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Recent Advancements in Life Sciences

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Preface

The Cashew Export Promotion Council of India (CEPC) was established by the Government of India in the year 1955, with the active cooperation of the cashew industry with the object of promoting exports of cashew kernels and cashew nut shell liquid from India. This institute was recognized as a research centre under University of Kerala in the year 2013. From then, the institute has been involved in research works and analytical services as well. The institute also supports full-time Ph.D scholars, M.Sc and B.Sc students from other research institutes, colleges and universities to carry out their dissertation works as part of their curriculum.

'icoral', 2022 being the first International conference hosted by CEPCI Laboratory & research Institute, aims to bring together scholars, researchers and experts from diverse background and different areas in science & technology to share and communicate more fruitfully. It provides an opportunity to enhance understanding of the relationships between knowledge and research related to life sciences and technology.

Finally, we express our gratitude to the keynote speakers, participants, delegates, and all committee members for their commitment to contributing and supporting this great event.

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About Our Keynote Speakers

Dr. Binu Tharakan

Dr. Binu Tharakan currently serves as Associate Professor &Vice Chair of Research, Department of Surgery of Morehouse School of Medicine, Atlanta U.S.A. He took his Doctoral degree from Banaras Hindu University, and Postdoctoral Research from NCBS, Bangalore and National Institutes of Health, Bethesda, USA. He then joined as Research Associate in the prestigious A&M University College of Medicine and Baylor Scott and White Research Institute, Texas. He then continued to work in the same institute as Assistant Professor & Research Scientist for 7 years. His areas of research are

Mechanisms of blood-brain barrier dysfunction and brain edema following traumatic brain injury

Neuroinflammatory pathways in micro vascular hyper permeability following traumatic injuries New therapeutic strategies for brain edema following traumatic brain injury

Micro vascular abnormalities following exposure to microgravity

Talk on: **The Brain & Brain Injury**

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Dr. Manoj K. Mishra

Dr. Manoj K. Mishra is an Associate Professor of Biology position in the Department of Biological Sciences, Alabama State University, USA. Additionally, he also serves as the Director for Cancer Biology Research and Training Program and Freshman Biology Program at ASU. He received his M.Sc. and PhD degrees from Banaras Hindu University, Varanasi, India. After obtaining his PhD, he moved to the US and did his postdoctoral training in Kansas State University, Manhattan, Washington University School of Medicine, and Medical College of Wisconsin, USA. He continued at Medical College of Wisconsin as a Research Scientist before joining Alabama State University in 2009. Since February 2011, Dr. Mishra also holds the position of part-time Professor in the Division of Molecular and Cellular Pathology, School of Medicine, University of Alabama. In 2013, he was recognized as one among the Top 25 professors at HBCU, USA and also received awards for his research work at ASU. His researches are mainly focused on Prostate cancer. His projects include:

Role of dietary compounds in controlling Prostate cancer development and progression

Role of immune cells n prostate cancer

Role of polymeric scaffolds in bone tissue regeneration

Talk on: **Immunological Biomarker development for Prostate Cancer**

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Micropropagation of *Barleria prattensis* Santapau., an endemic medicinal plant to Western Ghats

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Abstract

Barleria prattensis Santapau is an important medicinal plant mostly used by tribal people for increasing lactation level and as energy tonic. This plant is endemic to Western Ghats and belonging to the family Acanthaceae. The present study aimed at the micropropagation of *B. prattensis* using internodal explants. The seeds were cultured on MS basal medium and the seedlings reached a length of about 4.5 cm after 45 d. The internodes of seedlings were cut from 45 day old seedlings and cultured on MS medium supplemented with different concentrations of BAP, TDZ(0.5-4.0 mg/l) alone or in combination with NAA (0.1-1.0 mg/l). MS medium with 2.0 mg/l TDZ and 0.5 mg/l NAA was found optimum for direct shoot induction. On this medium maximum 59.2 % explants responded with a mean number of 4.3 shoots and 2.5 cm shoot length. The shoots below 1.0 cm were placed on MS medium supplemented with 1.0 mg/l BAP for elongation. The elongated shoots were subcultured on MS medium with various concentrations of IBA (0.5 - 4.0 mg/l) for rooting. The maximum percentage of root induction was observed on ¼ strength MS medium supplemented with 1.0 mg/l IBA. On this concentration 85.3% of cultures responded with a mean number of 8.3 roots per shoot after 45 days. Rooted plants were transferred to soil with 90% success. The protocol described here will be useful for the rapid propagation and germplasm conservation of this endemic medicinal plant.

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In vitro shoot induction from nodal segments of medicinally important *Lepidagathis cuspidata* Nees.

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Abstract

Lepidagathis cuspidata Nees. is a spiny medicinal shrub belongs to the family Acanthaceae, and is mostly found in tropical Himalayas and Southern Western Ghats. The plant is traditionallyused for treating painful inflammation of fingers, itchy infections, fever, boils and blisters. A protocol has been developed for the quick in vitro propagation of *L. cuspidate* by using nodal explants. Mature nodes of *L. cuspidata* were collected from field grown plants and surface sterilized and cultured on Murashige and Skoog medium (MS) Supplemented with different concentrations (0.5-2.5 mg/l) of 6 Benzylaminopurine (BAP), Kinetin (KN) and Thidiazuron (TDZ). Comparatively the response was high in BAP containing medium than KN and TDZ. The highest response was observed on MS medium supplemented with 1.0 mg/l BAP. Here 60% explants responded with an average number of 3.8 shoots per explant and 1.29 cm mean shoot length after 45 days of culture. In vitro shoots were transferred to half and full strength MS medium fortified with different concentrations (0.5-2.0 mg/l) of IBA. Maximum root formation was occurred on half strength MS medium supplemented with 1.0 mg/l IBA. On this medium 90% cultures responded with an mean number of 12±1.5 roots per shoot and 2.5±0.2 cm mean root length. Regenerated plantlets were isolated from the medium and transferred to paper cups filled with sand and soil. The acclimatized plants were transferred to field with 90% success. Theefficient protocol described here can be utilized for the large scale multiplication of this medicinal plant.

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Pharmaceutical evaluation of different extracts of *Ixora coccineae* (Rubiaceae)

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Abstract:

Plants have been historically used throughout the world for the treatment of many diseases because of their anti-oxidant and antimicrobial activities. Many plants have been validated by scientific criteria. *Ixora coccineae* is a plant belonging to the family Rubiaceae. This plant stands out in ethnopharmacology as a source of many compounds that can be used in future as new drugs. In this study methanolic extract of different parts (Leaf and Root) of plant was prepared and evaluated for their antioxidant and antibacterial properties. Fresh plant materials were collected after proper taxonomic identification and methanol extracts were prepared by maceration. Preliminary phytochemical screenings of the extracts were qualitatively assessed. Free radical scavenging activity of *Ixora coccineae* extracts were determined using 2, 2-diphenyl-1-picrylhydrazyl (DPPH). Methanol extracts (leaf and root) of *Ixora coccineae* were evaluated for its antibacterial activity by disc diffusion method against three Gram Negative organisms such as *Salmonella typhi, klebsiella pneumonia, Escherichia coli and* Gram - positive *Staphylococcu saureus.* The preliminary screening of percentage paw edema inhibition by aqueous and methanolic extracts of *Ixora coccinea* in carrageenan induced rats were done Preliminary phytochemical analysis revealed the presence of flavonoids, alkaloids, phytosterols, phenolic compounds and terpenoids in both extracts. Both extracts were found to be potential in scavenging free radical like DPPH. The IC_{50} value of leaf extract was found to be 0.37±0.006 mg/ml and root extract is 0.16 ±0.005 mg/ml. The methanol extract of both leaf and root of plant showed highest antibacterial activity against *Staphylococus aureus* and the root showed significant activity against *K.pneumonia.* These results reveal that methanol extract of root has strong antioxidant activity than leaf extract .Both extracts possessed potent antibacterial activity against *S.aureus*. The percentage paw edema inhibition result showed that aqueous and methanolic extract of *Ixora* had maximum effect.

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Keywords: *Ixora coccineae, Antioxidant activity, Phytochemical screening, Antimicrobial activity, Carrageenan.*

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Problems and Prospects of Paddy Cultivation in the Selected Panchayaths of Kuttanad Taluk

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Abstract

Rice is the major staple for more than 90 percent of the world‟s population. Rice cultivation in Kerala contributes a significant role to the economy of the state and the cultivation dates back to 3000BC (Manilal, 1991). Palakkad and Alappuzha districts are the two traditional rice-growing areas in Kerala. Alappuzha has a 56.97% decline in the areas cultivated for rice between 1960–61 and 2009–10. The reasons need to be addressed and bring back the production to the normal. Kuttanad taluk in the Alappuzha district has peculiar geography as it is lying below sea level. The hydraulic structure, drainage system, water quality structure, land use planning, roads, soil conservation practices, sewer management, routing of storm water, etc. are important in low-lying areas like Kuttanad to maintain a balanced agricultural production system. The Upper and Lower Kuttanad region is continuously affected by the floods that mostly occur during the southwest monsoon(Benny, M. K, 2019). The study went through two severely waterlogged panchayats of Kuttanad taluk, which were selected based on GIS data using Landsat 8. Primary and secondary data were obtained through field study. Data collection comprises questionnaires, surveys, sightseeing, etc. Data obtained from each panchayath shows similarities. UMA D1 is the common rice variety cultivated by 90% of farmers throughout Kuttanad taluk. UMA D1 is more efficient, strong, and shows some sort of waterlogging resistance than other crops. These reasons favor the cultivation of UMA D1 commercially. *Jyothi, Kanchana,Manu Ratna* are other varieties used for cultivation. Most fields have one cultivation-*'punja krishi'*. Second season cultivation is being done during the rainy season. As Kuttanad lies below sea level, water enters the fields after every heavy precipitation due to bund beaching. A major threat to farming is waterlogging formed as a result of bund beaching. It destroys 99% of the cultivated crops during the second season.

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Farmers in Kuttanad, demand more sufficient techniques to prevent bund beaching and crop loss due to waterlogging. They demand waterlogging resistant varieties. More cases and samples are to be evaluated for getting more insights into these significant results.

