among the thirty estuaries in Kerala. Thekkumbhagam, one among the eight creeks of Ashtamudi lake is a cradle for the post larvae of various fishes, clams, prawns, oysters that provides livelihood to thousands of people around the creek. The main objective of the present work is to remind the need for conservation of the biodiversity of this creek focusing on the planktonic resources that is the inevitable part of the aquatic biodiversity and its sustenance and to prevent its degradation to a mere sewage drain by thoughtless anthropogenic activities. The proper knowledge of plankton is essential as it forms a reliable tool for bio-monitoring and to maintain the sustainable fishery of the creek. The phytoplankton collected from Thekkumbhagam creek from 2008-2010 were grouped under Chlorophyceae, Cyanophyceae, Dinoflagellates, Bacillariophyceae. Zooplankton consists of Protozoa, Cladocerans, Copepods, Rotifers, Crustacean larvae, Ostracods, Molluscs, Bryozoa. The various physico-chemical parameters analysed in the present investigation were air temperature, water temperature, pH, salinity, dissolved oxygen, carbon dioxide, transparency, biological oxygen demand and nutrients such as nitrite, nitrate, phosphate and silicate that exhibited a definite seasonal pattern. From the results it was clear that various physico-chemical characters were closely related to the availability of different types of plankton's groups. Thus, the correlation analysis revealed the dependence of each plankton group with the hydrographical parameters of the Thekkumbhagam creek. Various types of pollution indicating algae were also found. From the present study a knowledge regarding the plankton abundance and its relationship with the the seasonal variations of the Thekkumbhagam creek will be helpful in planning and successful fishery management. In short the present study aims at providing useful data in the

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AN ANALYTICAL STUDY ON THE PREVALENCE OF THE COLIFORM BACTERIA IN THE THEKKUMBHAGAM CREEK OF ASHTAMUDI LAKE, KERALA, INDIA

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Original Research Article

ABSTRACT

The Ashtamudi estuary is of extra ordinary importance for its hydrological functions, biodiversity, rich fishery resources, a good source of fin fishes, prawns, crabs, oysters and thus provides livelihood to thousands of people. Thekkumbhagam is one among the eight creeks of Ashtamudi estuary located in the Kollam district. A perusal of existing literature revealed that no detailed study was carried out regarding the microbial load of this creek. Hence the present work involved the study of the Total Plate Count of the Thekkumbhagam creek that would help in understanding the extent of water pollution. House boats, floating restaurants with hanging latrines, reclamation, destruction of 90% mangrove vegetation by infrastructural development, inadequate port sanitation facilities, land encroachment, sand mining, toilet waste due to improper sanitation facilities for local people residing on the banks on this creek etc added to the deterioration of water quality of this creek. The total plate count ranged from 100 cfu/ml to 43x103 cfu/ml that indicated the intensity of microbial pollution. The bacteriological investigation revealed that the total coliforms ranged from 11 MPN/100ml to 17000MPN/100 ml, faecal coliforms varied form 1MPN/100 ml to 100 MPN/100 ml and *Escherichia coli* ranged from 1 MPN /100ml to110MPN/100ml. Among the stations, station 4 showed the maximum value for total coliforms and station 2 exhibited the maximum value for faecal coliforms and *Escherichia coli*. The comparison of MPN of coliforms with Indian standards for inland waters revealed that the four stations exhibited a total coliform count and *Escherichia coli* count that exceeded the desirable limits which indicated a high level of microbial load. As this estuary serves as the best settling places for clams and oysters besides acting as nursery ground for a variety of shrimps and finfishes, this microbial status report will be useful to the estuarine managers to identify the bottlenecks in the management and development. This emphasizes the need for proper sanitization, preventing indiscriminate dumping of wastes and also to rely upon proper treatment methods to be used to get rid of the degraded water quality.

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Seasonal Variations of certain Physico-chemical Parameters in the Valapattanam River of Kannur district, Kerala

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***Abstract*– Rivers are the primary source of water for drinking, irrigation and other domestic purposes. The present work deals with the analysis of seasonal variations of physico-chemical parameters and estimation of the salinity intrusion in the Valapattanam river of Kannur district. The objectives of the study were to analyse the physico-chemical parameters like temperature, pH, transparency, salinity, carbon dioxide, dissolved oxygen, Biological oxygen demand, ammonia, hardness, chemical oxygen demand and primary productivity with respect to the seasons following standard methods.The alteration of these water quality parameters may provide an early warning signal about the degradation of this precious ecosystems. The river water quality is degraded mainly due to discharge of wastes from residential area, sewage outlets, solid wastes, detergents and automobile oil waste. The result of the studies showed that of all the three sites, site2 and site 3 are the most polluted. In the present study it has been observed that salinity ranged from 48.006 to 1471.73 mg/l. Maximum salinity was recorded in site 2(1471.73mg/l) during the pre-monsoon period and minimum was recorded in site 3 (48.003 mg/l) during the post monsoon period. Saltwater intrusion occurs mainly due to human and natural activities.** This study brings to light the need for proper management of saline water intrusion in the riverine region because of the hardship its negligence brings upon the public that rely on it for livelihood. Strict measures must be brought about in order to adequately manage and control saline water intrusion so as to protect the dependent population from untold hardship that may result in near future.

Key words - Physico-chemical parameters, salinity, BOD, COD

I. Introduction

Water is essential for the survival of all forms of life. Though 80% of earth's surface is covered by water, the fresh water supply has increasingly become a limiting factor because of varied reasons. The expansion of industrialization and exploding population are the major causes for such a situation. Acute short fall of heavy rains, poor water shed management, abundant use of water for house hold and agricultural purposes have led to the overexploitation of the surface water sources especially from the river bodies. Many perpetual rivers become short-lived and even dried up. The Valapattanam River is the largest river in the Kannur district, located in the South Indian state of Kerala. The Valapattanam River originates from the Brahmagiri hills in Brahmagiri Reserve Forest in Karnataka at an altitude of 900-1350m above sea level and drains into the Kannur district. Major tributaries of this river are the Srookantapuram River, Bavali River, Veni River, and the Aralam River.

Rivers are very important in determining human progress by providing drinking water, making the earth as a comfort zone and serving as a medium for transportation. For centuries, humans have been enjoying the ecosystem services provided by rivers without having a knowledge how the river ecosystem functions and maintains its vitality (Naiman, 1992). Man has changed the nature of rivers by controlling their floods, by constructing large impoundments, by over exploiting their living and non-living resources and by using

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A HYDROLOGICAL STUDY ON THE IMPACT OF SEASONAL VARIATIONS OF ENVIRONMENTAL PARAMETERS ON THE PLANKTON POPULATION OF ASHTAMUDI ESTUARY, KERALA

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ABSTRACT

The Ashtamudi lake, a Ramsar site on the south west coast of Kerala located in Kollam district is the second largest among the thirty estuaries in Kerala. Thekkumbhagom, one among the eight creeks of Ashtamudi lake is a cradle for the post larvae of various fishes, clams, prawns, oysters that provides livelihood to thousands of people around the creek. The main objective of the present work is to remind the need for conservation of the biodiversity of this creek focusing on the planktonic resources that is the inevitable part of the aquatic biodiversity and its sustenance and to prevent its degradation in a more stronger [illegible] by thoughtless anthropogenic activities. The proper knowledge of planktons is essential as it forms a reliable tool for bio-monitoring and to maintain the sustainable fishery of the creek. The phytoplanktons collected from Thekkumbhagom creek from [illegible] were grouped under Chlorophyceae, Cyanophyceae, Dinoflagellates, Bacillariophyceae. Zooplankton consists of Protozoa, Cladocerans, Copepods, Rotifers, Crustacean larvae, Ostracods, Mollusca, Bryozoa. The various physico-chemical parameters analysed in the present investigation were air temperature, water temperature, pH, salinity, dissolved oxygen, carbon dioxide, transparency, biological oxygen demand and nutrients such as nitrite, nitrate, phosphate and silicate that exhibited a definite seasonal pattern. From the results it was clear that various physico-chemical characters were closely related to the availability of different types of plankton's groups. Thus, the correlation analysis revealed the dependence of each plankton group with the hydrographical parameters of the Thekkumbhagom creek. Various types of pollution indicating algae were also found. From the present study a knowledge regarding the plankton abundance and its relationship with the the seasonal variations of the Thekkumbhagom creek will be helpful in planning and successful fishery management. In short the present study aims at providing useful data to the

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Metazoan Parasites of Red Cornet Fish *Fistularia petimba* (Lacepede, 1803) from Kerala, Southwest Coast of India

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Abstract

Parasitic infections of red cornet fish (*Fistularia petimba*) were investigated from fish landing centres of southern Kerala coast, India. The helminth community consisted of five species of Digenea, *Allolepidapedon fistulariae*, *Stephanostomum salinterruptum*, *S. fistulariae*, *Bucephalus* sp. 1 and *Bucephalus* sp. 2; one each from Nematoda, *Hysterothylacium* sp., Copepoda, *Caligus tenuicaudis* and Isopoda, *Cymothoa* sp. The overall prevalence of infection was 72.7%, registering higher among males (90%) than females (67.6%). The mean intensity of infection was higher among females. The most prevalent species were *A. fistulariae* and *S. fistulariae*. Among the five digenetic trematodes, *A. fistulariae*, *S. salinterruptum* and *S. fistulariae* were reported for the first time off the southwest coast of India. *F. petimba* is a new host record for the metacercariae of the digenetic trematode *Bucephalus* spp.

Keywords: *Fistularia petimba*, Metazoan parasites, Prevalence, Mean Intensity

1. Introduction

Cornet fishes or flutemouths are elongated fishes of the family Fistulariidae under the order Syngnathiformes. The family consists of a single genus *Fistularia*, with four species (*Fistularia commersonii*, *F. corneta*, *F. petimba*, *F. tabacaria*). The red cornet fish, *Fistularia petimba* Lacepede, 1803, is perhaps the most widespread species, distributed along the Atlantic, Indian, and Western Pacific oceans, including Hawaii, usually occurs at a depth range of 10-200m. Adults are exclusively marine, crepuscular, slow movers over soft substrates of the sublittoral zone, while juveniles share estuarine habitats. They can reach up to 2 m in length; but rarely exceeds 1m (Froese and Pauly, 2018). The long tubular snout is very efficient in sucking small fish and shrimps as major food sources. The species constitute subsistence fisheries along with their distribution range.

Only scattered information is available on the metazoan parasite assemblage of red cornet fish and their close kins along their distribution range. Among these, parasitic reports exclusively on *F. petimba* are those of Yamaguti (1970), Dyer *et al.* (1988), Bray and Cribb (2003), Madhavi and Bray (2018) on Digenea; Hasegawa *et al.* (1991), Miguel (2010) on Nematoda; Amin *et al.* (2010) on Acanthocephala; Ho *et al.* (2008) on Copepoda; Williams *et al.* (2000), Rameshkumar *et al.* (2014) and Aneesh *et al.* (2020) on Isopoda. The present study forms the first comprehensive report on the occurrence and nature infection of metazoan parasites in *Fistularia petimba* off the south-west coast of India.

2. Materials and Methods

A total of 44 specimens of *Fistularia petimba* were collected from Neendakara and Sakthikulangara regions of the Arabian Sea (8° 56' 19.18" N, 76° 32' 25.19" E). The fishes were packed in ice, and brought to the laboratory of Department of Aquatic Biology and Fisheries, University of Kerala, Thiruvananthapuram, for parasitological examination. The fishes were weighed, measured and examined carefully for the presence of metazoan parasites. Sex of the fishes was noted during the parasitological examination. Each body part was examined using a hand lens and later under a stereo dissecting microscope (SDM – Olympus Stereozoom SZ-ST). Skin scrapings from various parts of the body were also examined under a high power transmission light microscope (TLM – Olympus TRM BX50) for the ectoparasites. Later, the fishes were dissected, gills, all the internal organs and muscle samples were examined in separate petri dishes in 8% saline. Parasites encountered were cleaned in tap water and preserved either in 10% neutral buffered formalin (NBF) or 70% alcohol with glycerine, depending upon the types of parasites. Digeneans were cleaned and fixed in 5% NBF. Representatives of each species of trematodes were stained in Gower's carmine and permanent mounts were prepared. Sufficiently stained materials were dehydrated in alcohol series, cleared in phenol-xylol and xylol and mounted in Dibutylphthalate Polystyrene Xylene (DPX). Copepods were dissected in 50% aqueous lactic acid by adopting the wooden slide method (Humes and Gooding, 1964). Camera Lucida sketches were made, and measurements were taken by using a calibrated ocular micrometer. Parasite identification was done following the standard literature and original descriptions (Yamaguti, 1961, 1975; Gibson *et al.*, 2002; Jones *et al.*, 2005; Bray *et al.*, 2008; Anderson *et al.*, 2009; Gibbons, 2010). All parasite species identified to the lowest possible taxon were evaluated through WoRMS (2021). The identification of host fish was based on Fish Base (Froese and Pauly, 2018) and WoRMS (2021). Data on the nature of infection were analysed following Bush *et al.* (1997).

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Zirconium phospho silicate doped cross-linked PVA-PSSA membrane for the adsorptive removal of methylene blue, Rhodamine B and malachite green dyes from aqueous solutions

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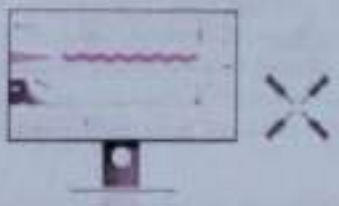

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Ion Exchanger Doped Polymer Composite Membrane For Heavy Metal Removal From Aqueous Solutions

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A novel cross-linked polyvinyl alcohol- polystyrene sulphonic acid-zirconium phosphosilicate (PVA-PSSA-ZPS) membrane was prepared by dispersing zirconium phosphosilicate gel into PVA-PSSA blend by solution casting method. It was used as an effective adsorbent for the removal of heavy metals, such as Pb^{2+}, Cu^{2+}, Cd^{2+}, Ni^{2+}, Co^{2+} and Hg^{2+} ions from aqueous solutions. The adsorption capacity of Pb^{2+}, Cu^{2+}, Cd^{2+}, Ni^{2+}, Co^{2+} and Hg^{2+} ions over PVA-PSSA-ZPS membranes are 0.7221, 0.6961, 0.7035, 0.6738, 0.6812 and 0.6105, respectively. The incorporation of ZPS into PVA-PSSA blend increased the selectivity of heavy metals towards the membrane. The membrane was characterized by XRD, FTIR, TGA-DSC, SEM and UV-Visible spectroscopy. Adsorption studies were carried by batch adsorption method. Effect of pH, contact time, initial concentration, etc., on heavy metal adsorption, were studied. The extent of adsorption for various metal ions was found to be in the order of $Pb^{2+} > Cu^{2+} > Cd^{2+} > Ni^{2+} > Co^{2+} > Hg^{2+}$. Kinetic and thermodynamic studies were carried out to explain the type of adsorption process.

