RICERCA National Conference 2022 Prceedings:

Multidisciplinary Perspective in Sustainable Research

20-Sept to 18-Oct 2022

Organized by

IQAC & Research & Development Cell,
St Joseph's College for Women, Alappuzha, Kerla, India

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RICERCA NATIONAL CONFERENCE 2022

Multidisciplinary Perspective In Sustainable Research

PROCEEDINGS

NATIONAL ONLINE STUDENT PROJECT PRESENTATIONS

Multidisciplinary

20-09-2022 to 18-10-2022

Editor-in-Chief

Dr. Bhagya D

Organized By

IQAC & Research and Development Cell, St Joseph's College for Women, Alappuzha

In Collaboration With

CSIR-IMMT

Kerala Sasthra Sahithya Parishath

Kerala State Council For Science Technology & Environment

Institution's Innovation Council

Alappuzha, Kerala, India

April 2023

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427, Palhar Nagar, RAPTC, VIP-Road, Indore-452005 (MP) INDIA
Phone: +91-731-2616100, Mobile: +91-80570-83382
E-mail: **contact@isca.co.in**, Website:**www.isca.co.in**

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Rev Sr Philomena Puthenpura

Manager, St Joseph's College ForWomen,

Alappuzha, Kerala, India

MESSAGE

The world today is witnessing an incredibly fast revolution in research and development. Since about 1990, when sustainability became a key concept for a wide range of scientific disciplines, the need for multidisciplinary collaboration has increased. Such a collaboration encompasses the disciplinary interests of its respective members along with providing a comprehensive approach to complex problems. The youth covering more than half of Indian population can do a lot through multidisciplinary research through various initiatives like Start Ups, Incubation, YIP, Skill India, IIC and many more.

I congratulate the students who made use of this opportunity to make this event a successful one. I exhort you to grab all the opportunities that come across your life so as to become a creative and successful person with values and character. I appreciate the Principal, IQAC Co-ordinator and the Research and Development Cell of the College for fanning the flame of multidisciplinary perspective for sustainable research.

With every best wish

Rev. Sr. Philomena Puthenpura

Dr Rita LathaD'couto

Principal, St. Joseph's College for Women,

Alappuzha, Kerala, India

MESSAGE

Research is essential for advancing society, strengthening the economy, driving innovation and addressing various contemporary challenges. It is also being recognized that there is significant enhancement in student engagement and achievement when they study in an environment rich with research and discovery. The RICERCA series was conceived as an initiative aimed at promoting the culture of research and inquiry in the student community, right from the undergraduate stage itself by providing a platform to bring together young researchers from different higher education institutions across the country. This year, the RICERCA National Conference 2022 was launched with the theme "Multidisciplinary Perspectives in Sustainable Research", envisaging the twin objectives of showcasing the research endeavours of students and igniting the innovative and entrepreneurial spark in them with the **KICKSTART Ideation Fest**. The competitions were held in hybrid mode and there were 101presentations of research projects undertaken in various disciplines. We are immensely grateful to all the academicians who inspired and motivated the student researchers with their insights on sustainable research. Much appreciation to Dr. Bhagya D, coordinator of the Research and Development Cell for spearheading the venture and to the entire RICERCA team for the effective conduct of the project presentation contest and Ideation Fest. The effort taken to bring out a comprehensive documentation of the Conference proceedings is indeed commendable.

To quote Ernest Hemingway, "It is good to have an end to journey toward, but it is the journey which matters in the end." I wish all the researchers who have been a part of RICERCA an enriching and productive research journey.

Best Wishes

Dr. Rita Latha D'couto

Dr T Pavan Kumar

Senior Scientist

Department of R&D Planning and Business Development

CSIR -IMMT, Bhubaneswar

MESSAGE

IPR for Sustainable Research

Intellectual property (IP or IPR) is an important asset for any country to grow and take lead in the present global context. Since remote past, IP was an important element in nation building for advanced countries such as USA, UK, France, Germany, Japan the realization for the same for developing countries has taken a momentum in present days. Though there are several forms of IP, patents are regarded as the main stream, as they are the effective outcomes of human creativity in problem – solution approach. This lecture will mainly focus on overview of IPRs with specific emphasis to patents, which will help the participants to work out on the possibilities of realizing the potential of day-to day activities towards innovative contributions there by adding value to the sustainable research.