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Pollination allocation in plants with special reference to Caesalpinioid members

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Abstract

The discipline of pollination biology is acquiring a great attention during topical years however diminutive concentration has been remunerated on species under hazardous condition. In the usual course of events, genetic improvements must be intended for the hike in yield of a single taxon, but plants survive by inhabiting with their greatest extent of pollination potentiality in their locality and genotype. The members of order Leguminales are characterized by pantropical distribution which has been wildly flourished throughout the world and is remarkably local. Within the family itself, reproductive characters influence genetic transmission, population genetic structure, selection response and hence exhibit patterns of evolutionary diversification.

The various members imparts several pollination syndromes which have been flourished as an impulse to natural selection requisite by different biotic and abiotic pollen vectors. These traits include flower shape, size, colour, reward type and amount, nectar composition, timing of flowering etc. For instance, the flowers of *Humboldtia decurrens* exhibit a showy pink-coloured sepals and white petals having pink bright lined nectar guides which act as an advertisement to butterfly visitors. Since pollen is indigestible to butterflies, nectars are offered than pollen. The nectar guides are hidden in narrow tubes which converge towards the base of the ovary, reached by the long tongue of the butterflies. Occurrence of versatile anthers illustrates a proof for anemophyllous pollination but species display a more support towards melittophily by rewarding subsequent amount of floral as well as extra floral nectaries. The number of rewards may vary according to nectar, pollen, or both. Another interesting lodging structure named as domatia that possess an ant-plant rapport was identified from *Humboldtia decurrens*. The ant species *Vombisidris humboldticola* is more specific to the domatia of *H. decurrens*, but it offers brooding sites to various other ants. The plants

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attract them only at the time of high magnitude herbivory pressures generating rich extrafloral nectaries as reward. Here in this scenario, this study explores the pollination syndromes of this species in the natural habitat.

Keywords: *Domatia, Extra floral nectaries, Humboldtia decurrens, Pollination syndrome, Nectar guides, Vombisidris humboldticola*

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Enhancement of carbon biosequestration via Engineered structures - A sustainable approach for better future

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Abstract

Unprecedented anthropogenic emissions of greenhouse gases are probably the cause of global warming and current alteration in climatic patterns across the world. Scientific studies reported that the carbon dioxide emissions have grown exponentially from 280 ppm before industrialization to the current levels of 412 ppm mainly owing to a dependency on fossil fuels. Such unbalanced productions of carbon dioxide have led to potential adverse impacts like sea- level rise, changes in the amount, timing, and distribution of rain, increase in frequency and intensities of wildfires, floods, droughts storms etc., which ultimately results in disruptions of the natural equilibrium. Considering the impacts due to elevated carbon dioxide concentrations identification of technically and economically feasible strategies to mitigate carbon dioxide emissions is of great urgency. Various technologies, including geological sequestration, chemical absorption, physical separation, membrane separation, and biological fixation have been applied to capture atmospheric carbon dioxide. Apart from the costly, energy consuming, physical and chemical technologies, biosequestration seems to be a sustainable alternative to curb the soaring emission rates. Several researchers also reported that green plants and microorganisms act as a natural CO_2 sink and produce biomolecules such as carbohydrates, proteins, and lipids during carbon fixation via photosynthesis. Moreover, the establishment and utilization of engineered designs like OTC and photobioreactors make biosequestration more attractive. The paper discusses existing approaches for enhanced carbon bio fixation and the operational challenges and drawbacks faced.

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Rapid micropropagation of *Thottea siliquosa* (Lamk.) Ding Hou., an important medicinal plant through nodal segment culture

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Abstract:

A protocol for the rapid micropropagation of *T. siliquosa* has been standardized. *T. siliquosa* is an important medicinal shrub which has several medicinal uses. Traditionally, the roots of *T. siliquosa* is used as an antidote to snake venom and to treat diarrhoea, dysentery, fever and stomach-ache. Nodal segments were collected from healthy field grown plants from Ranipuram, Kasargod district, Kerala. Surface sterilized nodal segments were cultured on woody plant medium (WPM) supplemented with various concentrations (0.5-3.0 mg/l) of BAP and KN alone or in combination with NAA (0.2-1.0 mg/l). Of the various types, concentrations and combinations of plant growth regulators (PGRs) tested, BAP (2.0 mg/l) and NAA (0.4 mg/l) combination gave maximum results. Here, 78% of the cultures produced a mean number of 8.3 shoots per explant with a mean shoot length of 4.5 cm after 45 days of culture. Individual use of PGRs gave low shoot induction frequency and number of shoots. However, the addition of auxin (NAA) significantly improved the result. Kinetin above 2.0 mg/l resulted in callusing of the basal cut end of the explant. In such cultures, frequency of shoot induction and number of shoots were low. Well developed (ca. 4.0 cm) nodal segment derived shoots were subcultured on half strength MS medium fortified with various concentrations of IBA (0.5-2.0 mg/l) for rooting. Higher concentrations of IBA (above 2.0 mg/l) induced callusing of the basal part of the explant. Optimum rooting (92% with 20.2 roots per shoot) was obtained on half MS medium supplemented with 1.0 mg/l IBA. The shoots with well-developed roots were transplanted to soil with 90% success. The protocol described here can be utilized for the large scale propagation and germplasm conservation of this precious medicinal plant.

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Plant regeneration via direct organogenesis through cotyledon explant in *Diplocyclos palmatus* (L.) C. Jeffrey

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Abstract

The family Cucurbitaceae includes a large group of plants traditionally used as vegetables in human diet. The seeds and fruits of some cucurbits are medicinally useful and are reported to possess purgative, emetics and antihelmintics properties due to the rich presence of bitter secondary metabolite cucurbitacins. *Diplocyclos palmatus* (syn. *Bryonia laciniosa*; Family Cucurbitaceae) is a perennial tendril climber and is used medicinally in traditional system of medicine. Different parts of this plant, such as the stem, leaves, flowers and seeds, are used to cure many diseases like jaundice, fever and inflammation. The primary objective of the present study was to standardize a protocol for the micropropagation of *D. palmatus* through isolated cotyledons. Cotyledons were isolated from 2-week-old seedlings and cultured on Murashige and Skoog (MS) medium supplemented with various concentrations of 6-benzyl amino purine (BAP; 0.5-3.0 mg/L) alone or in combination with α-naphthalene acetic acid (NAA) (0.2-2.0 mg/l) for shoot induction. The highest frequency of response (86%) and mean number of shoots per explant (6.3) were observed on MS medium supplemented with 1.5 mg/L BAP and 0.5 mg/L NAA. The shoots derived cotyledons were excised and cultured on ½ MS medium containing IBA (0.2-2.0mg /L) and the best rooting was obtained on 1.5 mg/L IBA (90% response with 4.5 roots per shoots). The rooted plants were transferred to a mixture of soil and sand for acclimatization and finally moved to natural habits after 3 months. This protocol is helpful in large scale multiplication and conservation of germplasm of this medicinal plant.

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Micropropagation and cryopreservation of *Celastrus paniculatus* Willd.

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Abstract

Celastrus paniculatus Willd. is an important medicinal plant of Western Ghats which is over-exploited in its natural habitat to meet the growing needs of the pharmaceutical industry and got listed in the regional IUCN list as a vulnerable species. An efficient micropropagation protocol was developed for mass multiplication of *C. paniculatus* using BAP and Kin. Maximum shoot multiplication was observed in MS media fortified with 1.5 mg/l BAP. Maximum root induction was observed in full strength with the addition of 0.2% activated charcoal. Cryopreservation has proven to be an *in vitro* conservation method that has become an important tool for the long-term storage of plant genetic resources. Cryopreservation protocol for the long term conservation of *C. paniculatus* was developed using nodal segments from *in vitro* regenerated shoots in 0.5mg/l BAP. The ideal time period for the desiccation of nodal segments is 1.5 hours. In vitrification procedure, the nodal segments pre-cultured in MS + 0.3M sucrose was found beneficial for shoot survival after treatment with Liquid Nitrogen. The ideal exposure period of nodes to PVS2 vitrification solution was 10 minutes at 25º C ± 2º C.

Keywords: *Celastrus, in vitro, vitrification, liquid nitrogen, conservation*

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In vitro callus induction and plant regeneration from endemic medicinal plant *Gymnostachyum febrifugum* (Benth.)

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Abstract

Gymnostachyum febrifugum (Benth.) is a rare and endemic medicinal plant to the Western Ghats of India and it is often used in ethno-medical practices. In vitro propagation method is a useful tool for both conservation and multiplication of this medicinally important endemic plant. An effective protocol was developed for in vitro regeneration of the G. febrifugum via indirect organogenesis from flower bud explants. Flower buds were collected from inflorescences at three different stages of development i.e. 4, 7, 10 days before anthesis (dBA) and cultured on MS medium supplemented with various concentrations (0.5-3.0 mg/l) of 2, 4-D alone or in combination of BAP (0.5-2.0 mg/l) for callus induction. The maximum callus induction was obtained from flower buds collected from 7 dBA on 1.5 mg/l 2, 4-D medium. Calli were further cultured on MS medium supplemented with different concentrations (0.5-3.0 mg/l) TDZ or BAP alone or in combination with NAA (0.1-0.7 mg/l) for shoot induction. Maximum shoot induction was found on MS medium supplemented with 2.0 mg/l TDZ and 0.5 mg/l NAA. On this medium 94% of cultures responded with an average of 44.6 shoots per callus. Regenerated shoots were further rooted on half strength MS medium containing 3.0 mg/l IBA and rooted plants were successfully established in the field. This protocol serves as a valuable technique for the mass propagation of this endemic medicinal plant.

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Nutritional and physicochemical profile of leaves of *Syzygium occidentale* endemic to Western Ghats

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Abstract

Syzygium Gaertner is one of the largest genera in the Myrtaceae family. The plant has been used as a traditional remedy for centuries. *Syzygium* is said to have a wide range of phytomolecules with a wide range of biological activities, including antihyperglycemic, antioxidant, anti-inflammatory, anticarcinogenic, and antihypertensive effects. In the present investigation, the nutritional properties of leaves of *S. occidentale* were documented. This is the first paper to aid in the accurate identification, authentication, and determination of adulterated pharmaceuticals for future research, as these plant species have never been studied previously. Extractive values, crude fiber, total ash, and water-soluble ash were all measured in percentages. The atomic absorption spectrophotometer method was used to determine mineral content (calcium, potassium, sodium) and heavy metal analysis (copper, manganese, zinc). *S. occidentale* contains large levels of nutraceuticals, according to the study.