KEYWORDS

Membrane adsorption, Heavy metals, Polyvinyl alcohol, Polystyrene sulphonic acid, Zirconium phosphosilicate, Desorption

1. INTRODUCTION

Environmental pollution has been a major crisis faced by human beings as well as aquatic life due to urbanization and economic development. Shortage of clean water has become one of the major issues faced by society due to population growth, climate change, industrialization, etc. Among the various pollutants, heavy metals are of special concern due to its high toxicity. Membrane adsorption technology plays an important role in the separation of heavy metals as well as other organic pollutants from wastewater because of low cost and lower consumption of energies. Adsorption is considered as the most economic method for wastewater treatment due to its high efficiency, increased life span, good mechanical, thermal and chemical stability [1]. The current study deals with the use of novel ion exchanger doped polymer composite membrane in the effective removal of heavy metal ions from aqueous solutions. Polyvinyl alcohol- polystyrene sulphonic acid- zirconium phosphosilicate (PVA-PSSA-ZPS) composite membrane was prepared by dispersing ZPS into the polymer matrix. Zirconium based heteropolyacids are extensively studied for their ion exchange properties. We explored ZPS for its efficiency in metal ion exchange and thereby its removal. It is a promising component due to its hygroscopic silicate group alongwith its acidic phosphate group [2,3].

2. MATERIAL AND METHOD

2.1 Chemicals

Polyvinyl alcohol (PVA) (99% hydrolyzed, MW = 115,000, LOBA Chemie, India), polystyrene sulphonic acid sodium salt (MW = 500,000, Alfa Aesar), maleic acid (MW = 116.08, Merck), zirconium oxychloride (MW = 322.25, Merck), sodium dihydrogen orthophosphate (MW = 119.98, Merck) and sodium silicate (MW = 284.20). Demineralized water is used throughout the experiment. Metal ion stock solutions were prepared by dissolving their nitrates in distilled water to give 0.005 M solution.

2.2 Synthesis of zirconium phosphosilicate

The definite concentration of orthophosphoric acid and sodium silicate were mixed and added to the zirconium oxychloride solution with continuous stirring. The white gel obtained was stabilised by adding 1 M HNO_3 and kept for 24 hr at room temperature for digestion. The precipitate obtained was filtered, washed thoroughly with distilled water to remove excess acid. The gel form of precipitate was taken for membranes fabrication. Dried ZPS was used for the determination of ion

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Dielectric Properties of $BaZr_{0.2}[Ti_{(1-x)}Mg_{x/3}Ta_{2x/3}]_{0.8}O_3$ Solid Solution

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$BaZr_{0.2}(Ti_{1-x}Mg_{x/3}Ta_{2x/3})_{0.8}O_3$ (x = 0.0, 0.05, 0.1, 0.2, 0.4, 0.6, 0.8, 1.0) (BZTMT) ceramics were prepared through conventional solid state ceramic route. The crystal structure and microstructure of the compounds were investigated respectively using XRD and SEM. The dielectric properties were measured in the frequency range of 100 Hz–1 MHz. The ferroelectric Curie temperature of $BaZr_{0.2}Ti_{0.8}O_3$ (x = 0) shifted from 21°C to −10°C with the addition of minute amount of dopant (x = 0.025) and the paraelectric transition temperature is diffusive in nature. The relative permittivity and dielectric loss of BZTMT at 1 MHz varies from 5205 to 24 and 1.6×10^{-2} to 2.0×10^{-3} respectively, as the value of x increases from 0 to 1.

Keywords: ferroelectrics, paraelectrics, solid solution, barium zirconium titanate, ceramics

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INTRODUCTION

$BaTiO_3$ based ferroelectric materials have received a great deal of attention from scientific community as an alternative for lead free materials for extensive applications in capacitors, piezoelectric devices and transducers(Wang et al., 2012; Chen et al., 2014; Magrone et al., 2016; Li et al., 2017; Co et al., 2020; Venkatachalam et al., 2020). The high curie temperature (128°C) and intrinsically low relative permittivity in pure $BaTiO_3$ make it unsuitable in practical device applications(Hennings and Schnell, 1982). Electrical properties of $BaTiO_3$ can be tailored by chemically substituting both dodecahedral Ba^{2+} sites and the octahedral Ti^{4+} sites(Hennings and Schnell, 1982; Singwan et al., 2018). Ti^{4+} site is generally substituted by Zr^{4+}, which is more chemically stable than that of Ti^{4+}. The resulting material, $BaZr_xTi_{1-x}O_3$ (BZT) generally exhibits very high and broad curie maxima and are often found application as relaxor ferroelectrics(Li et al., 2014). As in the case of $BaTiO_3$, three ferroelectric phase transitions are observed in BZT solid solutions for $x < 0.13$. On increasing the Zr content the three transition points and the corresponding dielectric maxima move closer together and finally coalesce in to single broad maxima(Hennings and Schnell, 1982). For composition $0.26 < x < 0.42$, the temperature dependence of the real part of dielectric constant at transition temperature is broad and frequency dependent (Maiti et al., 2008; Li et al., 2014). Until now many researchers have studied the dielectric properties of BZT system(Buscaglia et al., 2000; Weber et al., 2003; Maiti et al., 2008).

Substitution for both isovalent and aliovalent cation in the host BZT perovskite lattice plays a very important role in the modification of dielectric properties. Buscaglia et al. had reported that the aliovalent cation substitution in perovskite lattice can serve either as donors or as acceptors, which will affect the electrical characteristics greatly(Buscaglia et al., 2000). Many aliovalent compositional alterations in BZT have been studied either with higher valance substitution (donors), or with lower

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Fabrication of eggshell derived hydroxyapatite polymer composite membrane for efficient removal of thorium ions from aqueous solutions

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दलित उत्पीडन का दस्तावेज

डॉ० रतिका पंचारपोयिल कोट्टायी

सहायक आचार्य, हिन्दी विभाग, एस.एन.कॉलेज, कण्णूर

प्रख्यात दलित चिंतक श्री. शरणकुमार लिंबाले का मानना है कि "गाँव की सीमा के बाहर रहनेवाली सभी अछूत जातियाँ, आदिवासी भूमिहीन, खेत मजदूर, श्रमिक, कष्टकारी जनता और यायावर जातियाँ सभी दलित शब्द से व्याख्यायित होती है। दलित शब्द की व्याख्या में केवल अछूत जाती का उल्लेख करने से काम नहीं चलेगा। उसमें आर्थिक दृष्टि से पिछडे लोगों का भी समावेश करना होगा।"

दलित वर्ग की समस्याओं पर लंबे समय तक साहित्य में कोई विचार दृष्टिगत नहीं होता है जिस प्रकार समाज की वर्ण व्यवस्था ने उसे हाशिये पर रखा लगभग वही व्यवहार उसके साथ साहित्य में भी हुआ। नब्बे दशक में हिन्दी साहित्य में दलित विमर्श मुख्य रूप से उभरा। इन्हीं वर्षों में हिन्दी क्षेत्र में भी दलित पिछडों का आंदोलन देखने को मिला। पर हिन्दी फिल्मों में दलितों के संघर्ष और उनके हक के सवाल हाशिए पर ही रहे। बैंडिक्ट क्वीन, अरक्षण, मसान जैसी सफल फिल्मों में दलित किरदार तो हैं पर वे हिन्दी सिनेमा में नया विमर्श खडा करने में असफल रहे। पहली बार अनुभव सिन्हा निर्देशित 'आर्टिकल' 15 में समाज और सत्ता से किए गए दलितों के चुभते सवाल और उनके संघर्ष को हम फिल्म के केन्द्र में पाते है। सत्य घटनाओं से प्रेरित यह फिल्म भारतीय समाज में फैले जातिवाद के मुद्दे पर बनाई गई है। यह एक परंपरा है पिछले सालों से हो रहे हैं।

डॉ. अंबेदकर द्वारा लिखे संविधान के अनुच्छेद 15 कहता है कि सरकार या राज्य, किसी नागरिक के विरुद्ध के केवल धर्म, मूलवंश जाति, लिंग, जन्मस्थान या इनमें से किसी के आधार पर कोई विभेद नहीं करेगा। मगर यह भेदभाव आज भी समाज में है और इस कदर भयानक तौर पर है कि एक वर्ग विशेष को उनकी औकात दिखाने के लिए न केवल उनकी बच्चियों के साथ सामूहिक बलात्कार किया जाता है बल्कि मार कर पेड़ पर लटका दिया जाता है। भारत में जातिगत भेदभाव तो इतना ज्यादा है कि लोग एक जानवर का मूत्र पीना तो पसंद करते है लेकिन एक दलित इंसान के हाथों का पानी पीना पसंद नहीं करते हैं।

उम्मीद है कि समाज में समानता को बढावा देनेवाली फिल्म आर्टिकल 15 देश से विभिन्न प्रकार के भेदभावों को मिटाने की दिशा में सार्थक पहल करेगी।

कहानी इस प्रकार है कि IPS अधिकारी अयान रंजन को मध्यप्रदेश के लाल गाँव पुलीस स्टेशन का चार्ज दिया जाता है। यूरोप से हायर स्टडीस करके लौटा अयान इस इलाके में आकर बहुत उत्सुक है, मगर अपनी प्रेमिका अदिति से मेसेजस पर बात करते हुए वह बता देता है कि इस इलाके में एक अलग ही दुनिया बसती है, जो शहरी जीवन से मेल नहीं खाती। अभी वह वहाँ के माहौल को सही तरह से समझ भी नहीं पाया था कि उसे खबर मिलती है कि वहाँ कि फाक्टरी में काम करने वाली तीन दलित लड़कियाँ गायब है, मगर उनकी थ्र्ट दर्ज नहीं की गई है। उस पुलीस स्टेशन में काम करने वाले मनोज पाहवा और कुमुद मिश्रा उसे बताते है कि इन लोगों के यहाँ ऐसा ही होता है।

लड़कियाँ घर से भाग जाती हैं, फिर वापस आ जाती हैं। और कई बार उनके माता-पिता ऑनर किलिंग के तहत उन्हें मारकर लटका देते हैं। दलित लड़को गौरा और गाँववालों की हलचल और बातों से अयान को अंदाजा हो जाता है कि सच्चाई कुछ और है। वह जब उसके तह में जाने की कोशिश करता है तो उसे जातिवाद के नाम पर फैलाई गई एक ऐसी दलदल नजर आती है जिसमें राज्य के मंत्री से लेकर थाने का संतरी तक शामिल है।

अयान पर गैंग रेप के इस दिल दहला दहला देने वाले केस को ऑनर किलिंग का जामा पहनकर केस खोज करने के लिए दबाव डाला जाता है, मगर अयान इस सामाजिक विषमता के क्रूर और गंदे चेहरे को बेनकाब करने के लिए कटिबद्ध है। निदेशक अनुभव सिन्हा के निदेशन की सबसे बडी खूबी यह है कि उन्होंने जातिवाद के इस घिनौने रूप को थ्रिलर की परतें अंदाज में पेश किया और जब कहानी की परतें खुलने लगती है, तो दिल दहल जाने के साथ आप बुरी तरह चौंक जाते हैं कि इन तथा कथित सभ्य, परिवार प्रेमी और सफेदपोश किरदारों का असली रूप क्या है। फिल्म का वह दृश्य झकझोर देनेवाला है, जब अयान को पता चलता है कि मात्र तीन रुपये ज्यादा दिहाडी मांने पर लड़कियों को रेप कर मार दिया गया। फिल्म में द्रवित द्रवित कर देने वाले ऐसी कई दृश्य है। निदेशक ने फिल्म को हर तरह से रियलिस्टिक रखा है।

फिल्म में यही दिखाया गया है कि कैसे सी.बी.आई. अफसर हो, ब्रह्मदत्त जैसा पुलिस अधिकारी या कोई एस.सी.नेता जो एक महंत के कंधों का सहारा लेकर अपनी जाति के लोगों को मरवाने का षडयंत्र कर रहा है। तीन लड़कियाँ मात्र तीन रुपए की मजदूरी बढ़ाने के लिए कत्ल की जाती हैं और उनके साथ बुरी तरह से सामूहिक बलात्कार होता है।

एक दृश्य में नायक अयन रंजन सी.बी.आई. के अधिकारी से बैठकर बात कर रहे है- सर ये तीन लड़कियाँ अपनी दिहाडी में सिर्फ 3 रुपए अधिक माँग रही थी।

सिर्फ तीन रुपए....

जो मिनरल वाटर आप पी रहे है, उसके दो या तीन घूँट के बराबर।

Effect of Low and Medium Intensities of Resistance Training on Leg Strength and Strength Endurance

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Abstract

The objective of the study was to find out the effect of medium and low intensities of resistance training on leg strength and strength endurance. 45 college level male students who were not participated in any sports and games were randomly selected as subjects from S.N. College, Kannur, Kerala State. The age of the subjects were ranged from 18 to 21 years. The subjects were further classified at random into three equal groups of 15 subjects each in which group - I underwent low intensity resistance training (starts with 20% and end with 50%) for three days per week for twelve weeks, group - II underwent medium intensity resistance training (starts with 40% and ends with 70%) for three days per week for twelve weeks and group – III acted as control who were not undergo any special activities other than normal curricular activities. The selected criterion variables such as leg strength and strength endurance were assessed before and after the training period. Leg strength was assessed by using dynamometer and strength endurance was measured by administering sit – ups test. The collected data were statistically analysed by using Analysis of Covariance (ANCOVA). Since, three groups were involved in the present study, the Scheffe *S* post-hoc test was utilized. From the results of the study it was found that there was a significant improvement in leg strength and strength endurance for low and high intensity resistance training groups when compared with the control group.