All the Best

Dr T Pavan Kumar

Dr T Pradeep

Chairman, Alappuzha District Sub Committee, KSSP

MESSAGE

I am happy to be a part of RICERCA 2022, organized by St. Josephs college, Alappuzha. Research is the first step towards development of a nation. Sustainability is the key aspect when we mould a research topic. KSSP is working for sustainable development policy. It is very important to organize such seminars to inculcate the aptitude towards research in young generation. In spite of all the technological advancements people are side-lining science and indulging in purely unscientific practices. Science is the only rescue or hope for a promising world. We should study the pain and effort taken by great scientists in their search for perfection. Promotion of research is very important in colleges among teachers and post graduate students. The need of the hour is multi-disciplinary research.

I wish all a successful research career applying principles in multidisciplinary perspective.

Best Wishes

Dr T Pradeep

Dr Ajit Prabhu V

Chief Scientist, Sci G &
Nodal Officer
Technology Development and Project Management Division
(TDPMD)

INAUGURAL SPEECH

Multidisciplinary Perspective In Sustainable Research

I am happy to know that St. Joseph's College for Women, Alappuzha is organizing an online National Research Conference including Project Presentation Competition, RICERCA Conference 2022. The focal theme Multidisciplinary Perspective in Sustainable Research is very appropriate. Exposure to exciting developments in science and technology will stimulate and initiate innovative thinking in the minds of young graduates. Competitive spirit and interactions among the participants will bring the best out of them leading to human resource development in interdisciplinary research. The United Nations announced sustainable development goals(SDGs) as a blue print for achieving a sustainable future in accordance with the 2030 Agenda for sustainable development. Sustainable development means that the exploitation of resources, the direction of investments and technological development must enhance current and future potential for meeting human needs and preserving biodiversity. The Earth's natural environment consists of living species interacting with each other, climate and weather, affecting humans and their environmental, social and economic contexts. The built environment provides the setting for human activities, ranging in scale from buildings to cities. To respond to above challenges, the research aims to explore multidisciplinary and transdisciplinary collaborationin the nature based design of the sustainable built environment. In a multidisciplinary setting, individuals from various disciplines contribute their disciplinary perspectives to solve complex problems that individual disciplines cannot. Students need to learn how to exchange information and work in multidisciplinary teams including multiple aspects such as energy efficiency, the possibility of designing buildings at nearly zero energy consumption, the sustainable use of renewable and non renewable resources, and the use of recycled building products. Mutlidisciplinarity requires good team work that needs sufficient common ground among disciplines to support the sharing of knowledge and subsequent resolution of a shared problem. Researchers and practitioners must structure their collaboration using ICT tools for better team work, problem definition and resolution.

Congratulations to Management, Principal, IQAC and Research Development Cell of St. Joseph' College for Women Alappuzha for organizing this event and I wish all the best for the success of the program.

Best Wishes

Dr Ajit Prabhu V

From Editors Desk

Dr Bhagya D

Research Co ordinator

St Joseph's College for Women, Alappuzha

Welcome to the glimpses of National Conference Proceedings of RICERCA 2022 organized by Research and Development Cell of St Joseph's College for Women, Alappuzha, in collaboration with KSCSTE, Kerala Sasthra Sahithya Parishath, CSIR-IMMT & IIC. The National Conference RICERCA 2022 was organized with the aim of providing a virtual platform to students of undergraduate and postgraduate from all disciplines, research scholars and faculty to show case their multidisciplinary, and transdisciplinary research talents and exchange of research ideas nationally after undergoing rigorous review process. Among 119 entries from 9 disciplines 101 research papers were selected after peer review for quality and innovation. The online student project presentation was from 20-09-2022 to 18-10-2022 and the abstracts selected and plenary talks are compiled as proceedings. Among each category of research presentation for each subject best researcher with best presentation were evaluated nationally by eminent scholars from respective subjects and was awarded "**EXCELSIOR AWARD"**, for encouragement second and third place were also given certificate of merit.

I would like to express our deepest appreciation to the speakers whose technical contributions are also presented in these proceedings. I am indebted to the contributions of associate editors for their excellent co operation and hard work which made it possible to release the proceedings in an excellent manner.