Keywords: *Myrtaceae, Syzygium occidentale, nutraceutical, total ash, adulteration, pharmaceuticals*

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Tick-borne bacterial diseases affecting livestock- a review

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Abstract

Agriculture and livestock production are inevitable part of world economy. Disease affecting animals kept for milk, meat, wool etc is a global problem and has serious impact on human economy. Ticks, the blood sucking ectoparasitic arachnids are the most important vector transmitting several etiological agents including bacteria, virus, protozoa and fungi. They are also capable of causing direct damages like dermatitis, allergies etc. Many of the reported tick borne diseases are found to be bacterial. Borreliosis, Anaplasmosis, Tularemia, Rickettsiosis, Q fever, Ehrlichiosis are the major tick borne bacterial diseases affecting livestock. The infection caused by ticks lead to reduced meat and milk production and may even lead the animal to death.The species diversity of ticks, their distribution and associated pathogens studies are found to be extremely significant for the prevention and treatment of several diseases. The livestock animals have been importing between countries or continents for milk, meat and for other business purposes. Well planned disease diagnostic programs and care must be taken to prevent the world wide spread of infectious agents they are carrying with. This review emphasize on tick borne bacterial diseases of livestock, which will provide important data having medical and economic relevance.

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Depth wise variations of soil physico-chemical properties and distribution of *Cyphoderus javanus* in different sites of Thiruvananthapuram district

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Abstract

The present study was undertaken to determine the influence of depth on soil physico-chemical properties and distribution of a tropical soil collembolan *Cyphoderus javanus* in various sites of Thiruvananthapuram district (Neyyar, Vithura and Agastyavanam Biological park) on the basis of altitude. During the study period, soil edaphic factors like temperature, pH, moisture, organic carbon, exchangeable acid, exchangeable base, gravel, slit, sand and clay content in the three study sites exhibited slight variation according to depth. Highest value of chemical factors like nitrogen, phosphorus, potassium, calcium and magnesium were noticed in upper soil layers and minimum value in lower layers of soil. At all three sites, the mean population density of *Cyphoderus javanus* was found to be higher during post monsoon season and lowest during pre-monsoon season.Vertical distribution pattern of *Cyphoderus javanus* during various seasons at three sites were noticed, in which post monsoon period showed greater population density, followed by monsoon and pre-monsoon. The majority of collembolan was recorded higher in top layer soil than deeper layers of soil in all three sites.These results suggest that the depth wise and seasonal changes as well as soil physico-chemical factors play an inevitable role in controlling the population densities and diversity of *Cyphoderus javanus*along with habitat differences.

Keywords: *Depth, Vertical migration, Soil collembolans, Population density*

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Molecular endocrine model mechanism of insect metamorphosis and JH Acid as the key regulator

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Abstract

Metamorphosis comprises dramatic transformation in shape and function of organs, tissues and individual cells. According to the classical theory of the hormonal control of insect metamorphosis, ecdysteroids initiates a molt independent on the titer of JH. However a few observations earlier indicate that tissues must first acquire competence in the presence of JH acid alone is not sufficient for the metamorphic response to ecdysteroid. JH acid is an inactive precursor and metabolite of JH actually induces cells to become competent to undergo metamorphoses, whereas ecdysteroid merely stabilizes this commitment and facilitates the expression of this state of development program. The model system used in this project is the common Mormon butterfly *Papillio polytes* is a major pest of Rutaceous plants. Metamorphosis especially molting behavior in insects is known to be governed by specific dermal glands known as Version‟s glands. Ecdysteroid induces and coordinates the molting process and JH determines the nature of molt. JH acid is an inactive precursor and metabolite of juvenile hormone (JH) that induces cells to become competent to undergo metamorphosis, whereas ecdysteroid merely stabilizes this commitment that facilitates the expression of this state of developmental programme. Verson‟s glands that are found specifically in lepidopteran insects are paired dermal glands of epidermal derivatives which contribute a protective layer to the newly formed cuticle or might has defensive function. In the present study localization of Version‟s glands were done The specific role of JH metabolite, the JH acid in the induction of metamorphic competence were examined. Elucidation of the fundamental mechanism and interaction of insect endocrine molecules during insect metamorphosis were also explained.

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A review on population dynamics of house dust mites with respect to weather parameters and housing characters

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Abstract

House dust mites have been identified as one of the potent allergens in house dust, which can cause severe allergic responses in susceptible individuals. House dust mites come under the Subclass *Acari*, Order *Sarcoptiformes* and the *Cohort Astigmata*. The accumulated dust in almost every houses provides habitat for dust mites. They live in carpets, upholstered furniture, mattresses, clothing, curtains etc. feeding on shed human skin scales, insect debris, fungi etc. The number of dust mites varies with change in temperature and humidity. However, humid, damp houses are favourable for the survival of dust mites than fully ventilated houses. The commonest species which has been found in every house is from the family *Pyroglyphidae* and the species are *Dermatophagoides pteronyssinus* and *D.farinae*. Along with these, *D.maynei*, *Chelytus* species, *Blomiatropicalis* were also found prominent in house dust samples from various parts of the world. This review is based upon the population dynamics of house dust mites in relation to different climatic conditions throughout the world and changes in housing characteristics such as roof type, floor type, and hygiene practises etc.

K**eywords**: *House dust mites (HDM), weather parameters, housing characters, Dermatophagoides pteronyssinus, Dermatophagoides farina*

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An eco-toxicological investigation on the effect of insecticide- Deltamethrin- on the longevity and fecundity of the terrestrial isopod *Philoscia muscorum*.

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Abstract

Soil is an intricate and dynamic ecosystem supporting diverse fauna which constitute an integral component of ecosystem processes. Arthropod population in soil dynamically involve in global nutrient cycling. This sensitive ecosystem and its components are affected by various chemical stressors added to it. Agrochemicals pose a serious threat to the faunal component of soil system. In this study, impact of an insecticide, Deltamethrin, on the longevity and fecundity of a terrestrial isopod, *Philoscia muscorum* was analyzed. Using standard procedures, bioassay studies were done in laboratory to find out the impact of the agrochemical. Mortality rate was gradually increased with increasing concentrations of pesticide and time durations. LC 50 and LC 100 values were 7.7 and 13.59 respectively, at 96 hours. Safe concentration and sublethal concentration were found to be 1.868 ppm and 1.926 ppm respectively. Four replicates were used for conducting fecundity studies. When normal group was compared with the experimental group treated with deltamethrin, significant difference in fecundity was obtained ($P= 0.04$, $P<0.05$). Application of deltamethrin adversely affected the longevity as well as fecundity of *Philoscia muscorum*. Ecologically friendly agro practices are to be promoted for sustainability of soil ecosystem.

Key words: *Philoscia muscorum, Ecotoxicology, Deltamethrin, LC100*

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Seasonal influence of soil properties on population density of *Bilobella braunerae* (Dhervang 1981) - (Collembola: Neanuridae) in Rubber Plantation of Southern Western Ghats

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Abstract

The present study was conducted to know the impact of soil physicochemical parameters on population density and vertical distribution pattern of a soil collembolan *Bilobella braunerae* in rubber plantation of Southern Western Ghats. The results revealed that maximum mean abundance of collembola was found during post-monsoon season (40.6± 0.0061) followed by monsoon (21± 0.0107) and pre-monsoon (9.95± 0.0048). Population density of organisms was high in 0-10 cm layer of soil during post monsoon season. A vertical migration pattern was observed with increase in soil temperature and decreasing moisture content during pre-monsoon season. During monsoon season owing to heavy rainfall organism shows a vertical migration to 10-20 cm depth and thus lesser number of organisms were seen in 0-10 cm layer of soil .Seasons exerted a strong effect on the abundance of *B. braunerae* in plantation soil. Principal Component Analysis (PCA), was used to make the selection about soil components which directly influence the population. The first three principal components (PCs) explained more than 72% of the total variance in all seasons. In plantation soil the principal component controlling the density of *B. braunerae* in pre monsoon season were moisture, EB, clay, Nitrogen, Phosphorous, Calcium and Magnesium During monsoon season primary soil variables were Moisture, organic carbon, EB, sand, silt, clay, Nitrogen and Magnesium. In post monsoon season in plantation soil Moisture, pH, Organic carbon, EA, EB, Silt, Phosphorous, Potassium and Magnesium were having positive values.

KEYWORDS: *Bilobella braunerae, physicochemical parameters, population density, vertical migration, Principal Component Analysis (PCA)*

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A preliminary study on the feeding preference of the oribatid mite Lohmannia. Sp. (Acari: oribatida: lohmannidae) using microfungal and leaf litter diets.

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Abstract

The feeding preference of the Lohmannia Sp. was observed under the laboratory conditions (RH 80±2% and 27±2 °C) by providing different microfungi and semi degraded leaves as food items. The mite completely rejected microfungi *Pseudopestalotiopsis* and *Ectophoma multirostrata* but actively fed on *Curvularia verruculosa*, *Corynespora cassiicola*, *Lasiodipladia theobromae* and *Trichodema harzianum*. Similarly they completely rejected semi degraded leaves of *Hevea brasiliensis*, *Theobrama cacao* and *Myristica fragrans* but actively fed on *Gliricidia sepium*, *Tectona grandis*, *Artocarpus hirsutus Artcarpus heterophyllus*, and *Mangifera indica*. The results of this study indicate that the Lohmannia Sp. can exhibit both microphytophagous and panphytophagous behaviour. They can feed both lower plant elements like fungal hyphae and higher plant parts like leaves. These alternative feeding guilds in this species may help them to indirectly affect microbial activity and directly involved in the biodegradation of leaf litter in the soil ecosystem.

Keywords: *Oribatida; Lohmannia; feeding; Microfungi; Semi degraded leaves; biodegradation*

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Observations on feeding ecology of the common house gecko, *Hemidactylus frenatus* (Schlegel, 1836) and garden lizard, *Calotes versicolor* (Daudin, 1802)

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Abstract

House geckos (*Hemidactylus frenatus*) are very common in residential areas throughout Southeast Asia. Geckos are fierce insect feeders and their role in-home pest control is worth considering. This study is presented to analyse the prey preference of both House Lizard and Garden Lizard. 30 food items were identified.