KEYWORDS: low and high intensity resistance training, leg strength, strength endurance, ANCOVA and Scheffe *S* post-hoc test.

INTRODUCTION

The word training implies various things in various fields. In sports the word training is by and large comprehended to be an equivalent of doing exercise. Sports medicine and exercise physiologists comprehend training to do physical exercise for development of performance or of independent performance factors.[1] Training includes building an activity program to foster a competitor for a specific event. This expanding expertise and energy limits are equivalent thought.[2] In exercises were execution is most directly and unbiasely quantifiable, like in athletics and competitive swimming, training for physical conditioning is a fundamental pre-essential.[3]

Physical training alludes to the process utilized to foster the segments of physical fitness concerning model, how to improve vigorous perseverance, to extend and loosen up muscles, to build arm and shoulder solidarity to related exercise and projects to explicit necessities or individual games.[4] Training increasing skill and energy capacities are equal consideration.[5] Without contest, training is unimportant to-day. Every country is attempting to accomplish high level execution and to win shrubs in global rivalries.

Strengthening one's muscles through resistance training offers numerous advantages and makes it simpler to do one's every day schedule. One can find that

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Effect of brisk walking and yogic practices on flexibility and blood pressure

Dr. Ajayakumar Koorma and Dr. S Chidambara Raja

Abstract
The purpose of the present study was to find the effect of brisk walking and yoga practice on flexibility and blood pressure. For this purpose, forty five women living in and around Kannur town, Kerala State in the age group of 35 – 40 years were selected. They were divided into three equal groups (n = 15), each group consisted of fifteen subjects, in which group – I underwent brisk walking, group – II underwent yoga practice and group – III acted as control group who did not participate in any special training. The training period for this study was five days in a week for twelve weeks. Prior to and after the training period the subjects were tested for flexibility, systolic blood pressure and diastolic blood pressure. Flexibility was measured by administering sit and reach test and blood pressure was assessed by using sphygmomanometer respectively. The analysis of covariance (ANCOVA) was used to find out the significant difference if any, among the experimental groups and control group on selected criterion variables separately. Since there were three groups involved in the present study, Scheffé *S* test was used as pos-hoc test. It was concluded from the result of the study that the brisk walking and yoga practice has positively altered the criterion variables, such as, flexibility and blood pressure when compared with the control group. But there was no significant difference was found between the training groups.

Keywords: brisk walking, yoga practice, flexibility, systolic blood pressure, diastolic blood pressure

Introduction
This reality of pure Consciousness has been recognized by all thinkers, spiritualists or materialists, as the fundamental axiom of life from which intelligence, volition, love and thought emanate [1]. It is a science that affects not only the aware oneself but the subliminal as well. It is a practical physiological training, can praise man to the 'supra mundane level'.[2] Patanjali introduced yoga and its principles were first written down in India several thousand years ago [3].

According to Swami Vishnu Devananda [4] "Yoga is not an ancient myth buried in oblivion. It is the most valuable inheritance of the present. It is the essential need of today and the culture of tomorrow". Yogsanas have a deeper considerable value in the development of the physical, mental and spiritual personality. But pure physical exercises only have effect on the muscles and bones. Aerobic means "with oxygen", and refers to the use of oxygen in the body's metabolic or energy-generating process [5]. Walking is good for the muscles because all the muscles in our body contract at the time of walking [10]. Walking programs is being popular as recreational activity, that are characterized by moderate levels of intensity have been shown the most effective interventions when used to promote physical activity and adherence to exercise [11]. Regular walking of a moderate to vigorous intensity has been shown to benefit both cardiovascular and psychological health [12].

Methods
This study under investigation involves the experimentation of brisk walking and yoga practice on flexibility, systolic blood pressure and diastolic blood pressure. Only women those who were residing in around Kannur town, Kerala State and aged between 35 and 40 years were selected. The selected forty-five subjects were randomly divided into three groups of fifteen each, out of which group - I (n = 15) underwent brisk walking, group - II (n = 15) underwent yoga practice and group - III (n = 15) remained as control. The training programme was carried out for five days per week during morning session only (6 am to 8 am) for twelve

EFFECT OF PRANAYAMA PRACTICES ON SELECTED RESPIRATORY PARAMETERS AMONG MALE ASTHMA PATIENTS

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ABSTRACT

The purpose of the present study was to find the effect of pranayama practice on tidal volume, inspiratory reserve volume and vital capacity. For this purpose, twenty male bronchial asthma patients residing in around Kannur Town, Kerala State, those who were familiar with yoga were selected. Their age group was between 40 and 45 years. The symptoms of asthma was tested by forced expiratory volume in one second <80% with one salbutamol puffs used to confirm the bronchial asthma. Then, they were divided into two equal groups, each group consisted of ten subjects, in which group – I underwent pranayama practices and group – II acted as control group who did not participate in any special training. The training period for this study was five days in a week for twelve weeks. The selected criterion variables such as, tidal volume, inspiratory reserve volume and vital capacity were assessed by using the Medical Research International Spirometer. Prior to and after the training period the subjects were tested for tidal volume, inspiratory reserve volume and vital capacity and analysis of covariance (ANCOVA) was applied as statistical tool. It was concluded after the pranayama practices, that training group have increased the level of tidal volume, inspiratory reserve volume and vital capacity ($p > 0.05$).

Key words: ***Pranayama Practices, tidal volume, inspiratory reserve volume and vital capacity***

INTRODUCTION

Bronchial Asthma is a long term disease, which narrows the airways, swell and extra mucus was also produced. It results the breathing difficult, coughing, wheezing and shortness of breath.[1,2] The asthma patient's the inside walls of the airways (bronchial tubes) become inflamed and swollen and it makes extreme sensitive to irritations and develops their susceptibility to an allergic reaction.[3] It was classified into four ways, i.e., mild intermittent asthma, mild persistent asthma, moderate persistent asthma and severe persistent asthma.[2] In Chennai, nearly seven years ago,

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Effect of resistance training followed by yogic practices on muscular strength back strength and blood pressure

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Abstract
The aim of the study was to find out whether resistance training followed by yogic practices enhancing the muscular strength, back strength and reducing blood pressure of college aged men. Thirty college aged men in 18 and 25 years of age group studying in various faculties of Annamalai University were selected as subjects. They were divided into two equal groups, each group consisted of fifteen subjects, in which group – I underwent resistance training followed by yogic practices and group – II acted as control which did not participate any training apart from their regular curricular activities. The period of training for the present study was three days (alternative days, such as, Monday, Wednesday and Friday) in a week for twelve weeks. Prior to and after the training period the subjects were tested on muscular strength, back strength and blood pressure (systolic and diastolic). The muscular strength was measured by administering bent knee sit-ups test, back strength was measured by using dynamometer and blood pressure (both systolic and diastolic) was measured by using sphygmomanometer. The analysis of covariance (ANCOVA) was applied as statistical tool to find out any significant difference between the experimental and control groups. It was concluded from the result of the study that resistance training followed by yogic practices group have improved ($P < 0.05$) all the criterion variables, such as, muscular strength, back strength and decreased the blood pressure (both systolic and diastolic).

Keywords: resistance training followed by yogic practices, muscular strength, back strength and blood pressure

Introduction

Numerous training procedures are in practice to improve each and every physical and motor fitness qualities at various levels [1]. The major objective in training is to cause biological adaptation in order to improve performance in a specific task. Resistance training is a form of exercise that improves muscular strength and endurance [2]. Resistance training is any exercise that causes the muscles to contract against an external resistance with the expectation of increases in strength, tone, mass, and/or endurance [3]. It also causes damage or tears in muscle cells (catabolism) and quickly repaired to regenerate the muscle and grow stronger (anabolism) [3]. Resistance training also known as strength training or weight training is the use of resistance to muscular contraction which enables strength, aerobic and anaerobic endurance and muscle mass [7]. Frequent and regular resistance training has been shown to help prevent or treat serious and life-threatening chronic conditions such as high blood pressure, obesity, heart disease, Type 2 diabetes, insomnia, and depression [8]. Yoga is a complete science of life that originated in India many thousands of years ago, which of personal development in the world, encompassing body, mind and spirit [4]. Yoga is not an ancient myth buried in oblivion. It is the most valuable inheritance of the present. It is the essential need of today and the culture of tomorrow [5]. The yoga postures (known as asanas), help to stretch and relax the muscles and skeletal system. The physical release through these soothing movements can help create a sense of calmness and well-being [6]. Muscular strength is defined as "the force that muscle or a group of muscle can exert against a resistance for a prolonged period" [9]. The socio-psychological concept of self-confidence relates to self-assuredness in one's personal judgment, ability, power, etc., sometimes manifested excessively.[10] Blood pressure (BP) is a force exerted by circulating blood on the walls of blood vessels, and is one of the principal vital signs.

Methods

This study under investigation involves the experimentation of resistance training followed by yogic practices on muscular strength, back strength and blood pressure (systolic and diastolic). Thirty college aged men in 18 and 25 years of age group (mean age = 21 ± 0.9 years) studying in various faculties of Annamalai University were selected as subjects and they were new to resistance training and yoga exercises. The selected thirty subjects were randomly divided into two groups of fifteen each, out of which, group - I (n = 15) underwent resistance training followed by yogic practice and group - II (n = 15) remained as control and they were permitted to participate any activity related with their curriculum. The training programme was carried out for three days (alternative days) per week during morning session only (6 am to 8 am) for twelve weeks. Before the commencement of resistance training, all the subjects were tested with 1RM resistance. According to the 1RM the individual load was fixed for the resistance training. Muscular strength was measured by administering sit – ups test, back strength was measured with the help of dynamometer and blood pressure was measured by using sphygmomanometer. Before applying the experiment all the subjects of the resistance training followed by yoga practice and control groups were attended the pre-test, which was conducted a day prior to the commencement of the training and the data were collected on muscular strength, back strength and blood pressure (systolic and diastolic). After

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Review Article

The Effects of Yoga on Physical Functioning and Health Related Quality of Life in Older Adults: A Systematic Review and Meta-Analysis

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Abstract

Objective: The goal was to review systematically the comparative effectiveness of yoga, compared with other exercise interventions, for older adults as shown on measures of health and physical functioning.
Design: This was a systematic review with both narrative synthesis and meta-analysis.
Data sources: Searches were conducted in MEDLINE®/PUBMED, PSYCINFO, CINAHL, Web of Science, and SCOPUS; bibliographies of selected articles; and one systematic review on the effects of yoga on cardiovascular disease.
Methods: Original studies from 1950 to November 2010 were sought, evaluating the effects of yoga on older adults. The search was restricted to randomized controlled trials of yoga in subjects ≥age 60, and published in English. Data were extracted and evaluated regarding setting, population size and characteristics, intervention type and duration, comparison group, outcome assessment, data analysis, follow-up, key results, and the quality of each study according to specific predetermined criteria.
Results: The search yielded 18 eligible studies ($N=649$). The studies reported on older adults across a range of settings, intervention intensity, and outcome measures. The majority of the studies had <35 participants (range 9–77). Quantitative and qualitative synthesis of the studies suggested that the benefits of yoga may exceed those of conventional exercise interventions for self-rated health status, aerobic fitness, and strength. However, the effect sizes were modest, and the evidence was mixed for yoga's effect on depression, sleep, and bone-mineral density. Studies did not find an effect on cognition.
Conclusions: Small studies with mixed methodological quality suggested that yoga may be superior to conventional physical-activity interventions in elderly people. The precision of the estimates remains low. Larger studies are necessary to define better the intersection of populations, settings, and interventions in which yoga is most beneficial.

Introduction

Older adults who are physically inactive are at increased risk of functional limitations, disability, and frailty.[1–3] Research on aging has sought to identify effective ways to prevent or reverse frailty.[4] Current recommendations are 30 minutes of physical activity on most days of the week to prevent loss of abilities.[5,6] Physical activities that have been shown to improve functioning in frail older adults include weight training,[6] power training,[7] walking to promote endurance, balance, strengthening, and flexibility.[8]

Yoga is a potentially promising physical activity for older adults.[9–14] Surveys show that many older adults in the United States are practicing yoga.[9,11,15] Many forms of yoga exist—such as Hatha, Iyengar, and other yoga forms—that aim to promote overall movement, health, and wellness.[10] Iyengar yoga is a form of yoga that uses props such as bolsters, belts and chairs to adapt to an older individual's abilities.[13,16,17]

Yoga not only improves health-related quality of life (HRQoL)[18,19] but also enhances walking and balance,[8,16,17,20] muscle strength,[20–22] cardiovascular health,[23–25] blood pressure (BP),[23,25–27] sleep,[12,28] and functioning of other

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Occupational Hazards of Health Care Workers during Covid 19 Pandemic

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Abstract

Health care has been considered as among the most coveted and noble of all professions. Health workers are the backbone of an effective health system and they play a critical role in providing health solutions along with connecting families and communities to the health system. Frontline health workers are also increasingly critical to addressing diseases that impact the health around the world like the current COVID-19 pandemic. The COVID-19 pandemic has created a variety of challenges throughout the nation and has impacted the health of many healthcare workers. The uncertainty of the pandemic has brought up feelings of anxiety and fear among the health care workers. In this context this study analyse the occupational hazards of health care workers during covid19 pandemic. The main objective of the study is to find out the occupational hazards health care workers during Covid 19 pandemic. The specific objectives of the study are; to identifies the health hazards of health care workers during COVID-19 pandemic and to find out the various challenges faced by health care workers during covid 19 pandemic. The study is based on both primary and secondary data. Primary data is collected through a well- designed questionnaire for analyzing the study. The data required for the study has been collected by using convenience sampling method. For this number of health care workers were selected at random from two private hospitals, one government hospital and one public health centre.