We would like to thank all our keynote speakers who made all the efforts to synthesize the materials and their wide and rich experiences to deliver distinguished plenary talks and promote interactive discussion forums in contemporary research. We would also like to thank all our subject experts for their great efforts in delivering interactive and excellent sessions that address the learning needs of all categories, undergraduates, graduates, and professionals. Finally, I hope that the National Conference RICERCA 2022 have been beneficial for fostering research aptitude integrated with technology.

INAUGURATION

RICERCA NATIONAL CONFERENCE 2022

Multidisciplinary Perspective In Sustainable Research

National Online Student Research Project Presentation

Organized by

Research and Development Cell, St Joseph's College for Women, Alappuzha 688001, Kerala

in association with

Kerala State Council for Science, Technology & Environment

Kerala Sasthra Sahithya Parishath, CSIR-IMMT & IIC

PROGRAMME SCHEDULE

20-09-2022 Time: 10:30AM

Opening Remarks	:	**Ms Manju Thomas** Assistant Professor, Department of English **Ms Dhanya Joy** Assistant Professor, Department of English
Welcome Address	:	**Dr Bhagya D** Research Co-ordinator
Presidential Address	:	**Dr Suleena V S** Principal in Charge, Associate Professor & Head, Department of Commerce, St Joseph's College for Women, Alappuzha
Inaugural Address	:	**Dr Ajit Prabhu V** Chief Scientist (Sci -G), Nodal Officer, PIC-K Technology Development & Project Management Division (TDPMD), KSCSTE
Key Note Address	:	**Dr Abraham Verghese** Chairman, International Phytosanitary Research & Sustainability Services, Former Director, ICAR-NBAIR, Bangalore
Felicitation	:	**Dr T Pavan Kumar** Senior Scientist, Department of R & D Planning and Business Development, CSIR-IMMT, Bhubaneswar
Felicitation	:	**Dr Anju M Neeliyara** IQAC Co ordinator
Vote of Thanks	:	**Dr Pinkie Cherian** Assistant Professor, Department of Botany

VALEDICTORY

RICERCA NATIONAL CONFERENCE 2022

Multidisciplinary Perspective In Sustainable Research

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PROGRAMME SCHEDULE

18-10-2022 Time: 11:00AM

OpeningRemarks	**:**	**Prayer**
WelcomeAddress	**:**	**Dr Bhagya D** Research Co-ordinator, St Joseph's College for Women, Alappuzha
PresidentialAddress	**:**	**Dr Rita Latha D'couto** Principal, St Joseph's College for Women, Alappuzha
Valedictory Address	**:**	**Prof (Dr) K S Chandrasekar** Senior Professor & Head, IMK @ Campus Director University of Kerala,Trivandrum
		Announcement of EXCELSIOR AWARD
		Feed Back
Vote of Thanks	**:**	**Dr Kumari Nisha S** Assistant Professor, Department of Chemistry

RICERCA NATIONAL CONFERENCE 2022

ONLINE RESEARCH PROJECT PRESENTATION COMPETITIONS

EXPERT PANEL (Parallel Sessions)

20-09-2022 to18-10-2022

Date	Time	Subject	Expert Panel
20-09-2022	10:30 -1:30 PM	INAUGURATION	**Inaugural Address** **Multidisciplinary Perspective In Sustainable Research** **Dr Ajit Prabhu V** Chief Scientist (Sci-G), Nodal Officer, PIC-K, Technology Development & Project Management Division, (TDPMD), KSCSTE **Key note Address** **Research & Sustainability** **Dr Abraham Verghese** Chairman, International Phytosanitary Services, Bangalore
27-09-2022	10:30 to 11:45 AM	BOTANY	**IPR for Sustainable Research** **Dr T Pavan Kumar** Senior Scientist, Department of R & D Planning & Business Development, CSIR-IMMT,Bhubaneswar
28-09-2022	10:00 to 11:30 PM	CHEMISTRY	**Novel Designs and Innovations in Chemistry** **Dr Vipin Ipe Thomas** Assistant Professor, Department of Chemistry, CMS College, Kottayam
30-09-2022	10:30 -11:30 PM	COMMERCE	**Entrepreneurship and Regional Development** **Dr S Sajeev** Professor, Financial Management, Institute of Management In Government(IMG) Thiruvananthapuram,Kerala