Insect contributed maximum of the diet from the orders Orthoptera, Coleopterans, Diptera, Hymenoptera, Lepidoptera and Hemiptera Considerable variation in the selection of prey species was not observed, the selection was mainly on the basis of availability and the degree of disturbances and safety.

Keywords: *House gecko, garden lizard, prey preference*

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Bioassessment of a freshwater ecosystem using aquatic insects – a study on river Kallada, Kollam, Kerala

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Abstract

Aquatic ecosystems are prone to pollution because water is able to dissolve more substances than any other liquid on earth. Frequent monitoring of the pollution status and subsequent remedial measures are inevitable for the sustenance of life in any ecosystem. In aquatic ecosystems, macro invertebrates are much useful as bio-indicators since they have different levels of tolerance for perturbations. Aquatic insects were sampled from 18 sites along upstream, midstream and downstream segments of river Kallada, Kerala during February 2018 to January 2019 for checking the status of pollution. Large River – Bioassessment Protocol was adopted in this study. Benthic metrics revealed that pollution sensitive insects under the Order Ephemeroptera, Plecoptera and Trichoptera are higher in number at Site 1 (36.52%) in upstream segment during premonsoon season and their least occurrence is at Site 12 (3.80 %) in midstream during monsoon season. The highest percentage of tolerant organisms was recorded from Site 8 (37.96 %) during premonsoon season and least value noted was from Site 5 (13.46%) during monsoon season. Hilsenhoff Biotic Index values exhibited a gradual increase from upstream to downstream. In reference sites, the biotic index ranged from 3.87 to 5.35 and in test sites it ranged between 4.98- 6.57. Computation of between-site test and benthic metrics shows that the selected test sites at midstream and downstream segments of the river are moderately polluted during premonsoon and postmonsoon seasons.

Keywords: *Biomonitoring, Aquatic insects, Hilsenhoff biotic index, Benthic metrics*

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Study of Zooplankton communities in the treated and untreated sewage water ponds of CHRIST (Deemed to be University), Bangalore, Karnataka, India.

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Abstract:

The current research work deals with the study of zooplankton populations collected from both untreated and treated sewage water ponds belonging to six different sites of CHRIST(Deemed to be University) Campuses, Bangalore, Karnataka. The study reveals that these sewage treatment plants receive waste water released mainly from toilets, housekeeping works, laboratories, Laundries, restaurants, washrooms, Hostels and construction works that are present in these huge campuses which provides space for more than 35 thousands of students to study and to live in. Wastewater is collected through sewage systems (underground sewage pipes) to one or more centralized Sewage Treatment Plants (STPs).The main Idea of the sewage treatment is the re-use of waste water generated from the institute into a usable form and can be used for various purposes such as irrigation of plants, rest rooms, animal husbandry, culturing of fishes and vehicle washing etc.The six sites of water sample collection were represented as MU, MT,BU,BT,KU,KT i.e Main campus Untreated sewage water(MU), Main campus Treated Sewage water(MT), Bannerghatta campus Untreated sewage water(BU), Bannerghatta campus Treated sewage water(BT),Kengeri campus Untreated sewage water (KU)and Kengeri campus Treated sewage water(KT).The ponds were located in the Campuses between latitudes 12°5' -12°56 'N and longitudes 77°26'-77°36 'E.

Species composition, abundance and diversity of zooplankton populations were analysed on a monthly basis for the year November 2019-November 2020 from the treated and untreated sewage water ponds located in CHRIST(Deemed to be University) Bangalore. Untreated and treated sewage water samples were collected on a monthly basis from six different sites across three campuses of CHRIST (Deemed to be university) from viz. Main Campus Untreated water (MU),Main Campus treated water (MT), Bannerghatta campus untreated water (BU), Bannerghatta campus Treated water (BT), Kengeri campus Untreated water (KU), and

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Kengeri campus treated water (KT). The zooplankton populations were composed of a total of 32 species were reported from various sites of treated sewage water ponds such as MT,BT,KT present in all three campuses of CHRIST(Deemed to be University) Bnagalore. All the 32 species belong to four taxonomic groups such as 18 species of Rotifera, 3species of *Copepoda*, 8 species of Cladocera and 3 species of Ostracoda.

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Prevalence of *Staphylococcus aureus* in ready to eat or ready to cook fishery products.

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Abstract

About 76 RTE/RTC fishery product from different markets were analyzed and found 23.68% of the total samples was contaminated with Staphylococcus sp. among which 2.68% were coagulase positive *S.aureus* moreover 35 % of the products shows a microbial count of above 5 Log (cfu/g) which exceeds standard APC limit of 5 log (cfu/g). Biochemical test was performed with 50 isolates out of which 17 were coagulase positive, catalase positive, Mannitol salt agar positive, and DNase test positive, while rest of isolates were coagulase negative. Coagulase positive *S.aureus* was detected in fish pickles. Enterotoxigenic strains were not detected in any of the isolates. The incidence of MRSA strains was detected in 24% of RTE/RTC samples used in the present study, 6% showed multiresistance to methicillin, ampicillin, oxacillin, and erythromycin, 6% showed resistance to ampicillin, Cephalothin, oxacillin and trimethoprim and 2% with resistance to erythromycin β-hemolysis was exhibited by 52.9 % and 47.1 % exhibits δ-hemolysis. The isolation of potentially pathogenic S aureus isolates from RTE/RTC fishery products indicates risk to consumers; screening of prevalence, pathogenicity potential and antibiotic resistance is essential to implement control measures. This is a serious public health risk and highlights the need to implement good hygiene practices. These findings emphasize the need to prevent the presenceof S. aureus strains and SEs production in foods.

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Biochemical characterization and biological activities of honey samples from South Kerala.

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Abstract

Honey has been considered as one of the valuable functional foods of nature from ancient times itself because of its high nutritional content and various therapeutic applications. Honeyhas been used as a common sweetener for food and used as a powerful medicinal material for centuries. Since it is considered one of the expensive functional foods out on the market, and because of its high market value, it is subjected to numerous adulterations processes. Examination of various biochemical parameters may be helpful for detecting possible adulterations in honey. Honey quality control is evaluated based on guidelines of the Codex Alimentarius. There are mainly five different types of honey bees found in India, which include - *Apis dorsata* (Rock bee), *Apis florea* (Little bee), *Apis cerana* (Indian bee), *Apismellifera* (European bee), *Melipona irridipennis* (stingless bee). Among this *Apis cerana*, *Apis dorsata* and *Melipona irridipennis* are predominately found in South Kerala region. The present study mainly focused on the biochemical evaluation of honey samples collected from the South Kerala region. The major physical and chemical parameters evaluated are sugar content, 5-hydroxymethylfurfural (HMF) content (HPLC method), acidity, moisture, ash content, proline content electrical conductivity, qualitative analysis of phyto- compounds and protein profiling which are considered as the quality markers of honeysamples. The present study reveals that honey samples from the South Kerala region possess high nutritional and quality markers without any adulterations and numerous important biological activities.

Keywords - *Honey, Adulterations, Therapeutic applications*

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In vitro evaluation of anti-inflammatory potential of leaves extract of *Vitex altissima* in RAW 264.7 cell culture.

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Abstract

Traditionally *Vitex altissima* has extensive applications in the control of oxidative stress and inflammation. This study was focused on the measurement of anti-inflammatory activity of hexane, ethyl acetate and methanol extracts of *Vitex altissima* by inhibition of proteinase activity, protein denaturation activity, stabilization of HRBC membrane and in RAW 264.7 cell line through nitric oxide (NO) production and enzymatic activities of cyclooxygenase-2(COX-2), lipoxygenase (LOX) , myeloperoxidase and inducible nitric oxide synthase (iNOS). In addition total phenolic, flavanoid, alkaloid and antioxidant activities were evaluated. The studies revealed the methanolic extract (VAME) identified as the most potent extract. The extracts were found to inhibit the proteinase, protein denaturation and HRBC membrane beneficially in a dose-dependent manner. Non-cytotoxic concentrations of *Vitex altissima* extracts significantly alleviated the activity of iNOS and COX-2, LOX, myeloperoxidase, resulting in the decrease in NO in LPS treated RAW 264.7 cell line. *In vitro* anti-inflammatory activity increased in a dose dependent manner and *Vitex altissima* may be useful as a pharmacological agent for managing inflammation related diseases. Further detailed phytochemical studies along with *in vitro* and *in vivo* studies are required to reveal the active compound in the extract.

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Sub-acute toxicity evaluation of *Pterospermum rubiginosum* bark extracts using Sprague-Dawley rats

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Abstract

Pterospermum rubiginosum (Sterculiaceae), "Ellooti" bark, is a tropical tree endemic to the Western Ghats and has previously been identified by Kanikaran tribes to exert beneficial effects on bone fractures, preventing bone loss and promoting bone health. Hence, we planned to investigate the toxicological profile of methanolic fractions from *P. rubiginosum* bark. Toxicological screening of medicinal plants is a crucial step for developing new therapeutic agents and evaluating the pharmaceutical potential and efficacy level of existing herbal formulations and decoctions. The healthy female Sprague Dawley rats were procured from the animal house facility, Department of Biochemistry, University of Kerala. Animals were treated as per CPCSEA guidelines; the experimental protocol was approved by the institutional animal ethical committee (IAEC-2-KU-01/2018-19-BCH-AAR (13).

Sprague-Dawley rats were administered with *P.rubiginosum* methanolic extract (PRME), and its antioxidant potential was evaluated and found to be significant. In a sub-acute toxicity study, the experimental animals were grouped into five groups of three animals each, group: I - control rats (normal saline), and groups II, III, IV, and V were administered with PRME at single doses of 50, 100, 250, and 500 mg/kg/day for 48 hours, monitored carefully and continued the treatment for 28 days. Animals were sacrificed on the 29th day. The blood parameters and histopathological examination showed no remarkable variation between healthy and PRME-treated rats, demonstrating that the PRME extracts are compatible with animals up to 500 mg/kg body weight. In a dose-dependent study conducted on normal, healthy female SD rats, PRME was non-toxic up to a 500 mg/kg bodyweight concentration for 28 days.