Keywords- Occupational Hazards, Health Care, Healthcare Workers, COVID.

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भूमण्डलीकरण के दौर में गाँव : 'ग्लोबल गाँव के देवता' उपन्यास के संदर्भ में

डॉ० रम्या बालन० के

सहायक प्राध्यापक, श्री नारायणा कॉलेज, कण्णूर

उपन्यास समाज का संरचनात्मक, भावनात्मक एवं वैचारिक दस्तावेज है। समाज में घटित हर घटना की प्रतिक्रिया साहित्य में मिलती है। इस प्रकार का एक सही दस्तावेज है रणेन्द्र द्वारा रचित 'ग्लोबल गाँव के देवता'। 'ग्लोबल गाँव के देवता' उपन्यास में लेखक ने भूमण्डलीकरण से प्रभावित झारखंड के कीकट प्रदेश की असुर जनजातियों के संघर्ष को दिखाया है। यहाँ लेखक ने 'ग्लोबल गाँव के देवता' के रूप में बहुराष्ट्रीय कंपनियों एवं कॉरपरेट वर्ग को प्रस्तुत किया है। वेदों, पुराणों से उपेक्षित असुर जनजाति जन्मांतरों से पीडित और उपेक्षित है। मुख्यधारा के समाज ने इन्हें कभी मानव का दर्जा नहीं दिया। वेदों, पुराणों में यज्ञ और पुण्य कर्मों को भंग करने वाले राक्षसों के रूप में चित्रित किया है। आज भी 'असुर' नाम सुनते ही हर आदमी के मन में वेदों, पुराणों द्वारा निर्मित की गई वही क्रूर छवी सामने आती है। रणेन्द्र ने इसी बिन्दु को पकड़कर उपन्यास की शुरुआत की है। मुख्यधारा से हटकर आदिवासी समाज जंगल में अपनी अलग दुनिया बसायी है। लेकिन भूमण्डलीकरण के क्रूर प्रभाव से बचना इन लोगों के लिए भी आसान नहीं है। दरअसल भूमण्डलीकरण से सबसे अधिक प्रभावित आदिवासी समाज ही है। विकास के नाम पर यहाँ प्रतिदिन बाक्साइट का खनन होता है। इसके बाद उसी जमीन में शेष गड्ढों में आदिवासियों का भविष्य खत्म हो जाता है। इससे आदिवासियों को अपनी जमीन से भी विस्थापित होना पड़ता है।

भूमण्डलीकरण ने दुनिया को हमारी उँगलियों पर ला दिया है। लेकिन दुनिया मुठ्ठी में सिर्फ उन्हीं लोगों के लिए है जो मुख्यधारा में है। हाशिएकृत यह समाज आज भी जल, जंगल और जमीन के लिए संघर्षरत है। कोका कोला जैसी कंपनियाँ भू-गर्भ जल को बोतलों में भरकर बेचती हैं। यहीं आदिवासियों के बच्चे एक बूँद जल के लिए तड़पते हैं। सरकार भी इन बहुराष्ट्रीय कंपनियों के गुलाम बना है। सी.के जानु ने यह सही कहा है कि यह कंपनियाँ हमारे जंगल, जल सब को बेचने के लिए तुली बैठी हैं। अगर आदिवासियों की साँसें भी बेचने से इन्हें पैसा मिल जाए, तो यह हमारे साँसें भी बोतलों में भरकर आपके सामने पेश करेंगें। लेकिन आज समय बदल रहा है। दुनिया के हर कोने से आदिवासी संगठित हो रहे हैं। लेकिन उनकी प्रतिरोध और संघर्ष को दबाने के लिए सत्ता के दलाल भी नयी कूटनीति रचते हैं। 'ग्लेबल गाँव के देवता' में रणेन्द्र ने इसी विनाश के मोड़ पर खड़ी हुई असुर जनजाति के जीवन- संघर्ष को एक नयी दृष्टि देकर प्रस्तुत करने का प्रयास किया है।

आदिवासी समाज को न्याय पाने के लिए कई तरह के संघर्षों का सामना करना पड़ता है। 'ग्लोबल गाँव के देवता' में लेखक शिवदासन बाबा, किशन कन्हैया पाण्डे जैसे पात्रों के द्वारा ग्लोबल गाँव के देवताओं के अपराध की राजनीति को दर्शाया है। किशन कन्हैया पाण्डे और शिवदासन बाबा इस ग्लोबल गाँव के ही निर्मिती हैं। कहा जाता है कि भारत गाँवों का देश है। लेकिन अब वह सिर्फ कहने के लिए रही गयी है। भूमण्डलीकरण के इस युग में गाँव विलुप्त होते जा रहे है इसका कई कारण है - भूमण्डलीकरण इसमें मुख्य समस्या बनकर आती है। भूमण्डलीरण के इस दौर में 'ग्लोबल गाँव के देवता' जैसे उपन्यासों की प्रासंगिकता बढ़ती जा रही है। रणेन्द्र जैसे लेखकों ने इस प्रकार की ज्वलंत मुद्धे को पकड़कर रचना क्षेत्र में नया मोड दे रहा है।

भूमण्डलीकरण जैसे शब्द बहुत ही विवादास्पद है। एक दृष्टि से देखा जाए तो वह सकरात्मक लगता है, लेकिन दूसरे दृष्टि से देखा जाए तो उससे ज्यादा नकारात्मक भी लगता है। 'ग्लोबल गाँव के देवता' पढ़ते समय इस शब्द का नकारात्मक पक्ष ही ज्यादा सामने आते है। भूमण्डलीकरण ने एक समूचे विश्व को ग्लोबल विलेज का रूप प्रदान किया है। सूचना और प्राध्यौगिकी क्रांति ने लोगों के बीचों की दूरी समाप्त करते हुए एक नये विश्व का निर्माण कर रहा है। इसका एक छोटा सा हिस्सा है ग्लोबल विलेज। यहाँ तुम्हें हर चीज उपलब्ध होगा। पूरे विश्व के माल तुम्हें एक ही जगह में उपलब्ध होगा। ग्लोबल गाँवों के वक्ताओं का कहना है कि अब राष्ट्रों की सीमा का कोई महत्व नहीं है। पूरे विश्व अब एक ही गाँव की तरह है। बल्कि यह पूरा विश्व अब एक बाजार मात्र है।यह बाजार में आम जनताओं की कोई महत्व नहीं है। जिसका मूल्य ज्यादा है वहीं यहाँ बिकेगा। अपनी चीजों के मूल्य बढ़ाने के लिए लोग यहाँ आकर कुछ भी करने को तैयार होते है। इस प्रकार पूरे जनता में तनाव बरकरार रखने केलिए वह सफल हो जाते है। इस प्रकार पूरी तरह तनाव से भरी एक पीढ़ी का निर्माण हो रहा है और मनुष्य के अन्दर की सारी चेतना नष्ट होकर वह जड बन जाता है। कॉरपरेट लोग हमारे देश को ग्लोबल बनाकर वह उनकी देवता बनकर विराजमान है। जैसे पौराणिक ग्रन्थों में जिस प्रकार देवता लोग असुरों को अत्याचार करके उन्हें सताया उसी प्रकार आज भी देश में अभिजात लोग आदि मानवों के साथ अत्याचार कर रहे हैं। यहाँ रणेन्द्र ने इन सारी बिन्दुओं को जोडकर ही ग्लोबल गाँव के देवता का निर्माण किया है। असुर जैसे शब्द शायद हम पौराणिक संदर्भों में ही सुना होगा लेकिन हमारे ही देश में असुर नाम की एक जनजाती है। हाशिएकृत यह समाज बहुत संघर्ष करके अपने गुजारा करते है। प्रस्तुत उपन्यास में उपन्यासकार ने असुर जैसे विलुप्त हो रहे आदिम जनजातियों के संघर्ष के साथ ही ग्लोबल होते जा रहे गाँव की समस्याओं को भी दिखाया है।

Probiotic Evaluation of Lactic Acid Bacteria Isolated from Conventional Sources

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Abstract: Probiotic bacteria represent the good bacteria that impart health benefits. Lactic acid producing bacteria called as LAB are commonly used as probiotics as they have long history of safe use in food. The present study aimed to evaluate bacterial isolates from curd, cow's milk, and breast milk thereby determining its potential to be used as probiotics. Out of 108 133 isolates, eight strains showed phenotypic characteristics similar to that of lactic acid bacteria and were investigated further. The tolerance for low pH, different concentrations of bile and phenol, resistance to the simulated gastrointestinal and salivary conditions were studied in detail for these strains. Haemolytic activity of the strains and their susceptibility to antibiotics were tested. Strains were also evaluated for probiotic properties including adherence to the Caco-2 cells and antagonistic activity against pathogens. All the strains showed tolerance to acidic pH, bile salts, phenol, lysozyme, pepsin and also successfully adhered onto the Caco-2 cells in-vitro. The cell-free supernatant (CFS) of the strains exhibited antioxidant activity by scavenging 1,1-Diphenyl-2-Picryl-Hydrazil (DPPH) radicals and showed antimicrobial activity against pathogenic strains like *Salmonella typhi*, *Pseudomonas aeruginosa,* and *Escherichia coli.* The three strains with profound probiotic activity were identified using 16s rRNA sequencing as *Weissella confusa* C8 from curd, *Lactobacillus paracasei* MK2 from milk, and *Staphylococcus epidermidis* BM4 from breast milk. Hence, these three isolates from the above sources have a potential to be considered having good probiotic traits with antibacterial activity.

Keywords: Probiotic, curd, breast milk, efficacy, characterisation, milk

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SELF HELP GROUPs: AN EFFECTIVE APPROACH TO WOMEN EMPOWERMENT WITH SPECIAL REFERENCE TO KANNUR CORPORATION

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Abstract

Empowerment is an active multidimensional process to enable women to realize their identity and power in all spheres of life. Women empowerment refers to increasing economic, social, political and spiritual strength of women. It often involves developing confidence in their capabilities. Empowerment can enable women to participate, as equal citizens, in the economic, political and social sustainable development of the rural communities. At the grassroots level, women's participation and development often take place through interventions in the form of development programmes or projects. The Government of India has introduced many community development programmes to uplift the socio economic status of women and reduce their vulnerability to poverty. One such programme was the Microcredit Self Help Groups (SHGs). It is against this background, a study has been undertaken to analyze the role of Self Help Groups on the empowerment of women in Kannur Corporation. The broad objective of the study is to examine the role of SHGs in promoting women empowerment in the study area. The more specific objective of the study is to analyse impact of SHGs on various dimensions of women empowerment. For analyzing the objectives, a well structured interview schedule has been prepared and administered to collect the various empowerment aspects of 50 women SHGs beneficiaries. A comparison was made between the level of empowerment before joining the SHG and their conditions after two years of joining the group in order to see the extent of improvement. For this paired sample t test has been applied. Further, data has been analyzed with the help of simple Statistical tools like tables, percentages, averages, and diagrams. The secondary sources of information have been collected from Government publications, from various books and journals. Through this study SHGs have been recognized as a useful tool to help the women and work as an alternative mechanism to meet the urgent credit needs of poor through thrift. SHGs is a media for development of savings habit among the women. Moreover, the study found that after joining the group they empowered as compared the situation prior to joining SHGs and this is strengthened through various dimensions of empowerment such as economic, socio-cultural, interpersonal and political dimensions. Further they have gained power over decision making in the households. It enhances the equality of women, as participants, decision makers and beneficiaries in the democratic, economic, social and cultural spheres of life.

Key Words: Empowerment, Micro Credit, Self-Help Groups, , Sustainable Development, women

$BaZrO_3$ based non enzymatic single component single step ceramic electrochemical sensor for the picomolar detection of dopamine

Jasmine Thomas [a], P.K. Anitha [a], Tony Thomas [b], Nygil Thomas [c]

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Abstract

$BaZrO_3$ perovskite crystallites were synthesized in a single step using a calcination free room temperature co precipitation method. Crystallite size, presence of metal oxygen bond, thermal stability, defect structure, surface morphology were studied

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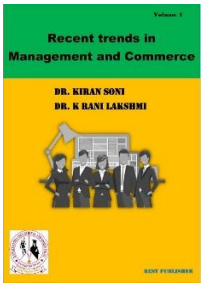

Payment Banks in India: A comprehensive Analysis

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Abstract

One of the greatest difficulties facing the Indian economy today is the banking sector's non-inclusion in rural India. Any traditional bank would find it unprofitable to open a new branch in every village. A payments bank, as defined by the Reserve Bank of India, is a new type of bank that works on a smaller scale than a traditional bank and does not carry any credit risk. It can perform the majority of banking functions, but it cannot make loans or issue credit cards. The goal of establishing payments banks is to increase financial inclusion by providing small savings accounts and payments/remittance services to migratory workers, low-income families, small enterprises, other unorganised sector firms, and other users. Rather than having physical branches, these banks operate digitally (via mobile phones and other internet-connected devices). Through this study, the researcher is seeking to make a detailed investigation to the payment banks in India.

Key words: Payment banks, financial inclusion, revenue stream

Introduction

The Indian government wants its digital India plan to reach every Indian citizen. To realise the goal of digital India and to promote financial inclusion in the country, the Reserve Bank of India envisioned the notion of payments banks, which will boost financial service penetration by reaching regions where traditional banks cannot. The purpose is to give financial services to workers, low-income families, small enterprises, and others who do not have (or have restricted access to) them. Commercial banks' fundamental drawback is that they have a limited geographic reach. By opening a payments bank, this restriction is abolished. A payment bank is a public limited company that has been registered under the Companies Act of 2013 and has been granted a licence under Section 22 of the Banking Regulation Act of 1949 as well as a special authorization by the RBI to operate as a payments bank. Only 11 of the 41 companies that filed for a payments bank licence were granted. RBI took into account the company's network and reach as one of the most important elements. As a result, payment bank licences have been issued to companies that provide mobile telecommunications services, supermarket services, prepaid wallet services, and other similar services in order to serve consumers and small businesses who would otherwise have limited or no access to banks. Payments Banks will augment the potential of financial inclusion in the Indian economy. It will allow those citizens who have only transacted in cash, to head towards formal banking. Traditional banks may be reluctant to open branches in every village due to its uneconomic returns, but simple mobile phone coverage is all that is required now. India also serves as a big remittance market and with money transfers possible through mobile phones, workers and migrant labours could simply shift to Payments Bank and send their money home.