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Molecular characterization and optimization of protease enzyme

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Abstract

Protease refers to a group of enzymes that can catalyze the hydrolysis of peptide bonds of proteins. Proteolytic enzymes are present in almost all life forms: microorganisms, plants, and animals. Among them, microbial protease occupies a safe position, as they have functional characteristics and enormous industrial applications. Microbial proteases have wide applications in the food, leather, detergent, and textile industry as well as in silver recovery and bioremediation. In the food industry, they are used in the modification, improved quality, and storage stability of protein sources and meat tenderization. In the present study, microorganisms from household wastewater were screened for novel protease bacteria in a casein agar plate. Among the isolates, the colony with the highest zone of proteolytic activity was selected for further analysis; it was identified as *Enterobacter* by molecular characterization through the blast. The optimization of the isolate for maximum protease activity was carried out using protease production media. The optimization was carried out for pH, carbon, organic, and inorganic nitrogen sources, and the incubation time determined the maximum production of protease by the isolate. The optimized conditions were where maximum protease activity was found at pH 9.0, and the incubation period was 72 hours.

Keywords: *Protease, Household wastewater, 16S rRNA, Production media, Optimization media*

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Isolation, characterization and screening of biological activities of red-pigmented fungi

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Abstract

Fungi are eukaryotic organisms that have many biological activities. Due to the climatic and geographical diversity of India, a wide range of microorganisms with potent biological activities are available. fungi represent a valuable source of structurally novel and biologically active metabolites of industrial interest. They also have drawn attention for their capacity to degrade several pollutants, including textile dyes, organochlorides and polycyclic aromatic hydrocarbons (PAHs), among others. The objective of this study was to isolate, identify, and screen the biological activities of red pigment-producing fungi. Considerable attention has been given to filamentous fungi able to produce colors of various shades including yellow, red, orange, and green. These pigments fall in the substratum of melanin, carotenoids, or polyketides, with the polyketides instituting a larger portion of pigments normally produced by filamentous fungi. Pigments are chemical compounds that give colors because of their ability to absorb light in the wavelength range at the visible region these pigments exhibit several biological activities besides cytotoxicity. The red pigment extracted from the fungi has bio-potential, such as anti-oxidant, and anti-bacterial activities. The extracted pigment was evaluated for antimicrobial activity.

Keywords: *Endophyte, Red pigment biological activities*

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Direct shoot regeneration from cotyledonary node explants of *Centratherum punctatum* Cass.

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Abstract

In vitro micropropagation is a reliable tool for the large-scale multiplication of elite clones of selected economically important taxa. *Centratherum punctatum* Cass. belongs to the family Asteraceae, is an important medicinal aromatic herb. It has anti-inflammatory, anti-hypersensitive, anti-bacterial, anti-cancerous, anti-fungal, cytotoxic, anti-plasmodial properties and is used in hair care and skin whitening. The objective of the present study was to develop an efficient micropropagation protocol via direct shoot induction from cotyledonary node explants of *C. punctatum*. Seeds were collected from Periye, Kasaragod, Kerala, sun-dried for 6 hrs, thoroughly washed and surface sterilized before culturing on MS basal medium. Cotyledonary nodes were excised from the germinating seedlings and cultured on MS medium supplemented with different concentrations TDZ or BAP (0.1-2.0 mg/l) alone or in combination with NAA (0.1-0.7 mg/l). A combination of 1.5 mg/l TDZ with 0.5 mg/l NAA gave maximum shoot induction with 86±3.4% percent response and 12.8±0.6 shoots per explant with a mean shoot length of 4.4±2.6 cm. The age of the explant plays a significant role in inducing shoot regeneration. Out of the 5 day, 10 day and 15 day old cotyledonary nodes used, 10 d old explants resulted in maximum shoot induction with 85±4.02% percentage response, 13.6±0.5 shoots per explant and mean shoot length of 4.5±2.4 cm. The rooting of the micropropagated shoots were obtained on half strength MS medium containing 0.5 mg/l IBA. The rooted plants were acclimatized and transferred to soil with 85% survival rate. The protocol standardized here will be useful for the large-scale production and genetic improvement studies of this plant.

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Synthesis, characterization and antimicrobial studies of antibiotic conjugated fluorescent carbon dots for drug delivery application

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Abstract

Nanotechnology can serve as a promising tool in developing highly efficient nanosized drug carriers with fluorescence property. Different nanoparticles were utilized for the same, among which carbon nanoparticles have a great significance owing to its unique physical, chemical and photoluminescent properties. Ultrasonication assisted synthesis was carried out to generate water soluble carbon dots (CD) from simple carbohydrate precursor. This inexpensive method can be employed for large scale production of the carbon dots. Spectroscopic and microscopic studies were used to characterize the carbon dots. Carbon dots- Ciprofloxacin conjugate (CD- CC) was synthesized upon constant stirring for 4h and then assessed for the drug loading efficiency. This conjugate was then tested for antibacterial activity against selected gram negative and gram-positive microorganisms. Controlled drug release and retainment of fluorescence even after antibiotic conjugation makes the synthesized carbon dots a powerful candidate for bioimaging application.

Keywords: *Carbon dots (CD), Carbon dots-ciprofloxacin conjugate (CD-CC), Fluorescence, Antimicrobial, Drug release*

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Screening of keratinolytic enzyme producing bacteria from poultry farms

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Abstract

Keratinolytic bacteria belong to a group of proteolytic bacteria which degrade keratin. This study was conducted to isolate keratinolytic bacterial strain from 10 soil samples collected from different poultry farms located in various regions of Southern Kerala. Soil samples were serially diluted and spread plated; bacterial colonies obtained were checked for their proteolytic ability on skim milk agar. The colonies that showed the highest CZ/CS ratio were further checked for their keratinolytic ability. Out of the 13 proteolytic strains obtained, isolate KR24 best displayed keratin degradation both in whole feather degradation study as well as zone formation in keratin agar plates.

The chosen isolate was gram positive rod. Cultural Characterization, Biochemical characterization and Identification was done by following Bergey‟s Manuals of Systematic Bacteriology. The bacterial strain was identified as *Bacillus subtilis*, which was further confirmed via 16S rRNA sequencing.

Keywords: *Keratinolytic, skim milk, Bacillus subtilis, 16S rRNA, poultry farms.*

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Study of genetic variations in *par C* gene in quinolone resistant isolates of *Escherichia coli* from urinary tract infections

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Abstract

Urinary tract infection (UTI) is a bacterial infection that affects any part of the urinary tract. When bacteria get into the bladder or kidney and multiply in the urine, they cause a UTI. The most common type of UTI is a bladder infection which is also called cystitis. Another kind of UTI is a kidney infection, known as pyelonephritis, and is much more serious. The diagnosis of UTI is confirmed by a urine culture. Uropathogenic *Escherichia coli* (UPEC) is responsible for approximately 90% of UTI seen in individuals with ordinary anatomy. Uropathogenic *Escherichia coli* utilize Pfimbriae (pyelonephritis –associated pili)to bind urinary tract endothelial cells and colonize the bladder. These adhesins specifically bind D-galactose-D-galactose moieties on the P blood group antigen of erythrocytes and uroepithelial cells. Approximately 1% of the human population lacks this receptor, and its presence or absence dictates an individual‟s susceptibility to *Escherichia coli* urinary tract infections. UPEC can evade the body‟s innate immune defense, the complement system by invading superficial cells to form intracellular bacterial communities (IBCs). IBCs have the ability to form K antigen, capsular polysaccharides that contributes to biofilm formation. Biofilm producing *Escherichia coli* are recalcitrant to immune factors and antibiotic therapy and are often responsible for chronic urinary tract infections. Quinolones are a family of broad spectrum antibiotics. They inhibits the bacterial DNA gyrase or topoisomerase IV enzyme thereby inhibiting DNA replication and transcription. The present study reveals the prevalence rate of quinolone resistant isolates of *Escherichia coli* from patients suffering from UTI attending in SRM Medical college hospital and Research Centre, Chennai.

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Molecular analysis of genetic diversity in *Manihot esculenta* Crantz

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Abstract

Manihot esculenta Crantz, commonly known as Cassava is a perennial vegetative propagated shrub, which is grown throughout the low land tropics. Cassava appears to be one of the earliest crops to have been domesticated and was widespread throughout the new world tropics by the last 15th century. It ranks as the fourth major source of carbohydrates in the tropics. Cassava is a subsistence crop, which provides high calorific value throughout the developing world, unlike many other crops, cassava can be grown with minimal inputs and it is able to yield reasonably well under unfavourable conditions such as low soil fertility, acidic soil or drought. It is a staple crop for more than 500 million people, despite the low attention historically received in research because it is considered as a subsistence crop. The botanical characters encountered within the species show a tremendous variation indicative of a large degree of hybridization, inter-specific, intra-specific and both. Due to vegetative propagation and hybridization between different varieties that co-exist within a single field, a large variety of cassava is now available. In the present study, genetic diversity between groups of cassava cultivars was studied using RAPD analysis. Cassava mosaic disease (CMD) is the most important problem of this crop in India leading to 16-18 percent yield loss. In the present study, RAPD analysis was used for the identification of genetic variability within nine accessions of cassava verities. The study concluded that RAPD analysis is a better tool for identification of different released varieties of Cassava.

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Role of serotonin transporter gene in schizophrenia

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Abstract

Schizophrenia is a complex mental disorder due to the involvement of several genes. Schizophrenia is mainly due to the abnormal brain function. This abnormalities is mainly involved in the transferring and processing of information‟s in the brain. Nerve cells in the brain communicate with each other by releasing chemicals from the nerve endings. These chemicals are called neurotransmitters. Many of the symptoms of Schizophrenia have been linked to the abnormal activity of particular neurotransmitters. Serotonin is a type of neurotransmitter that have a major role in Schizophrenia. Serotonin transporter gene (SLC6A4) is one of the most promising candidate gene in the psychiatric disorder, Schizophrenia. Serotonin transporter gene encodes an integral membrane protein that transports the neurotransmitter serotonin from synaptic spaces into presynaptic neurons. The encoded protein terminates the action of serotonin and recycles in a sodium dependent manner. A single nucleotide polymorphism (SNP) in the promoter of this gene has been shown to affect the rate of serotonin uptake and then cause the abnormal brain function. In the study the investigation is mainly based on the potential influence of the SLC6A4 gene on the psychopathology of Schizophrenia due to the SNPs in SLC6A4 gene. From the data‟s obtained from sequence analysis, there were clearly observed the SNPs of SLC6A4 gene. These sequence analyzed data‟s were then subjected to the statistical analysis for further clarification of the results. Data‟s obtained from the statistical analysis it is significantly observed the role of serotonin transporter gene in the most distressing and disabling mental disorder, Schizophrenia.