Literature Review

Thushara T.K. (2020) in the study "Role of Payment Banks in Financial Inclusion," argued that financial inclusion aims to remove the barriers that prevent people from participating in the financial sector and benefiting from its services. Payment banks' savings and remittance services are aimed at persons who live in rural regions or who have little or no bank access. Currently, the RBI has awarded licences to corporations that operate supermarket chains (with a significant distribution network), mobile operators (with a large client base), and postal services which tap in a large number of customers. . Because these firms have a wide distribution network or client base, they aid financial penetration by ensuring that financial and banking services are available to everyone in the country. This encourages citizens to save money. **Dr. Prasanna Kumar T M and Mr.Arjun J (2020)** in their study reveals that there are various RBI restrictions on this payment banks. Deposit collection for payments banks is capped at Rs 1 lakh per customer, and they are not allowed to lend. The money collected as deposits has to be parked in government securities and larger banks. Payments banks are proving to be nothing more than aggregators. Payment banks were established with the primary goal of boosting the effect of the financial inclusion movement. There are numerous bottlenecks that need to be addressed before the real benefits of payment banks. Hundreds of millions of Indians lack access to financial services. They are unable to get government benefits, loans, insurance and even interest on savings. **Bhansali Shrey and Iyer Geeth (2018)** investigated the views of various groups of the Indian people on the RBI and Government of India's payment banks initiative. Persons are aware of the payment banks being launched in our nation by the RBI, and the payment banks' target market, namely small company owners, migrant workers, and other people from low-income categories, are eager to utilise payment banks, according to the survey. According to **Dr. G. Sabitha**

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Recent developments in the adsorptive removal of heavy metal ions using metal-organic frameworks and graphene-based adsorbents

Pinnanath Neethu Das [a], Kavil Jithesh [b], Kovummal Govind Raj [a]

https://doi.org/10.1016/j.jics.2021.100188

Abstract

Clean and potable water is a growing concern around the globe. Among the

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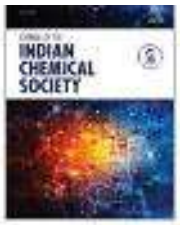

MoS_2 incorporated carbon allotropes (activated carbon, graphene, MWCNT) as electrodes in symmetric supercapacitors

Shabeeba Pilathottathil [a c], Jithesh Kavil [b], Mohamed Shahin Thayyil [a]

https://doi.org/10.1016/j.jics.2021.100169

Anti-mycobacterial compound from an endangered medicinal plant *Curcuma aeruginosa* and identification of its probable targets using *in silico* method

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Abstract: Due to the development of multi-drug resistance, tuberculosis, a re-emerged deadly disease demands novel therapeutics. In the present study, antimycobacterial phytochemicals were screened from medicinally and traditionally valued plants. Plants were extracted with different solvents and growth inhibition potential of the extract was evaluated against *Mycobacterium smegmatis*, an often used model in tubercular studies. The ethyl acetate fraction of *Curcuma aeruginosa* was found to inhibit the growth of the organism and hence it was further purified. The LC-MS characterisation of the extract showed that the active compound might be curcumenone. To identify the possible targets, *in silico* docking studies were carried out against ten selected enzymes, involved in the pathways of cell wall formation, mycolic acid, nucleic acid and amino acid synthesis and energy metabolism of *Mycobacterium tuberculosis*.

Keywords: tuberculosis; *Curcuma aeruginosa*; LC-MS; homology modelling; molecular docking.

Reference to this paper should be made as follows: Vysyan, S.M., Gangadharan, A.K., Kappadan, S. and Chittalakkottu, S. (2021) 'Anti-mycobacterial compound from an endangered medicinal plant *Curcuma aeruginosa* and identification of its probable targets using *in silico* method', *Int. J. Computational Biology and Drug Design*, Vol. 14, No. 6, pp.481–509.

Biographical notes: Sneha Manthattil Vysyan is a research scholar at the Department of Biotechnology and Microbiology, Dr Janakiammal campus., Kerala. She is working on antitubercular compounds from natural sources under the guidance of Prof C Sadasivan. She completed post graduation in Applied Microbiology from Periyar University, Tamil Nadu.

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SENCKENBERG

ORIGINAL PAPER

Species diversity and genetic variation of caligids (Copepoda: Siphonostomatoida) infecting the marine fishes of Kerala coast, India

MV Nikhila Reshmi[1] · K Rijin[2] · OK Drisya[2] · TA Jose Priya[1] · Sudha Kappalli[1,2]

Received: 22 April 2021 / Revised: 16 September 2021 / Accepted: 21 September 2021

Abstract
This study reports population structure, host preference, species diversity, seasonality, and genetic variability of caligids infecting the marine food fishes of Kerala coast, India. The survey included 22,629 fishes belonging to 85 species, 65 genera, and 34 families sampled from 6 different stations. Of which 24 species of fish from 24 genera and 14 families were found infected with caligids revealing 5% susceptibility. The recovered caligids included 26 species comprising eight genera and genus *Caligus* was the dominant one with 18 species (69.23%; 18 out of 26). The prevalence was highly varied irrespective of the host fish family. Sampling stations from the northern Kerala showed higher values of abundance, species number, richness and diversity indices compared to the southern stations. *k*-dominance plot showed the highest dominance and low diversity of caligids in Azhikkal (Northern station) and lower dominance and high diversity in Kalamukku and Thoppumpadi (Southern stations). Seasonal prevalence revealed the highest infection of caligids during post-monsoon and the lowest during monsoon season. Molecular level identification of recovered caligids using mCOI gene revealed 80 to 93% sequence identity with other parasitic copepods based on BLAST results. Phylogenetically, species of *Caligus* displayed intra-genus variation of 13–27% (k2p genetic distance). The species of the family Caligidae formed distinct clades from that of the families Lernaeopodidae and Lernanthropidae. Present study also documented host preference, site of infection, seasonality, and genetic divergence of the recovered caligids, all of which are relevant for further exploration of the species diversity and genetic variation of caligids along the Indian coasts and Indo-pacific region as well.

Keywords Caligidae · Infection rate · Host specificity · Diversity · Seasonality · Molecular phylogeny

Introduction

Caligidae Burmeister, 1835 is one of the most predominant families of siphonostomatoid copepods consisting of 30 genera with 501 species. Caligid infection on captive and culture fishes causes serious health issues leading to huge economic losses to fisheries and aquaculture industries world over (Pillai 1985; Costello 2009; Helna et al. 2018; Nikhila et al. 2019; Hemmingsen et al. 2020). Being exhibited a wide range of morphological adaptation, caligids massively entrench skin, inner operculum wall and gills, and feed on host fish mucus, tissues, and blood (Kabata 1974; Boxshall and Halsey 2004; Smit et al. 2019). Caligid infection on farmed marine fishes often causes severe hemorrhage and erosion on the skin, fins, and eyes facilitating the secondary viral and bacterial infections (Nylund et al. 1994; Nowak et al. 2011; Hadfield and Smit 2019).

Indian coasts are known for parasitic copepod diversity; significant taxonomical information of parasitic copepods was emerged during the period from 1949–1986 (Kurian 1949; Redkar et al. 1949; Rao 1950; Rangnekar 1957, 1960; Pillai 1985; Prabha and Pillai 1986) and later their occurrence and prevalence (Aneesh et al. 2013; Rameshkumar et al. 2014; Helna et al. 2013, 2016; Rijin et al. 2018; Nikhila et al. 2019). Being the

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Occupational Hazards of Health Care Workers during Covid 19 Pandemic

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Kannur, Kerala.

Abstract

Health care has been considered as among the most coveted and noble of all professions. Health workers are the backbone of an effective health system and they play a critical role in providing health solutions along with connecting families and communities to the health system. Frontline health workers are also increasingly critical to addressing diseases that impact the health around the world like the current COVID-19 pandemic. The COVID-19 pandemic has created a variety of challenges throughout the nation and has impacted the health of many healthcare workers. The uncertainty of the pandemic has brought up feelings of anxiety and fear among the health care workers. In this context this study analyse the occupational hazards of health care workers during covid19 pandemic. The main objective of the study is to find out the occupational hazards health care workers during Covid 19 pandemic. The specific objectives of the study are; to identifies the health hazards of health care workers during COVID-19 pandemic and to find out the various challenges faced by health care workers during covid 19 pandemic. The study is based on both primary and secondary data. Primary data is collected through a well- designed questionnaire for analyzing the study. The data required for the study has been collected by using convenience sampling method. For this number of health care workers were selected at random from two private hospitals, one government hospital and one public health centre.

Keywords- Occupational Hazards, Health Care, Healthcare Workers, COVID.

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ETHNOBOTANICAL AND FLORISTC STUDIES OF THE SACRED GROVE, SREE KURUMBHA KAVU, KANNUR DISTRICT, KERALA

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Abstract

Sacred groves are forest fragments of varying sizes, which are communally protected and which usually have a significant religious connotation for the protecting community. Sacred groves are relic forest patches traditionally protected by communities in reverence of a deity. These groves are mostly associated with temples and are also culturally important. They manifest the spiritual and ecological ethos of rural indigenous communities. The sacred groves play an important role in ecosystem services. An ethno-botanical study was carried out to document the medicinal plants in Sree Kurumba Kavu, Pallikkunnu in Kannur district, Kerala. This grove consist of a total of 81 vascular plants falling under 69 genera and 40 families were documented. Out of which, the angiosperm dominate with 78 members, while 3 were pteridophytes and *Cycas circinalis* is one and only gymnosperm. During our present study we analyzed that there are about 30 red listed species.

Key words: Sacred groves, forest patches, ecological ethos, ecosystem services, vascular plants.

Introduction

Sacred groves are a small area of forest protected by the local people. It is one of the rich biodiversity spots wherein rare plants, animal, and medicinal plants are established in reserved forests [1]. Tribal people in these grove areas depend on traditional medicine system for healthcare[2] . A sacred grove creates a cultural space among communities to affirm the identity and solidarity. Sacred groves have been the repositories of valuable medicinal plants and wild relatives of cultivated species which have potential to address the countries food and medicine [3]. In India, studies on sacred groves with regard to ethno-medicinal plants emphasized the local utilization of this age old tradition.

Folklores play a significant role in confirming the beliefs associated with the sacred groves. Though most of the indigenous people are illiterate, they have scrupulously nurtured their traditional customs, rituals, ceremonies and a way of forest life through folk beliefs with great fervor.

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Distribution and ecological impact of invasive species in the Sacred grove of Kannur District, Kerala

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Abstract

A sacred grove, also known as a sacred forest, is made up of patches of natural vegetation ranging in size from a few trees to several acres. Local communities protect the sacred groves' spaces because of religious beliefs and traditional rituals that have been passed down through generations. Our present study in Sree Oorpazachi kavu, Edakkad, was a floristic survey along with the assessment of distribution of invasive species.We were able to document 86 vascular plants belonging to 75 genera and 38 families. In which twenty two were alien species of which *Acacia caesia, Alternanthera brasiliana, and Chromolaena odorata* have been identified as high risk categories of invasive plants that require immediate attention in terms of control and management in the study area.

***Key words*:** Sacred groves, invasive species, , ecosystem, vascular plants, kavu.

Introduction

Sacred groves are one of the best examples of traditional in-situ conservation practises that predate the modern concept of wildlife reserves. These are patches of natural near-climax pristine vegetation of trees and associated organism groups that are managed as part of a local cultural tradition. Sukumaran and Raj [1] make an attempt to identify folklore medicinally

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β-Ni(OH)$_2$ supported over g-C$_3$N$_4$: A novel catalyst for *para*-nitrophenol reduction and supercapacitor electrode

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ABSTRACT

β-Ni(OH)$_2$ supported over g-C$_3$N$_4$ was synthesized by two simple approaches. Its catalytic activity in reducing hazardous *para*-nitrophenol (PNP) to the industrially important *para*-aminophenol (PAP) was studied in detail. The applicability of this material as a supercapacitor electrode was also studied. The material shows 100% conversion efficiency with a rate constant of $65.4410 \times 10^{-3}\ s^{-1}$. The catalytic efficiency and the supercapacitor electrode behaviour of the material can be explained based on the structure of β-Ni(OH)$_2$ nanoparticle and the synergy between β-Ni(OH)$_2$ and g-C$_3$N$_4$.

Introduction

There has been a global awareness of green chemical technologies and sustainable energy solutions in the last decade. Green energy technology and the availability of drinking water constitute the core of sustainable development goals (SDGs) [1]. These modern energy and environmental goals have opened a new world of opportunities and challenges for nanotechnology. Scientists and stakeholders are scaling up their innovations and investments in nanomaterials that can be employed as functional materials in renewable energy conversion, storage, water sanitation, green chemical conversions, etc [2].

The marine ecosystem is an integral part of sustainable growth, and its contamination leads to the development of 'dead zones' with very low oxygen concentrations [3]. Marine resources are alarmingly threatened due to man-made pollutants, including fertilizers, oilspills, pigments, etc. The nitroaromatic compounds form an important class of pollutants. They are extensively used to produce pigment dyes, pharmaceuticals, explosives, pesticides, etc., and is released into the environment in large quantities [4]. Agricultural and industrial wastewater containing nitroaromatic compounds can cause serious health hazards to animals and plants [5,6]. Among the different nitroaromatic compounds, the most widely used compound is *para*-nitrophenol (PNP). PNP can easily accumulate in the surface and groundwater systems as it is highly stable and non-biodegradable [7]. According to The US Environmental Protection Agency, the upper limit of PNP in drinking water is 10 ppb [6]. Hence, efficient methods for the removal of PNP from water are required.

The hydrogenation of PNP to *para*-aminophenol (PAP) has attracted a lot of interest in recent years. The process removes PNP through its conversion to PAP. PAP has a profound use in analgesic and antipyretic drugs, photographic developers, corrosion inhibitors, and hair dyeing agents [8]. Catalytic reduction of PNP using sodium borohydride ($NaBH_4$) in the presence of nanoparticles of noble metals (Pd, Ag, Pt, Au), non-noble metals (Co, Ni, Cu) and bi-metallic alloys has been widely studied [9–15]. To make the reduction process cost-effective, there were attempts to replace the metal catalysts with transition metal oxide nanoparticles [16,17]. Among the different metal oxides, nickel oxide has been reported to have the best catalytic efficiency compared to iron and cobalt oxides [18]. However, the nickel oxide nanoparticle surface tends to be less stable, especially under moist conditions leading to the growth of a nickel hydroxide layer on its surface [19]. Hence it is better to engineer nickel hydroxide nanoparticles as a catalyst for the reduction of PNP. Previous studies using α-Ni(OH)$_2$ shows that the material exhibited catalytic performance. The catalytic efficiency of α-Ni(OH)$_2$ depends on the extent of exposure of Ni^{2+} ions to the reactant species. Since the α-Ni(OH)$_2$ has a layered structure, the exposure to Ni^{2+} for the reactant species can be tuned by adjusting the morphology, specific surface area and the interlayer spacing between

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Article

Facile Synthesis of Polyindole/$Ni_{1-x}Zn_xFe_2O_4$ (x = 0, 0.5, 1) Nanocomposites and Their Enhanced Microwave Absorption and Shielding Properties

Anjitha Thadathil, Jithesh Kavil, Govind Raj Kovummal, Chamundi P. Jijil, and Pradeepan Periyat*

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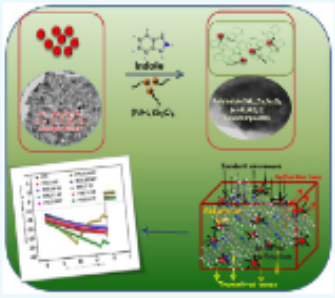
ABSTRACT: The present work reports the fabrication of polyindole (PIN)/$Ni_{1-x}Zn_xFe_2O_4$ (x = 0, 0.5, 1) nanocomposites as efficient electromagnetic wave absorbers by a facile in situ emulsion polymerization method for the first time. The samples were characterized through Fourier transform infrared spectroscopy, UV−vis spectroscopy, X-ray diffraction, thermogravimetric analysis, scanning electron microscopy, high-resolution transmission electron microscopy, and vibrating sample magnetometry. The resulting polyindole/$Ni_{1-x}Zn_xFe_2O_4$ (x = 0, 0.5, 1) nanocomposites offer better synergism among the $Ni_{1-x}Zn_xFe_2O_4$ nanoparticles and PIN matrix, which significantly improved impedance matching. The best impedance matching of $Ni_{1-x}Zn_xFe_2O_4$/polyindole (x = 0, 0.5, 1) nanocomposites was sought out, and the minimum reflection loss of the composites can reach up to −33 dB. The magnetic behavior, complex permittivity, permeability, and microwave absorption properties of polyindole/$Ni_{1-x}Zn_xFe_2O_4$ (x = 0, 0.5, 1) nanocomposites have also been studied. The microwave absorbing characteristics of these composites were investigated in the 8−12 GHz range (X band) and explained based on eddy current, natural and exchange resonance, and dielectric relaxation processes. These results provided a new idea to upgrade the performance of conventional microwave-absorbing materials based on polyindole in the future.



INTRODUCTION

The development of high-performance electromagnetic interference (EMI) shielding/microwave-absorbing materials has become a current focus in solving the problem of EMI pollution arising from the fast-growing telecommunication equipment and other electro-electronic device industries.[1,2] In the last decade, the charm of 2D nanomaterials, such as graphene,[3,4] g-C_3N_4,[5] MXenes,[6] WS_2,[7] and MoS_2,[8] has intrigued great deal of interest due to their microwave-absorbing properties originating from their broadband optical response, strong plasmon oscillation, gate-tunable conductivity, active variable THz band gaps, and enormous surface area-to-volume ratio. In addition, as a new class of Dirac materials with a small band gap, TI was also found to show saturable absorption at telecommunication wavelengths.[9] In general, it is noticed that individual magnetic and dielectric electromagnetic wave-absorbing materials show satisfactory performance due to the poor impedance matching.[10] Accordingly, noteworthy attempts have been made to build high-performance composite microwave-absorbing materials comprising both magnetic and dielectric components, which would offer better impedance matching and improved electromagnetic shielding performance through the effective complementarities and synergies between magnetic loss and dielectric loss.[11,12] Recently, researchers have explored the effect of nanoparticle-induced moderations in conducting polymers that possess the most effective colligative electronic, magnetic, and optical properties. Conducting polymer ferrite composites have drawn much attention as an EMI-shielding/absorbing material due to their high dielectric and magnetic losses,[13] corrosion resistance, low density, and ease of processing.[14] Among the conducting polymers, polyindole (PIN) and its derivatives have not yet been explored as microwave-absorbing/shielding materials. Despite several advantages such as air-stable electrical conductance,[15] slow hydrolytic degradation,[16] high redox activity,[17] high cycling, and thermal stability as compared to polyaniline (PANI) and polypyrrole (PPY), PIN still suffers from lesser conductivity than PANI and PPY.[18] However, electrical conductivity in the range from 10^{-3} to 10^{-1} S cm^{-1} is shown by PIN in its doped state.[19,20] When organic dopants with surfactant functionalities such as sodium dodecyl sulfate (SDS) and sodium dodecylbenzenesulfonate (SDBS) are employed, they play a dual role as dopants and as a

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Boosting ion dynamics by developing graphitic carbon Nitride/Carbon hybrid electrode materials for ionogel supercapacitor

Shabeeba Pilathottathil [a c], Jithesh Kavil [b], Mohamed Shahin Thayyil [a]

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Highlights

- g-C_3N_4 based nano-hybrid materials with graphene, activated carbon and CNT were prepared.
- g-C_3N_4 /AC shows Csp value of 266F/g in Na_2SO_4 electrolyte.
- g-C_3N_4 /AC shows Csp value of 303F/g in Ionic liquid/gel electrolyte.

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ORIGINAL RESEARCH PAPER

Physical Education

EFFECT OF WEIGHT TRAINING AND CIRCUIT WEIGHT TRAINING ON LEG STRENGTH AND VITAL CAPACITY AMONG MALE FOOTBALL PLAYERS

KEY WORDS: Weight training, circuit weight training, leg strength and vital capacity.

Dr. Ajayakumar Koorma Associate Professor & Head, Department of Physical Education, S.N. College, Kannur.

ABSTRACT

The purpose of the study was to find out the impact of weight training and circuit weight training on leg strength and vital capacity. Forty five male football players studying in S.N. College, Kannur, Kerala, aged between 17 and 21 years were selected for the study. They were divided into three equal groups, each group consisting of fifteen subjects in which two experimental groups and one control group, in which the group I (n=15) underwent weight training, group II (n = 15) underwent circuit weight training for three days (alternative days) per week for twelve weeks, and group III (n=15) acted as control, which did not participate in any training. The subjects tested on selected criterion variables such as leg strength and vital capacity at prior to and immediately after the training period. For testing the leg strength, dynamometer was used and to measure the vital capacity expirograph was used. The analysis of covariance (ANCOVA) was used to find out the significant difference if any, between the experimental groups and control group on selected criterion variables separately. Since there were three groups involved in the present study, the Scheffé S test was used as post-hoc test. The selected criterion variables such as leg strength and vital capacity were improved significantly for the training groups when compared with the control group. Moreover, there were no significant difference was occurred between the training groups on selected criterion variables.

INTRODUCTION

The universe has been observing the evolution of sports performance for a while now. This development was unthinkable a few years ago, but it is now typical and helps sportsmen perform better on the world stage. Intense drive is a typical cause of the lengthy and arduous hours that sportsmen put in since sport is a demanding discipline. Additionally, coaching is a sophisticated profession that benefits from the assistance of sports scientists and athletic professionals. The players' knowledge base has expanded in recent years, which has an effect on coaching and training methods. Sports science has advanced from descriptive to scientific methodologies and their application.[1]

Training also helps to carried out for an important purpose of helping the working peoples to acquire and apply the knowledge, abilities, attitudes and skills needed for the particular work. It is also a methodological procedure of continuous and progressive exercise of performing work which involving, learning and acclimatization.[2] The schedule during dynamic training should take certain things into account since the functional and psychological traits developed throughout training would be displayed during competition. To attain the goal, the maximum number of training sessions/periods should be introduced. These sessions/periods should be guided by physical, physiological, or psychological characteristics.[3] The word training in sports is commonly unwritten that it is a synonym of performing physical exercise and in broad sense; sport training is doing physical exercises to improve the overall performance.[4] Dale S. Beach[5] defines coaching as 'the geared up system by means of which humans analyze know-how and/or ability for a precise purpose'. It is a technique of instructing of unique talent to somebody, both human or animal and the intention is to enhance the capacity, overall performance ability or productiveness of an character.[6]

The term "weight training" also refers to a type of physical activity that uses resistance to enhance muscular contractions that contribute to strength, increase the measurement of skeletal muscle, and increase anaerobic endurance. It can improve general health and fitness, including the measurement of muscle, tendons, ligaments, and joints, and decreases the risk of injury[7]. It can also increase bone density, fitness, metabolism, and heart function. [8.9] principles entail changing the number of repetitions, sets, pace, exercise kinds, and weights in order to increase muscular strength, endurance, and size. When lifting weights, a person should adjust the precise ratio of repetitions, sets, workout type, and weights based on their personal goals. The term "Circuit Weight Training" (CWT) was first used in the early 1950s to describe a training method for boosting leg strength and endurance. The weight training activities in CWT should be completed one weight exercise station to the next with the least amount of rest possible. In order to improve overall body fitness, CWT exercises typically require between 6 and 12 workout stations, with two to three sets at each circuit.

MATERIALS AND METHODS

The purpose of this study was to determine the impact of weight training and circuit weight training on the vital capacity and leg strength. In order to accomplish the goal, 45 male football players from S.N. College in Kannur, Kerala, were chosen as subjects. They were split into three equal groups of fifteen each, two experimental groups, and a control group. Group I (n = 15) underwent weight training, Group II (n = 15) underwent circuit weight training for three days (alternate days) each week for twelve weeks, and Group III (n = 15) acted as control which did not participate in any special training apart from the regular football coaching activities. For every training programme there would be a change in various structure and systems in human body. So, the researchers consulted with the experts and then selected the following variables as criterion variables: 1. leg strength, 2. vital capacity.

DATA ANALYSIS

The differences, if any, between the corrected post test means on several criteria variables were examined independently using analysis of covariance. The Scheffé S test was used as a post-hoc test if the adjusted post test mean's "F" ratio was shown to be significant. To evaluate the "F" ratio discovered using analysis of covariance, the level of significance was set at.05 level of confidence.

Table – I Analysis of Covariance and 'F' ratio for leg strength and Vital capacity of Weight training Group, Circuit weight training Group and Control Group

Variable Name	Group Name	Weight training	Circuit weight	Control Group	'F' Ratio

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Effect of Circuit Weight Training on Anaerobic Power and Strength Endurance Among Male Football Players

Dr. Ajayakumar Koorma
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Abstract **- The purpose of the study was to find out the impact of circuit weight training on anaerobic power and strength endurance. Thirty male football players studying in S.N. College, Kannur, Kerala, aged between 17 and 21 years were selected for the study. They were divided into two equal groups, each group consisting of fifteen subjects in which one experimental group and one control group, in which the group I (n=15) underwent circuit weight training for three days (alternative days) per week for twelve weeks, and group II (n=15) acted as control, which did not participate in any training. The subjects tested on selected criterion variables such as anaerobic power and strength endurance at prior to and immediately after the training period. For testing the anaerobic power, Margaria Kalamen Anaerobic Power Test was administered and to measure the strength endurance sit-ups test was administered. The analysis of covariance (ANCOVA) was used to find out the significant difference if any, between the experimental group and control group on selected criterion variables separately. The selected criterion variables such as anaerobic power and strength endurance were improved significantly for the training group when compared with the control group.**

Index Terms **- circuit weight training, anaerobic power, strength endurance and ANCOVA.**

INTRODUCTION

All around the world, the phrase "sports for all" has gained enormous popularity. "Today, doing sports will improve everyone's physical fitness and overall health. Most aspects of modern life are reliant on science and technology. People in these situations need to exercise more to maintain their physical and mental fitness and do the activity well.[2]

The primary goal of contemporary sports competition is to identify and nurture human potential at an early age and guide it in the proper direction to meet the goals set for certain sports or games. The world of games and sports is always growing due to the intensity of competition and the growth of human movement research. The method of selecting, screening, and training athletes in a range of sporting activities at the world level has been impacted by technical and scientific innovation.[1]

The improvement of anaerobic capacity may be necessary for a particular sporting event to be successful. The capacity to use anaerobic reserves, balance, mobility, agility, speed, power, body levers, endurance, skills, tactics, intelligence, neuro-muscular coordination, acute hearing, excellent vision, reaction time, experience, perceptual ability, motivation, consent motion, dedication, adequate rest, food, sleep, emotional stability, and many body measurements.[3]

Any type of athletic performance is a multifaceted outcome of an athlete's abilities and interactions with their surrounding environment.[4]

In order to answer the question of whether a single program can improve muscular strength and endurance while working the aerobic system, circuit weight training (CWT) was created in the 1950s. With little break in between stations, the goal of CWT is to travel from one training station to the next. CWT programs typically contain 6–12 workout stations that emphasise complete body training. Typically, 2 to 3 sets of each circuit make up a full workout.[5] The program specifically calls for 10-15 repetitions at each station, employing around 40 to 50 percent of a person's one-repetition limit, and then 15 to 30 seconds of recovery time. The coach should employ other methods to bring variation to the program in addition to circuit weight training.[6,7] CWT can be utilised as an introductory program, to keep an athlete's physical strength and endurance up throughout the season, and for injury recovery. A general strength and conditioning program can benefit from the addition of CWT.[9,10]

Strength endurance is defined as the capacity of the whole organism to withstand under the long-lasting

Why Do Consumers make Purchase Decisions? Exploring Fast Moving Consumer Goods as an Emerging Market

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ABSTRACT:

The Fast-Moving Consumer Goods (FMCG), also known as Consumer-Packaged Goods (CPG), are goods that have a high shelf turnover, relatively low cost, and don't take much thought, time, or financial investment to purchase. Any product that is widely used; often moves relatively quickly and regularly. The FMCG sector is India's fourth-largest sector that affects daily life for everyone. The FMCG goods sector contributes vitally to the gross domestic products of India. The present study is an attempt to examine various factors that influence the consumers' purchase decision of FMCG products with the sample size of 195 consumers by surveying through a structured questionnaire in the state of Kerala and analyzed using correlational analysis and factor analysis. To accomplish the objective of the study, both primary and secondary data were used. The result of the study showed that promotional factors, product factors, price factors, brand image, social influence, convenience, and information

Adaptation towards Green banking; exploring acceptance and awareness among stakeholders of Banking Industry; A Post COVID-19 outbreak analysis

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ABSTRACT:

The COVID-19 outbreak has imposed a higher focus on sustainable development and associated corporate investments and refinancing initiatives. Banks, together with their customers and other stakeholders, play a critical role in accelerating the transition to a low-carbon, sustainable economy. Green banking is about financing climate-friendly power plants, supporting social investments in hospitals and schools, and offering sustainability development. This study is designed to analyze the acceptance and awareness regarding green banking initiatives among different stakeholders of the banking industry in the Indian market after the COVID-19 outbreak. The Sample consists of 320 respondents and data collection was done by the distribution of structured questionnaires. The study reveals that the level of awareness towards green banking is high among managers and employees, whereas it is minimum among the general public. The study also finds that the young generation is more inclined towards green banking products than middle and senior age groups.