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Fabrication of natural product-based wound dressing –*Mirabilis jalapa* loaded fish collagen scaffold for wound healing applications

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Abstract

Chronic wounds are a global public health concern that demands significant resources from the healthcare system. Ayurvedic herbs are a repository of traditional medicines. Several plant-derived compounds are widely used for many treatments in conventional medication. Here we evaluate the healing efficacy of the traditional medicinal plant Mi*rabilis jalapa* (Four o‟clock plant), incorporated fish collagen scaffold to treat chronic wounds. The study focused on synthesizing and characterizing phytochemical incorporated fish collagen scaffolds and wound healing potential of the scaffold by *in vitro* scratch wound model. Physico-chemical characterization was done by scanning electron microscopy, Fourier-transform infrared spectroscopy, and X-ray powder diffraction. Scaffolds showed the cytocompatibility, cell viability, optimum dose concentration, and healing efficacy of scaffold with L929 mouse fibroblasts cells by MTT, LDH, Live/Dead assay and Scratch wound healing assays. Hence, the phytochemical incorporated collagen scaffolds have proved to be non-cytotoxic, cytocompatible, revealed wound healing activity, and confirmed the cell migration.

Plant-based wound management is an ongoing treatment of a wound by providing an appropriate environment for proper healing. Phytochemical incorporated collagen scaffolds are a promising candidate for managing injuries in skin tissue engineering applications through accelerating cell migration and proliferation. Thus, evolving traditional knowledge to cutting-edge tissue engineering would definitely contribute to the concept of an „unmet clinical need‟ and revolutionize tissue engineering applications in medicine.

Keywords: *Mirabilis jalapa, wound dressing, fish collagen, skin tissue engineering*

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Development and Characterization of Bovine Serum Albumin Nanoparticle as β-Carotene Delivery System

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Abstract

β-Carotene, a major food carotenoid, which plays an important role in human physiology and it hasthe ability to quench/neutralize the singlet oxygen and inhibits peroxyl free radical reactions. But its use is limited mainly due to its poor water solubility. Bovine serum albumin (BSA) is a water soluble, biocompatible and non-toxic protein with a promising application in lipophilic bioactive compound delivery. In this context, we studied the fabrication of β-Carotene incorporated BSA nanoparticles (BBSA -NPs) by desolvation technique. The Interaction of β-Carotene to BSA nano construct was studied in PBS buffer pH 7.4 by fluorescence spectroscopic techniques and the subsequent formation of complex, was investigated by static quenching process of tryptophan present in BSA. The stability of β-Carotene conjugated BSA nanoparticles was confirmed by measuring its ζ potentials and it was found to be -84.3 mV. The structural characteriaztion of the β- Carotene loaded nanoconstructs was carried out using Fourier transform infrared (FTIR), Scanning electron microscope (SEM) and Atomic force microscopy (AFM). Fourier transform infrared (FTIR) analysis verified the interaction of chemical bonds between β-Carotene and BSA nanoparticle. SEM and AFM revealed the surface morphology of the vitamin (β-Carotene) functionalized nanoconstruct. Results highlights the ability of BSA-NPs for β-Carotene vehiculization in an aqueous medium which could found potential application in food industry and in medical field.

Keywords: *BSA Nanoparticle, β-Carotene, Nanoconstruct, Fluorescence Spectroscopy*

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Invasion of *Chromolaena odorata* alters soil microbial diversity

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Abstract

Biological invasions have been identified as a growing threat to ecological balance and global sustainability. *Chromolaena odorata* (L.) King and Robinson (*C. odorata*) are some of the most widely distributed tropical shrubs. As one of the most invasive weeds globally, it is a serious problem in Central and West Africa, India, Australia, Pacific Islands, and Southeast Asia. With the rapid and continuous development of cultivation-independent metagenomic approaches, our knowledge of soil microbes has increased. Microbial communities in native soils consist of a few dominant species and many other rare taxa. Deep metagenomic sequencing enables understanding genomic insights into a low abundance population and may reveal a wide range of plant-microbe interactions in soil. The extensive spread of *C. odorata* species and its suitability for climate change requires immediate attention to elucidate the mechanism of invasion and the contributing factors. This work studied the soil properties of *C. odorata* and its microbiota. Our studies show the association of plant invasion with an increase in nutrient cycling and fostering copiotrophic organisms' development, including *Bacteroides*.

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In vitro characterization of phyto incorporated electrospun scaffolds for tissue engineering applications

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Abstract

The practice of wound care has continued to evolve from the traditional/cultural practices to novel biomedical techniques. The science of wound healing has been a matter of concern for human race through centuries. Medicinal plants are rich with numerous properties like antimicrobial, antioxidant and anti-inflammatory, which regulates the healing process. The present treatment modalities could be better substituted by phytochemical incorporated fibrous scaffolds which increases the wound healing efficiency and subsequently reduce the risk of infections.

Polycaprolactone (PCL) and Polyethylene glycol (PEG) were synthetic polymers blended in methylene chloride and dimethyl formamide solvents. Phytochemical extracts from medicinal plants may accelerate the proliferation when impregnated into the electrospun scaffolds. Extracts obtained from the leaves of *Clerodendrum infortunatum* was prepared by soxhlet extraction method. The phytoconstituents of the extract was analysed through LC MS, GC MS analysis. The antioxidant and antimicrobial activity was studied by phosphomolybdinum method, reducing power assay and agar well diffusion method respectively. Fabrication of PCL-PEG phyto incorporated electrospun scaffolds was synthesised by Nanofiber Electrospinning Unit. Morphology of the PCL-PEG sheets was analysed by SEM. Structural changes of electrospun scaffolds were identified by Fourier Transform Infrared Spectroscopy (FTIR). Cytotoxicity and direct contact test was done on electrospun polymeric scaffolds on L929 fibroblast cells.

The Ethanolic extracted fractions of leaves of *Clerodendrum infortunatum* contains different phytoconstitutents has shown antioxidant as well as anti-microbial activity against common pathogens, *Psuedomonas aeruginosa* and *Staphylococcus aureus*. Phyto incorporated PCL-PEG electrospun sheets have depicted non cytotoxic (MTT Assay) and cytocompatible

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(SEM).The novel phytoextract incorporated PCL scaffolds with anti-oxidant, antimicrobial and cytocompatibility properties may be further translated as cost-effective wound care products in Health Care.

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A Mini-review of Pharmaceutically active Marine Peptides derived from Actinomycetes

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Abstract

The marine environment harbors millions of microorganisms that play a broad spectrum of bioactivities. Among the marine microorganisms, actinomycetes comprise an important group have tremendous potential to synthesize bioactive secondary metabolites. They are Gram-positive bacteria that have been placed within the phylum Actinobacteria, Class Actinobacteria, subclass Actinobacteridae, order Actinomycetales which currently consists of 10 suborders, more than 30 families and over 160 genera. They are efficient newly secondary metabolites producers that show a wide range of biological activities.From these, peptides are more significant molecules that have high potential neutraceutical and bioactivities due their complex structural entities. In this review highlights the evaluation of recent research in pharmaceutically active marine peptides isolated from marine actinomycetes. Additionally, many of them have unique structures show a lot of prominent features that make them ideal therapeutic tools and alternatives to current antibiotics.The current and therapeutic bioactivities of these peptides includes antibacterial, antifungal, anticancer, antitumor, cytotoxic, cytostatic, anti-inflammatory, anti-parasitic, anti-malaria, antiviral, antioxidant, anti-angiogenesis, cardioprotective (anticoagulant, antihypertensive and antiatherosclerotic), neuroprotective, analgesic, anxiolytic, antidiabetic, appetite suppressing etc.

Keywords: *Marine actinomycetes, Lipopetides, Thiopeptides, Diketopiperazine (DKPs), Dimeric peptides, Nucleosidyl peptides, Thioamide-containing peptide, Lanthipeptides*

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Design and characterization of phytochemical incorporated stem cells seeded tendon scaffolds for tissue engineering applications – a boon for orthopedic reconstructive surgeries

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Abstract

Achilles tendon are fibrous band of tissue that links the muscles to bone, helping in the transmission of muscular forces to bone, thus permitting bone motion & body motion. Mechanical force transmission during sports or trauma is a major cause of injury. WHO has reported 33 million musculoskeletal injuries out of which 50% involving tendon and ligament injuries.Regeneration of tendon is slow due to its avascular nature thus prone to re-injury. Use ofECM derived from Decellularization of tendon (DT) seeded with Mesenchymal Stem Cells is a combination product to heal worn out or damaged tendon. Decellularization was done by chemical method. DT were characterized by Histology evaluation, SEM analysis, Contact angle measurement, Mechanical testing etc. Rabbit Adipose Derived Mesenchymal Stem Cells(RADMSCs) are isolated and characterized by Flow cytometry analysis. *In vitro,*cytocompatibility and proliferation of the phytochemical incorporated RADMSCs seeded DT scaffolds were analyzed by MTT and Live dead assay. Medicinal plants are traditionally used all over the world for the treatment of injuries. A combination of biomimetic properties of surrogate ECM from the DT and regenerative potential of MSCs together might be a promising solution for tendon defect healing. From the results, phytochemical incorporated RADMSCs seeded DT construct could be used as natural scaffolds for repairing injured tendon - an unmet clinical need in orthopedic reconstructive surgery and rehabilitation. The restoration of normal structure and function of injured tendons represents one of the most challenging areas in Orthopedic Medicine. Present study revealed that DT seeded with stem cells is biocompatible could be used as a natural scaffold – a boon to athletes, geriatric population, labour intensive groups etc.