KEYWORDS: Climate change, COVID 19, Environmentally friendly, Green banking, Paperless banking,

1.0 INTRODUCTION:

The COVID-19 outbreak has paralyzed the global economy, worsened inequities, and governments face the biggest crisis of unemployment since the Great Depression (Rassanjani et al., 2021)[1]. However, relief may be on the way as vaccinations become available to everyone, the world conversation is vibrating with optimism for not just recovery, but also a new sustainable system that assures economic stability and addresses climate change. So, how do we achieving that aim in practice?

The public sector will play a key role; even so, government efforts to climate change are hampered by inefficient renewable energy alternatives.

In today's world, green banks are a component of the solution for optimizing public intervention (Dewi and Dewi, 2017)[2]. Go Green is the theme of the twenty-first century. Being green (Indira, 2016)[3] i.e., proactive with the environment and safety of mother earth has grown to be very fundamental today. Technology improvement has supported human beings, commercial enterprise entrepreneurs, and service carriers to undertake eco-friendly concepts, helped to reduce carbon emission and it's had an effect on the environment (Campiglio, 2016)[4]. In India, the banking industry is one of the most dynamically developing industry (Kumar, 2011)[5]. Banking transactions have reached a new level due to technological advancements and e-business (Raghunandan et al., 2018; Regmi, 2015; Vijayakumar et al., 2011)[6,7,8]. The sudden change in the financial environment has stripped banks of all comforts, and many of them are struggling to cope with the demands of a changing climate (Chaudhury et al., 2013)[9]. Banks are highly reliant on technology to succeed in an increasingly

INSIGHTS INTO FINANCIAL STRESS AMONG ADULTS: HOW ARE FINANCIAL WORRIES AFFECTING THE YOUNG, MIDDLE-AGED, AND OLDER ADULTS?

Vyshak P. K.*, Jayarajan T. K., Vishnu P. K.*****

Abstract *Adults often experience financial stress. Managing financial stress among adults is a broad-based problem that impedes the management of family and social relationships. Financial stress is defined as the uncomfortable feeling of not being able to satisfy financial obligations and afford necessities. This study is aimed at describing the relationship between financial stress and the age of the participants, and also exploring the effect of financial stress on family and social relationships among adults in the state of Kerala. Three age categories were distinguished, broadly described as the young (18 to 35), the middle-aged (36 to 55), and the older (56 and older). Data have been gathered from 345 adults in Kerala using a convenience sampling method. Descriptive statistics were used to characterise survey participants and compared using chi-square tests across the age groups. To assess the significant difference between financial stress and age, analysis of variance was used as appropriate. A general linear model of multivariate tests was used to assess the effects of financial stress on family and social relationships among the different categories of adults. The results have shown that there is a significant difference between age and financial stress among adults. It also inferred that the effect of financial stress differed statistically significantly depending on the age group of the participants. The paper provides a greater understanding of financial stress and its relationships with stages of life among adults. Finally, the research revealed that financial stress has both direct and indirect effects on adulthood life at various stages.*

Keywords: *Financial Stress, Financial Hardship, Adults, Family Relationship, Social Relationship*

INTRODUCTION

Financial stress is characterised as subjective feelings of financial worries and anxieties, as well as a deterioration in financial circumstances and trouble meeting family commitments (Hilton & Devall, 1997; Crous, 2017). Money is a common source of stress for adults. In fact, 72 per cent of individuals say money stresses them out, whether it is worrying about paying their rent or being in debt. This is crucial since financial stress has been related to a variety of health problems (Tran et al., 2018). Financial stress may be described as the inability to pay one's financial responsibilities; however, it might entail emotional or psychological impacts (Northern et al., 2010). When families are unable to satisfy their present and ongoing financial responsibilities, financial stress develops. Financial stress is defined as the physical or mental health problems that result from not being able to satisfy necessities, not being able to pay the bills, or not having money left over at the end of the month (Afifi et al., 2018; Ponnet, 2014; Romo, 2014; Valentino et al., 2014). When a family's income, wealth, or debt is insufficient to withstand economic adversity, they face financial stress or distress (Lai, 2011; Park & Kim, 2018; Sweet et al., 2013; Thorne, 2010). These variables, which evaluate how much a family's financial resources are insufficient to meet current or long-term responsibilities, assist to explain why more income and wealth are generally linked to less financial stress (Lai, 2011; Romo, 2014; Valentino et al., 2014). Individuals inside and across households experience financial hardship in different ways. When compared to males, women suffered the impact of financial stress by having inferior physical and mental health. (Afifi et al., 2018; Lai, 2011; Park & Kim, 2018; Stein et al., 2013; Thorne, 2010). There were also differences in financial stress across racial groups (Afifi et al., 2018; Park and Kim, 2018; Serido et al., 2014; Valentino et al., 2014). Moreover, because the published literature frequently attempts to understand differences in financial stress by race, class, and gender, a disregard for the economy and economic environments may unwittingly advance harmful stereotypes by blaming families for their lived experiences

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Polyvinyl alcohol-polyvinylpyrrolidone-hydroxy apatite (PVA-PVP-Hap) membrane for effective removal of benzene from aqueous solutions:-Kinetic, isotherm, and thermodynamic studies

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Highlights

- Hydroxyl apatite doped PVA-PVP composite membrane shows 94.79% removal efficiency of Benzene from aqueous solutions.
- Rate of reaction is most fitted to pseudo second order kinetic model and Freundlich model is more appropriate isotherm model for

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A Comparative Efficiency Analysis of Public Sector General Insurance Companies in India in the Pre and Post Liberalisation Period

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Abstract
Insurance sector in India undergo many changes after the introduction of liberalisation, privatisation and globalisation.Several new players enter in to the market. Opening up of the insurance industry to private players create high competition and efficiency challenges to the existing players in the market. Liberalisation brings many drastic changes in this sector. Here the investigator tries to compare the efficiency of public sector general insurance companies in the pre and post liberalisation period. In the post liberalisation period, due to increased competition, they have to improve their efficiency in order to exist in the market. Efficiency refers to the insurers ability to produce a given set of out puts with the use of inputs. The present study evaluates the efficiency parameters of four public sector general insurance companies in the pre and post liberalisation period.For the evaluating the efficiency of the public sector general insurance companies in India, secondary data are collected from four public sector general insurance companies. To assess the financial performance of the general insurance companies, a comparative performance of efficiency of public sector general insurance companies during the pre and post liberalization period has been worked out. Then the efficiency parameters are compared and analysed. The efficiency of the general insurance companies is evaluated company-wise using the non-parametric method viz. Data Envelopment Analysis (DEA). Efficiency is evaluated trilaterally-Technical Efficiency, Pure Technical Efficiency and Scale Efficiency. The hypotheses pertaining to efficiency parameters are tested using Mann-Whitney U Test. The results shows that even after the introduction of liberalisation in the general insurance sector, the four public sector companies performed well in the case of technical efficiency and pure technical efficiency. But the companies fails to maintain scale efficiency during the post liberalisation period.

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A Comparative Efficiency Analysis Of Public And Private General Insurance Companies In The Post Liberalisation Period

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Abstract
Indian general insurance sector has undergone major structural changes during the post liberalisation period. Opening up of the insurance industry to private players create high competition and efficiency challenges to the existing public sector companies in the market. The existing four public sector companies face tough competition from newly entered private sector companies. The existing companies are competing with each other and with the private players also. So, they have to improve their efficiency in order to exist in the market. Efficiency refers to the insurers ability to produce a given set of out puts with the use of inputs.To compare the efficiency of the public and private sector general insurance companies in India, secondary data are collected from 12 out of the 34 general insurance companies (4 from the public-sector and 8 from the private-sector) were selected. The efficiency of the general insurance companies is evaluated company-wise using the non-parametric method viz. Data Envelopment Analysis (DEA). Efficiency is evaluated trilaterally- Technical Efficiency, Pure Technical Efficiency and Scale Efficiency. The hypotheses pertaining to efficiency parameters are tested by using Mann-Whitney U Test.
Key words: - Efficiency, General Insurance, Technical Efficiency, Scale Efficiency

I. INTRODUCTION

The survivability of modern firms or industry is based on efficiency. In this sense, efficiency parameter gives rise to a quartet framework of price, technical, economic and structural efficiencies. The general insurance is a highly globalised sector and several global players make their effort to penetrate the newly emerging economies like India. This makes survivability issues to the local firms either to perish or to structurally efficient and competitive. Efficient firms will

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g-C_3N_4/CuO and g-C_3N_4/Co_3O_4 nanohybrid structures as efficient electrode materials in symmetric supercapacitors

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Metal oxide dispersed graphitic carbon nitride hybrid nanocomposites (g-C_3N_4/CuO and g-C_3N_4/Co_3O_4) were prepared *via* a direct precipitation method. The materials were used as an electrode material in symmetric supercapacitors. The g-C_3N_4/Co_3O_4 electrode based device exhibited a specific capacitance of 201 F g^{-1} which is substantially higher than those using g-C_3N_4/CuO (95 F g^{-1}) and bare g-C_3N_4 electrodes (72 F g^{-1}). At a constant power density of 1 kW kg^{-1}, the energy density given by g-C_3N_4/Co_3O_4 and g-C_3N_4/CuO devices is 27.9 W h kg^{-1} and 13.2 W h kg^{-1} respectively. The enhancement of the electrochemical performance in the hybrid material is attributed to the pseudo capacitive nature of the metal oxide nanoparticles incorporated in the g-C_3N_4 matrix.

Introduction

Renewable energy storage and its supply upon demand have been a major challenge for researchers owing to the short life span and poor power delivery of conventionally used lithium-ion batteries.[1] The supercapacitor has been recognized as a suitable storage device that can be used in combination with batteries to mitigate the power delivery problems associated with batteries.[2,3] Supercapacitors possess excellent performance recyclability due to the absence of any mass transfer between the electrodes.[4] Carbon-based electrode materials have been used conventionally in supercapacitors owing to their high surface area and storage capacity.[5,6] Nitrogen-doped carbon allotropes emerged recently as supercapacitor electrodes, which show excellent electrode electrolyte interaction due to the presence of lone pair electrons on the nitrogen atom.[7]

Graphitic carbon nitride (g-C_3N_4) is considered as an intrinsically nitrogen-rich system with lamellar structure. It is the most stable allotrope of carbon nitrides at ambient atmosphere, but it also has rich surface properties that are attractive for many applications including supercapacitor electrode and hydrogen evolution photocatalyst.[8] The polymeric structure of g-C_3N_4 arises from the repetition of tri-*s*-triazine (symm. 1,3,5 triazine) units and the 2D lamellar structure arises from the weak van der-Waals interaction between the layers. The lone pair of electron on nitrogen could provide surface polarity on the electrode material and that could offer several binding sites for the electrolyte ions to interact with the electrode surface.[9] However, the semiconducting nature, low surface area and the agglomerated layer structure limit its application as a supercapacitor electrode.[10]

As in other carbon electrodes, the charge storage in g-C_3N_4 is due the formation of electrical double layer at the electrode–electrolyte interface (EDLC) which is non-faradaic in nature. However the pseudo capacitive behavior in transition metal oxides (TMO), sulphides and conducting polymers arises due to the fast and reversible redox process between the electroactive material and electrolyte molecule (faradaic process).[11–15] Thus TMO with pseudocapacitive nature can be suitably coupled with g-C_3N_4 layer structure to mitigate the limitations of bare g-C_3N_4 electrodes.[16]

The commonly used transition metal oxides are ruthenium oxide,[17] manganese dioxide,[18] tungsten oxide,[19] nickel oxide,[20] *etc.* Among them, Co_3O_4 and CuO have received a great deal of attention due to their economically viable and environmentally friendly nature.[21,22] Moreover, as reported by Zhou *et al.* Co_3O_4 shows a very high theoretical capacitance of 3560 F g^{-1} with an excellent shuttling between its Co^{2+} and Co^{3+} ions during electrochemical process.[23,24] In a recent report by Zheng *et al.* mesoporous Co_3O_4 was anchored on the g-C_3N_4 surface, and the composite material showed a specific capacitance value of 780 F g^{-1} at a current density of 1.25 A g^{-1}.[25] In another attempt, Shim *et al.* fabricated a supercapacitor from carbon and CuO anchored g-C_3N_4, which has given a specific capacitance value of 247.2 F g^{-1} at a current density of 1 A g^{-1}.[26] In the available reports, the electrochemical measurements were carried out in three electrode

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2. Gender and LGBTQ

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ABSTRACT:

LGBTQ community getting more attention and consideration in the modern world. Different cases are filed in courts to consider their rights. It is required to protect the interest of this community then only they can enjoy their freedom. The enjoyment of their freedom is some what a psychological matter.

Because if any person is realized as LGBTQ category then their negligence from family, society starts. Now a days the government is taking initiative to improve the conditions of LGBTQ. The health department is coming forward to protect the interest of LGBTQ. The society is also tried to accept them. People are ready to work with them. The conditions of these group are improving compared to earlier.

LGBTQ is an abbreviation commonly used to refer to lesbian, gay, bisexual, transgender, and questioning individuals. In all regions and countries, including those with anti-discrimination provisions, LGBTQ persons experience economic and social inequalities and marginalization, including in health, education, employment and access to justice. Adam Smith mentioned about freedom of action in his writings.

He advocated the philosophy of free and independent action. Similar to that the LGBTQ community should have the right and freedom to enjoy their life and live according to their whims and fancies. Smith also explained that each member of society is left free to pursue his economic activities, he will maximise the output to the best of his ability and would render a great service to the society. LGBTQ can improve their productivity by enjoying the freedom in their life.

The term LGBTQ is used to denote the following sets of people:

- Lesbian: A lesbian means, a woman who is sexually attracted to a woman

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Occurrence of Stored Grain Pests in Thrissur District, Kerala, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Original Research Article

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ABSTRACT

The aim of this study is not to eliminate all pests. Some pests are tolerable and essential so that their natural enemies remain in the crop. Rather, the aim is to reduce pest populations to less than damaging numbers. Hence the objective of the study is to enumerate the species composition and diversity of the stored grain pests of the study area. In the present study a variety of stored grain insect pests were recorded for 6 months from 2 sites in Thrissur District. For the convenience of the study the period is divided into 2 seasons. The seasonal studies were done and find the species diversity in each season through the survey and statistical analysis. From two seasons 9 species

Insights into the Association between Financial Literacy and Stock Market Participation of Retail Investors: A Bibliometric Review

Athira K*

The proposed work is intended to provide insights into past and contemporary research themes in financial literacy and stock market participation by employing the technique of bibliometric analysis. Bibliographic information involving financial literacy and stock market participation was compiled from Scopus, which generated 1628 documents spanning from 1991 to 2022. In order to execute various bibliometric analyses and evaluations, Biblioshiny - an open-source platform, was used in this research paper. The analysis of the bibliographic data offered a detailed description of the theme of financial literacy and stock market participation. Further it addressed the contemporary themes and trends in the subject area. The themes of financial literacy, financial education, risk tolerance, household finance, financial advice, and stock market participation were discovered to be the less-researched areas in this domain. To better comprehend the idea of financial literacy and propagate its relevance to investors and non-investors, further research may be carried out on these topics.

Keywords: Financial Literacy, Stock Market Participation, Retail Investors, Bibliometric Analysis, Biblioshiny

1. Introduction

The economy is witnessing the emergence and spread of diverse and complicated investment avenues, many of which are tricky for investors who are not proficient in financial matters, to understand (Lusardi & Mitchell, 2014). Considering the prevailing progressive financial market landscape, investors ought to be well-versed in financial

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REVIEW OF WOMEN ENTREPRENEURSHIP LITERATURE: A BIBLIOMETRIC ANALYSIS

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ABSTRACT

The growing trends and concern in women entrepreneurship makes it necessary to create models and bibliometric summary on this field of study.The goal of this work is to look at the descriptive and evaluative findings of articles in the scopus database about women entrepreneurs and also assess the impact of women entrepreneurship on scholar. The bibliometric analysis method was applied in this study for this reason. The scopus database was searched for 1264 scientific papers published between 1997 and 2023.Biblioshiny software was utilised to display the analysis results.The descriptive results showed that most articles analyzed in the year 2022, Morduch J was the most co-cited author,U.S.A is the most productive country,international journal of gender and entrepreneurship is the most productive journal,microfinance and self help group is the most productive words and feminism and entrepreneur is most trended topics in the study area.based on theses results,systematic literature reviews on women entrepreneurship at national level in different could be carried out.

KEYWORDS;-women entrepreneurship,female entrepreneurship,Women Business,Bibliometric analysis,Scopus.

INTRODUCTION

In recent years, the study of women entrepreneurship has grown rapidly, gaining widespread acceptance among academics and, most all, contributing to a better understanding of the variables contributing to women's difficulties pursuing entrepreneurial careers. According to the coming literature, women can make a significant contribution to entrepreneurial activity (Noguera et al., 2013) and economic growth (Kelley et al., 2017; Hechevarría et al., 2019) with the aim of creating new jobs and increasing the gross domestic product (GDP) (Bahmani-Oskooee et al., 2013; Ayogu and Agu, 2015), with positive impacts on reducing poverty and social exclusion (Langowitz and Minniti, 2007; Rae, 2015). However, the percentage

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Systematic Literature Review on Financial Literacy and Recent Trends

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ABSTRACT

Financial literacy is the capacity to comprehend and efficiently manage financial matters, which can assist individuals in making educated financial decisions and achieving their financial goals. Based on an analysis of previous financial literacy literature, the study aimed to provide an overview of current research as well as an outline for future research with the goal of identifying key indicators of financial literacy as well as variables that are affected by financial literacy. the study uses a detailed systematic literature review. The study develops an extensive theoretical framework for mapping financial literacy based on an examination of the most referenced articles. Entrepreneurship, women's entrepreneurship, financial inclusion, return on wealth, risk diversification, and other variables are also affected by financial literacy. The study delves into the main trends and topics in financial literacy research by focusing on the financial literacy of entrepreneurs, women entrepreneurs, financial inclusion, and micro, small, and medium-sized enterprises (MSME's). The study's findings can assist policymakers in their efforts to improve the financial literacy of individuals, particularly entrepreneurs and women entrepreneurs, by enabling them to make more informed financial choices, prevent financial strain, and achieve their financial objectives. It can also aid governments' efforts to achieve the Sustainable Development Goals (SDGs).

KEYWORDS: *Financial Literacy, Financial Inclusion, Entrepreneurship, Women Entrepreneurship, MSME's*

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INTRODUCTION

Financial literacy extends beyond basic math abilities. It includes the capacity to critically evaluate financial information, assess risks and benefits, develop financial plans and goals, and grasp the long and short-term ramifications of financial decisions. According to OECD, "Financial literacy is the combination of awareness, knowledge, skills, attitudes, and behaviors necessary to make sound financial decisions and ultimately achieve individual financial well-being." There exist other definitions of financial literacy also. According to Lusardi and Mitchell, "Financial literacy is the ability to understand economic information and make informed decisions about financial planning, wealth creation, debt, and retirement". According to the United States Commission on Financial Literacy and Education, financial literacy encompasses "the skills, knowledge, and tools that enable people to make individual financial decisions in order to achieve their own goals."

Financial literacy includes not only knowledge of financial concepts and products but also awareness and understanding of the larger financial environment, as well as the capacity to use such information successfully in real-life situations. It entails the acquisition of skills such as budgeting, saving, investing, and debt management, as well as the cultivation of positive attitudes and behaviors toward financial management.

Financial literacy is critical for entrepreneurs, especially women entrepreneurs because it affects their capacity to properly run and expand their firms in terms of financial decision-making, financial independence, avoiding financial pitfalls, empowering financial well, funding and investment

Analysis of Antimicrobial potential of Marine red algae; Centroceras clavulatum (C. agardh) Montagne against selected strains of human pathogens

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ABSTRACT:

Finding novel antimicrobial components has achieved a global research focus as the contaminating and pathogenic microbes develop resistance against standard drugs. Current study encompasses Agar well diffusion mediated Antimicrobial (Antibacterial and Antifungal) analysis using methanol extract of marine red algae Centroceras clavulatum (C. agardh) Montagne collected from coasts of Kannur District, Kerala. Tests have performed against 5 pathogenic bacteria such as Bacillus aeruginosa, Pseudomonas aeruginosa, Escherichia coli, Staphylococcus aureus and Klebsiella pneumoniae and 5 strains of pathogenic fungi such as Candida albicans, Candida auris, Candida pelliculosa, Candida parapsilosis, and Candida tropicalis using various concentrations of sample. When compared to the colony inhibition by standard (Chloramphenicol and Fluconazole) (10µl), 25 µl concentration of sample has effectively inhibited most of the tested strains. The study suggests Centroceras clavulatum (C.Agardh) Montagne as potential seaweed to be used for isolating various antimicrobial components.

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A Study on Phytochemistry and Cytotoxicity of Methanolic Extract of Marine Red Alga, *Gelidium micropterum* Kütz.

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Abstract

Gelidium micropterum Kütz., one of the economically important marine red alga has been used for the analysis of phytochemical components and cytotoxic potential against selected lines of human carcinoma cells such as MCF-7 (Breast), HT-29 (Colorectal) and A549 (Lung) cancer cell lines. Presence of Alkaloids, Flavonoids, Glycosides and Phenolic compounds was identified in various solvent extracts of the algae. MTT assay for cytotoxicity resulted in effective inhibition of cancer cells using appropriate concentrations of methanolic extracts of the sample. When comparing the IC_{50} values obtained from the sample treatment to that of standard treatment, A549 cell lines promises the most effective inhibition using a minimal concentration of the sample, i.e., 44 ± 1.0 µg/ml.

Key words: *Gelidium*; MTT Assay; Phytochemical; Cytotoxicity; Seaweeds.

Introduction

Non-communicable diseases (NCDs) caused 71% of all deaths worldwide. It was estimated that NCDs caused 63% of all deaths in India and Cancer was one of the main causes of mortality. As per the reports from WHO (World Health Organization) 9% of deaths due to NCDs in India were cancer deaths. This indicates the alarming incidence of cancer could be a threat to humankind globally (Shah *et al.*, 2020). National cancer control programs consider cancer registries to be essential elements. Publications from both industrialized and developing nations offer up-to-date details on cancer incidence, trends, and projections. The population-based cancer registries (PBCRs) and hospital-based cancer registries (HBCRs) documented by the National Centre for Disease Informatics and Research (NCDIR) under Indian Council of Medical Research (ICMR), Bengaluru, have been performing the systematic collection of data on cancer in India since 1982 (Mathur *et al.*, 2020). More than 15 types of malignancy conditions are identified so far, among which Breast cancer is the most common type worldwide, followed by lung and prostate cancer (NCI, 2022). Since 2019, COVID-19 pandemic had been impacting negatively the detection and treatment of cancer. Delays in diagnosis and treatment as a result of health care facility closures and COVID-19 exposure fears have resulted in less access to care (Siegel *et al.*, 2022).

When the established conventional medical systems fail to prevent and cure the incidence of cancer, scientific communities have to focus more on developing novel drugs and techniques for the former. Phytochemical components isolated from various aquatic and terrestrial plants have been reported to pose antioxidant and cytotoxic potential (Adedeji *et al.*, 2023). As free radicals are more capable of forming cancer, plants with phytochemicals having antioxidant activity are useful in suppressing cancer (Chakraborti, 2022; Chakraborti *et al.*, 2022). Marine seaweeds-one of the major plant groups being the reservoir of miscellaneous resources are more promising in the richness of their constituent phytochemicals (Alves *et al.*, 2018; Pandey *et al.*, 2021; Pangestuti and Kim, 2015). Hence researchers are taking into account marine phycology and the study of anti-carcinogenic substances together (Abhishek

Lernanthropids (Siphonostomatoida: Copepoda) parasitizing the marine fishes of Kerala Coast (India): Species diversity, phylogeny and host-parasite interaction

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Abstract

This study provides new information on the distribution of 17 known species of lernanthropids recovered from 25 species of commercially valuable marine fishes of the Kerala coast, including two new host records. The sampled species comprised five genera viz. *Lernanthropus*, *Lernanthropinus*, *Mitrapus*, *Aethon* and *Sagum*, of which *Aethon* appeared dominant with the prevalence of 67.99 %. *Lernanthropus* comprised 10 species with the prevalence ranged from 3.20–64.15 %, followed by *Lernanthropinus* comprising 4 species with the prevalence 4.8–43.04 %. *Aethon*, *Sagum* and *Mitrapus* were monotypic with the prevalence of 67.99 %, 33.77 % and 23.21 %, respectively. The data on host

Article

Synthesis and characterization of alpha and beta cobalt hydroxide nanostructures for photocatalytic dye degradation and supercapacitor applications

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Customer Awareness and Level of Satisfaction Towards Health Insurance Policies

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Abstract

Health expenditure is increasing day by day which most people pay out of their pockets. In the current scenario of consistently increase medical expenses, most people spend more money on medical expenses in comparison to health insurance. In case of having health insurance, paying out of pocket or borrowing money can be avoided. The study tries to know that which factors affect the health insurance and for the successful implementation of health insurance coverage, it is necessary to understand basic dynamics of consumer preferences, acceptability, pricing of health insurance products and satisfaction obtain from it. The main objectives of the study are; to find out the customer awareness towards health insurance policies and to analyse the policy holder's level of satisfaction on various aspects of health insurance policies. The present study is based on primary and secondary data. The study is mainly based on primary data. Secondary data have also been used for the study. Secondary data is collected from nationally published journals, research thesis, articles etc.For the analysis and interpretation of collected data various statistical tools like percentage, Likert scale, Garratt ranking, diagrams have been used.

Key words: Health Insurance, Customer Satisfaction, Health Insurance Products

I. Introduction

The world we live is in full of uncertainties and risks. Individual, families, businesses, properties and assets are exposed to different types and levels of risks. These include risk of losses of life, property, assets etc. Many happy lives are ruined either by the untimely death of the earning member of the family or by disastrous calamities such as floods, fire, earthquake, war, accident, etc. which may take a heavy toll on human life. These risks are such which cannot be known in