Keywords: *Stem cells, Tendon, Tissue Engineering, Decellularization, Phytochemicals*

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Nano strontium hydroxyapatite incorporated electrospun polycaprolactone scaffolds for bone tissue engineering applications

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Abstract

Bone disorders like osteoporosis, osteoarthritis, bone fractures and injuries are at its peak, necessitating the highest demand for bone grafts especially when the defect is beyond self-healing. Synthetic bioceramics (calcium phosphates, bioglasses etc.), polymers and composites are replacing the conventional methods of treating bone defects with autografts due to their higher chance of graft rejection. This study aims at a comparative evaluation of the effect of nanohydroxyapatite (nHA) and nano strontium hydroxyapatite (nSrHA) on cell adhesion, proliferation and osteogenic differentiation of rat adipose derived mesenchymal stem cells (RADMSCs) *in vitro*as well as synthesis and characterizations of nano biocomposite bone grafts (nSrHA incorporated electrospun PCL scaffolds) for bone tissue engineering applications.

The physico-chemical characterizations (SEM, TEM, DLS and Zeta potential) and *in vitro* analysis of nano materials for viability (MTT, Live dead Assay), proliferation (LDH) and morphology (SEM) were carried out with RADMSCs. The osteogenic induced RADMSCs grown with nano ceramic materials were analysed for their osteogenic differentiation (ALP and osteocalcin expression). Further the fabrication of nano composite material (nSrHA- PCL) for bone regeneration is the ultimate aim of this work. *In vitro* characterizations on RADMSCs such as SEM, MTT, LDH, Direct contact assay, live dead assay qualitative and quantitative ALP assays and gene expression studies were carried out for studying cell viability, proliferation, cytocompatibility,and osteogenic differentiation nature of the nano composite material.

It has been evident that the osteogenic differentiation and cellular activities of RADMSCs were significantly higher on the rod shaped nSrHA suggests the role of nano Sr in the

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differentiation of mesenchymal stem cells into the bone/ osteogenic lineage. In addition, the *in vitro* analysis of fabricated nano composite material (nSrHA – PCL) proved its cytocompatible and osteogenic differentiation on RADMSCs.

We can conclude that the cytocompatible nano composite hard tissue construct will be a better platform to surface topography mediated regulation of bone regeneration and remodelling*in vivo*.

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In-vitro evaluation of total phenol, flavonoid, antioxidant and cytotoxic potential of Indian traditional plant *Saraca asoca* and *Curcuma longa* beneficial for treating endometrial cancer

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Abstract

Saraca asoca and *Curcuma longa* are Indian traditional plants that are used since ancient times as biologically active ingredient for menstrual related issues. These plants are having a potential medicinal property that was well mentioned in several ayurvedic formulations for healing female reproductive disorders. The phytochemical constituents (phenol and flavonoid) along with antioxidant potential (IC 50 of 15.94 and 98.21) of this crude plant extract shows remarkable cytotoxicity in endometrial cancer cell ishikawa. The HPLC identified isolated compound curcumin and catechin from the crude extracts shows antiproliferative effect in ishikawa cell lines demonstrates cytotoxicity of 85.45% and 67.9% even in 25µg concentrations. Anti- angiogenic activity of the extracts was analyzed in Chorio-Allantioc Membrane. Based on limitations and disadvantages of current studies on endometrial cancer, plants with major phytoconstituents can be a natural treatment option with high efficiency and less chance of adverse effect. This work reports the cytotoxicity assay in ishikawa cell line which can lead to explore the valuable source for drug discovery against endometrial cancer with natural source.

Keywords: *Ishikawa cell line, phytoconstituents, HPLC*

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Expression changes of proadipogenic NEAT1 lncRNA and anti adipogenic lncRNA U90926 during white adipogenesis

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Abstract

Last few decades witness an upsurge of obesity, one among the key risk factors associated with a wide range of metabolic diseases. Caloric imbalance leads to expansion of adipose tissue associated with adipogenesis. White adipocytes are characterized by distinct developmental programme and play a critical role in metabolism and its dysfunction leads to diseases. Long non coding RNAs are peculiar transcripts involved in regulation of a wide range of biological processes. Diverse range of regulatory networks including long noncoding RNAs (lncRNAs) governs various aspects of adipocyte biology including development and metabolism. Apart from their involvement in normal physiology, lncRNAs also seem to be associated with adipose biology hence indirectly to obesity. Proadipogenic positive regulatory Neat1 and anti adipogenic negative- regulatory lncRNAs are found to be associated with white adipogenesis. The aim of the present study was to evaluate the expression pattern and role of lncRNA U90926 (lnc-U90926) and lncRNA Neat1 during various phases of 3T3-l1 preadipocyte differentiation. Quantitative real-time PCR (qPCR) was performed to determine lnc-U90926 and Neat-1 expression. Lipid accumulation was evaluated by oil red O staining, adipogenic marker mainly PPARg was also analysed by qPCR. A negative correlation and inhibitory role were evident from the relative expression pattern of the lnc-U90926 during different phases of differentiation. Positive regulation of expression was observed during the differentiation events by the Neat1 lncRNA. Further studies on the differential expression of these lncRNAs during adipogenesis will provide insights into adipose tissue functioning and the possible target for therapies against obesity.

Keywords: *lncRNA, U90926, obesity, pre-adipocytes, Neat1, adipogenesis*

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Amylase enzyme producing bacteria isolated from soil receiving kitchen waste

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Abstract

Enzymes are the most important substances used to day in so many areas either in research, medicine or in industries. Starch degrading bacteria are mostly important in food, textile, fermentation and paper industries. The isolation and manipulation of pure culture of starch degrading microorganisms from soil have a great importance on biotechnology field. In this research bacteria strain was isolated from soil receiving kitchen wastes where conditions for growing were controlled, three kinds of bacteria were isolated, which are *Sphingomonas paucimobilus*, *Rhizobium radiobacter* and *Escherichia hermanii*. From these isolates, *Rhizobium radiobacter* was selected and used for enzyme production.. In the pH range of 5 and temperature of 32^0C showed the maximum enzyme production in this study. Growth rate was showed maximum in the 96 hours of incubation period. Solid substrate fermentaion was used here for further production of amylase enzyme. Wheat bran used here as the solid substrateby Solid Substrate Fermentation. The enzyme produced was applied on chocolate slurry to produce less viscous and soft chocolate.

Keywords: *Enzymes, Fermentation, Microorganisms*

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Population dynamics of micro fungi from Cashew Nut Shell Liquid (CNSL) contaminated soil in Kerala

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Abstract

The present investigation deals with the isolation of fungi from Cashew Nut Shell Liquid (CNSL) from three different sites in Kollam, Kerala. The predominant fungal species identified were *Penicillium longibratum, Penicillium citrinum, Fusarium solani, Trichoderma viride, Helminthosporium oryzae, Aspergillus candidus, Aspergillus niger, Fusarium oxysporum, Fusarium* sp and *Cunning hamella* sp. In the Kerala State Cashew Development Corporation cashew processing unit Kollam(site 1) soil fungi *Aspergillus flavus, Aspergillus niger, Fusarium oxysporum. Penicillium citrinum* and *Cunning hamella* sp. were identified. Prasanthi Cashew processing unit of Uliyakkovil, Kollam, Kerala (site 2), soil fungi such as *Fusarium oxysporum, Penicillium* sp, *Nigrospora* sp, *Penicillium longibratum, Penicillium citrinum, Fusarium* sp, *Aspergillus* sp, *Aspergillus awamori, Aspergillus niger* and *Curvularia lunata* were recorded. Soil samples from Prasanthi Cashew Processing Unit, Second mile stone, Kollam (site 3) recorded fungi such as *Aerogenospora, Trichoderma viride, Aspergillus candidus, Aspergillus niger, Fusarium* sp, *Penicillium* sp, *Sarocladium oryzae* and *Aspergillus flavus*. It was interesting to observe that site 2 revealed maximum fungal colonies. The paper discusses the results in detail.

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Development and evaluation of sensory and nutritional quality of products made from fish skin powder

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Abstract

The study on "Development and Evaluation of Sensory and Nutritional analysis of fish skin crisp and fish skin soup mix" has undertaken to explore possibility of developing a nutritionally enriched crisp and soup. The study was conducted in a period of 12 months (2019-2020). The project provides a good utilization of by-product and provide snacks rich in PUFA and protein. Sensory evaluation was carried out by ten panelists via hedonic scaling. As the sensory evaluation proved that the product is widely acceptable, nutritional tests such as lipid, protein and carbohydrate contents were analyzed. The fish skin was dried in a tray drier and powdered. The development process is simple and can be implemented by a common man. There‟s no addition of any chemicals or preservatives. All the ingredients are natural and they complement each other.

Keywords: *Fish skin powder, food processing, sensory evaluation, and nutritional analysis*

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Isolation, characterization, optimization of pigment producing bacteria from soil

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Abstract

Pigment producing bacterium strain isolated from soil when characterized for morphological,physiological and biochemical parameters was identified accordingly. The isolated strain produced Red, Violet, Yellow and Fluorescent yellow pigmented bacteria on Nutrient agar medium.The optimum conditions for pigment production was determined at 30-37 degree Celsius for 7-10 days. From those isolates with maximum pigment production was noted. The selected red pigment producing bacteria and the optimum growth conditions were done by growing it on in different incubation, temperature, pH, Carbon source and Nitrogen sources. Biochemical tests and staining tests were performed accordingly. Antibacterial activity of pigment producing bacteria were noted against food borne pathogens. The pigment producing bacteria is used as a biocolerent in textiles, food industry etc we produced them on easily and cheaply available media.

Keywords: *Pigment, antibacterial activity*

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Effect of germination on total phenolic content and anacardic acid production in cashew nut seeds (*Anacardium occidentale L.)*

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Abstract

In this study, the effect of germination on Total Phenolic Content (TPC) and quantification of anacardic acid production in cashew nut seeds (*Anacardium occidentale L.*) was evaluated. Germination is a process that causes an enhancement in the whole secondary metabolite profile of a plant. Cashew nut seeds were selected based on the viability test. The viable seeds were grown in sterilized soil in pots and collected at 2^{nd}, 4^{th}, 6^{th} and 8^{th} day of germination (C_1, C_2, C_3 and C_4 respectively). The germination process was considered complete when the radicle emerged from the seed on the 8^{th} day of germination. The collected samples were extracted in methanol. Total Phenolic Content (TPC) was determined by Folin-Ciocalteau method and anacardic acid production was quantified by using High Performance Thin Layer Chromatography (HPTLC). The TPC of the samples C_1, C_2, C_3 and C_4 were found to be 17.2±0.26mg GAE/g, 92.77±0.25mg GAE/g, 98.17±0.76mg GAE/g and 131.6±1.45mg GAE/g respectively. In HPTLC, the anacardic acid was separated at an rf of 0.573±0.090. Anacardic acid content in the extracts (C_1, C_2, C_3 and C_4) were found to be 77.30±0.46, 149.27±0.31, 292.64±0.66 and 397.7±0.27µg/ml respectively. The results obtained conclude that the phenolic content and anacardic acid production was enhanced during germination.

Keywords: *Cashew nut, Germination, Total phenolic content, Anacardic acid, HPTLC*

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Production of Laccase from microorganisms using Response Surface Methodology

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Abstract

The tremendous increase in water pollution has been affecting the globe; the major challenge needed for mankind is to be provided with clean water. But the increasing population and developing commercialization have led to the release of carcinogenic dyes in the water that can affect aquatic organisms, plants, animals, and humans around the world. To degrade these dyes, microbial enzymes play a major role. Therefore in the present investigation, isolation of laccase activity of PS1 showed a brown-red zone on the Guaiacol agar plate, and screening of laccase enzyme production was done using statistical analysis where laccase activity was found to be 77U after purification analysis with pH 7 and temperature 42^0 C. In the application study, the laccase enzyme showed about 82%-96% decolorization of dyes within 12-24h which proved helpful in degrading the carcinogenic dyes. Thus Laccase acts as a promising enzyme for variousdye degradation against bromophenol blue and congo red.

Keywords: *Laccase, Carcinogenic dyes, Statistical analysis*

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Development and evaluation of sensory, nutritional, proximate analysis of wheat grass waffle cone

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Abstract

The study has been undertaken to develop and evaluate the sensory, nutritional and proximate analysis of the new-fangled wheat grass waffle cone. The study was conducted during the period of 2019-2020. Primary study was done about the development and evaluation of sensory, nutritional and proximate analysis. Secondary data was collected from reports, books and journals. The general aim was to develop and evaluate the sensory, nutritional and proximate analysis of wheat grass based waffle cones. Wheat grass has an increased nutritional quality. It provides health benefits such as digestion, helps to eliminate toxins, boost metabolism, decreases cholesterol level, boost immune system etc. Two types of wheatgrass waffle cone was prepared and coded as Sample A and Sample B. The Sample A was prepared by using wheatgrass juice and wheat flour as major ingredients. Sample B was prepared by using wheatgrass juice and ragi flour as major ingredients. Sensory analysis of the samples was analyzed by 10 panel members with the help of 9 point Hedonic scale. Among the 2 samples wheatgrass- wheat flour waffle cone was highly accepted by the panelists in terms of taste and concept. The sample accepted after sensory evaluation was tested for nutritional and proximate analysis. Determination of carbohydrate and fiber content was done for the nutritional analysis and pH and acidity values determined for proximate analysis. From the analysis it was found that sample A contains carbohydrate-45.4%, fiber-7.6g, pH- 4.9 units, Acidity- 38%.

Keywords: *Wheatgrass juice, Wheatgrass based waffle cones, Sensory, Nutritional and Proximate analysis*

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Antimicrobial activity of pyocyanin against biofouling microorganisms isolated from sea water

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Abstract

Pyocyanin is a blue green water soluble phenazine pigment produced by *Pseudomonas aeruginosa*. It has antibiotic activity against wide range of microorganisms. In the current study the pyocyanin pigment was extracted from *Pseudomonas aeruginosa* strains isolated from sea water samples and purified. Biofouling microorganisms were isolated from sea water samples. Antimicrobial activity of the pigment against the fouling microorganisms was screened by Scrap method and Agar well diffusion method.

The biofouling microorganisms isolated were identified as *Delftia acidovorans* and the non pigmented *Pseudomonas aeruginosa*. In scrap method, after incubation, it was observed that the growth of biofouling microorganisms was inhibited. In agar well diffusion method, the zone of inhibition of pyocyanin against fouling bacteria was measured. The pigment showed antimicrobial activity against *Delftia acidovorans* and the non-pigmented *Pseudomonas aeruginosa*.

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Tick borne zoonoses; an emerging threat in India

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Abstract

Ticks are blood sucking arthropods inhabiting wide variety of vertebrates including mammals. These acts as pests on livestock and can transmit serious diseases to humans from animals. They carry all types of pathogens ie., bacteria, virus, fungi and protozoa. The list of diseases transmitting from animals to humans are increasing and most of them are difficult to diagnose. Several tick species act as vectors of theileriosis, babesiosis and anaplasmosis in animals and are of high veterinary importance. In man they cause Lyme disease, ehrlichiosis, babesiosis, rocky mountain fever, Colorado tick fever, Tularemia, CCHF, KFD, Q fever, spotted fever, tick paralysis and tick encephalitis. Spotted fever is the most common zoonoses and is transmitted by around 27 species and Lyme disease is the one with most concern. The widening spectrum of tick-borne diseases is getting more attention in India, largely after the periods of frequent outbreaks of Kyasanur forest disease which is endemic to south India. the genera Haemaphysalis, Amblyomma, Rhipicephalus and Hyalomma are already reported from domestic and wild habitats are potential vectors of various diseases. Ticks in wild life is the main reservoir of these emerging threats. Kerala, being a state with incredible and rapidly depleting forest cover is more prone to tick borne zoonoses. The present paper discusses about the tick vectors of Kyasanur forest disease (KFD), Crimean-Congo hemorrhagic fever (CCHF), Lyme disease (LD), Q fever (also known as coxiellosis), and other Rickettsial infections which are already reported in India.

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Development of atta based noodles enriched with barley flour, carrot and aloe vera

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Abstract

Noodles are tasty, nutritious, convenient, and safe, have longer shelf life and are reasonably priced. This has made it popular and recognized around the world. A study was carried out to make noodles from Atta flour, Barley flour, carrot and aloevera in different compositions. The raw materials like carrot and aloe vera were washed, cleaned and blended to form the wet ingredients which were then combined with the dry ingredients to form the composite noodle dough. This dough was then extruded and dried to form noodles. Barley is a rich source of B vitamins, beta-glucans, and minerals like potassium and sodium. Carrots are rich in vitamins, minerals and fibre. They are also good source of antioxidants. The aloevera gel contains important antioxidant vitamins like vitamin A, C and E. It also contains Vitamin B1, niacin, Vitamin B2, choline and folic acid. The addition of all these ingredients makes the noodles more nutritious than the commercially available Maida noodles. The sensory and proximate analysis of the developed noodles was carried out.

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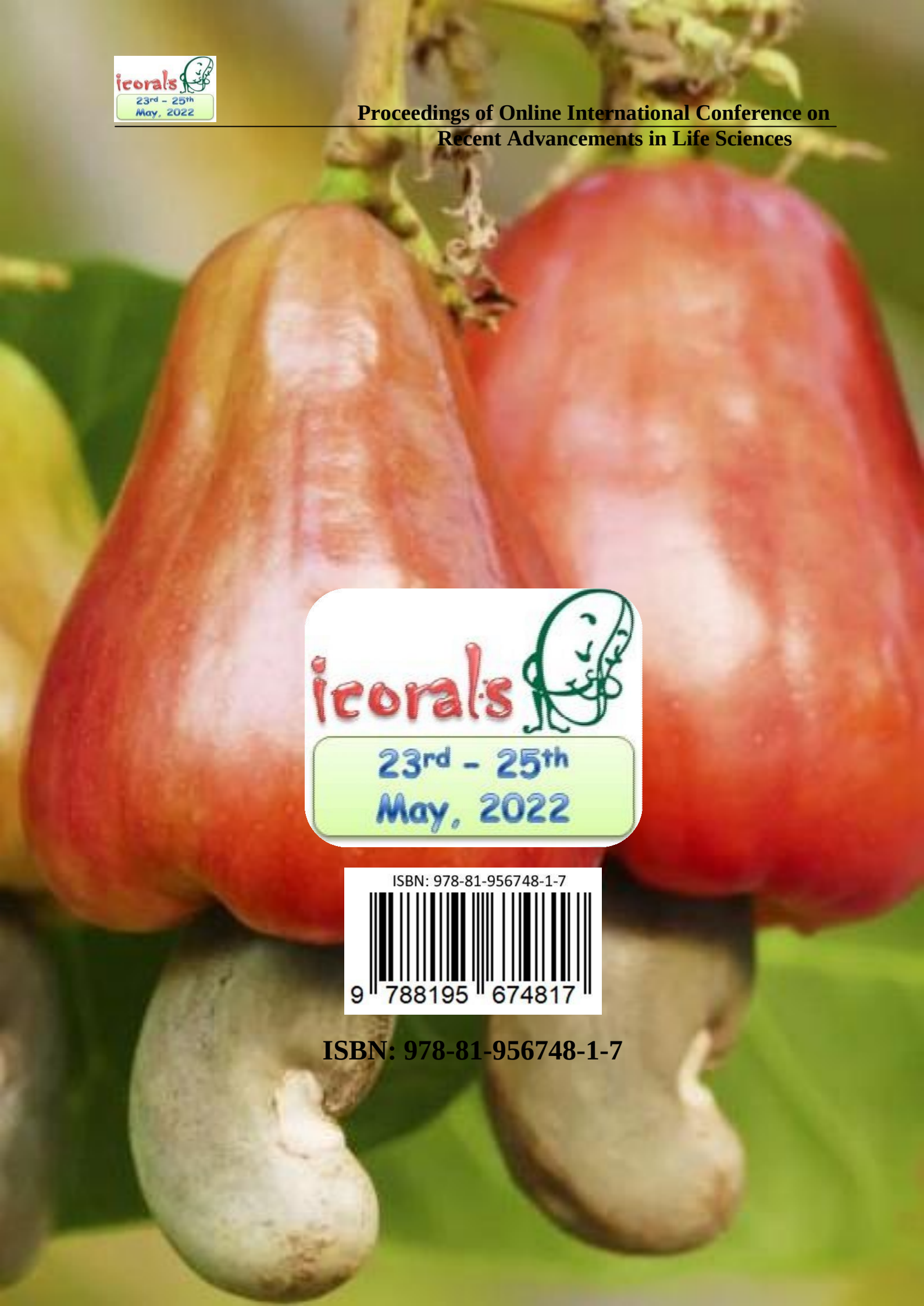

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