29-09-2022	10:30 -12:30PM	ENGLISH	**Current Research Paradigms In English Studies** **Dr Cherian John**, Professor of English, St John's College, Anchal
30-09-2022	10:00- 1:00PM	HISTORY	**New Trends In Historical Writing** **Dr Biju R I** Assistant Professor, Department of History, MSM College, Kayamkulam
28-09-2022	10:30 -5:30PM	HOME SCIENCE	**Mixed Methods Research For Health-Nutrition And Social Sciences: Principles And Applications** **Prof Sr ShubhadaKanani** Adjunct Prof at Parul University, Parul Institute of Public Health, Former Prof Dept of Foods and Nutrition, MS University of Baroda Session Chair: **Dr. Hemangini Gandhi**, Assistant Professor (CES), Department of Foods and Nutrition, M S University of Baroda, Vadodara, Gujarat
26-09-2022	11:00- 1:00PM	MATHEMATICS	**Applications of Mathematical Modelling In Various Fields** **Dr Dilip Kumar** Assistant Professor Department of Mathematics University of Kerala, Kariavattom **Dr K F Mary Latha** Associate Professor & Head of Department of Mathematics, JayarajAnnapackiam College for Women, Periyakulam

28-09-2022	10:00-12:00PM	PHYSICS	**Recent Research Trends In Physics** **Dr K Sethuraman** Head & Dean, Department of Material Science, School of Technology,Central University of Tamilnadu,Thiruvarur **Session Chairs:** **Dr Sreeja R**, Assistant Professor,Department of Physics, Mar IvaniousCollege(Autonomous) Thiruvananthapuram **Dr R Mary Jenila** Co ordinator Shift II, Department of Physics, St Xaviers College(Autonomous) Palyamkottai,Tamilnadu
22-09-2022	10:00 -12:00PM	ZOOLOGY	**Oceans in Anthropocene: Issues related to Sustainability** **Dr S Sureshkumar** Professor, Biological Oceanography, Faculty of Ocean Science and Technology, Kerala University of Fisheries and Ocean Studies **Session Chair:** D**r Sangeetha G Kaimal**, Assistant Professor, Department of Zoology, Providence Womens College,Calicut
18-10-2022	11:00AM	VALEDICTORY	**Sustainable Research** **Prof K S Chandrasekhar** Senior Professor &Head, IMK @ Campus Director,University of Kerala, Trivandrum

Organizing Committee

Dr Bhagya D, (Research Co-ordinator), Assistant Professor, Department of Home Science

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Dr Sreekala G, Assistant Professor, Department of Physics

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Ms Manju Thomas, Assistant Professor, Department of English

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Dr R NishaNair, HOD, Department of Botany

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Prof (Dr) Abraham Verghese, Chairman, International Phytosanitary Research & Sustainability Services, Former Director, ICAR-NBAIR, Bangalore

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Dr T Pradeep, Chairman, Alappuzha District Sub Committee, KSSP

Dr Pavan Kumar, Senior Scientist, Department of R&D Planning and Business Development, CSIR -IMMT, Bhubaneswar

Dr Hemangini Gandhi, Associate Professor (CES), Department of Foods & Nutrition, MS University of Baroda, Vadodara, Gujarat

Dr Anju M Neeliyara, IQAC Co ordinator, St. Joseph's College for Women, Alappuzha, Kerala

Editorial Board

St. Joseph's College for Women, Alappuzha, affiliated to the University of Kerala is situated at Convent Square. Established in 1954, by the Canossian Daughters of Charity, an international congregation of missionary sisters, the college offers 09 undergraduate and 3 postgraduate courses and opens up various settings for the understudies in curricular and extra-curricular fields in accordance with the vital needs of greatness and worldwide standards. The college has been able to combine the core values of higher education upheld by the Higher Educational Council and NAAC with its own vision and mission which stem from the educational policy evolved by the Canossian Congregation, guided by the precepts of St. Magdalene of Canossa, the founder of the order, thus ensuring value based education that aims at global competencies. The college was accredited by the National Accreditation and Assessment Council (NAAC) without precedent for 2004 with a commendable B++ (82.5%). In 2013, it was re-accredited with an 'A' Grade. In 2015, the College was the recipient of grant from **DST - FIST** for the infrastructural development of Science labs. In **2016**, the College was granted the status of **"College with Potential for Excellence" (CPE)** by **UGC**, the only college to be granted it that year among colleges under the University of Kerala. The college was awarded **B++ Grade**with a CGPA of 2.87 on a scale of four in the third NAAC accreditation process conducted in 2018.

The college has made considerable progress academically and in updating of its infrastructure facilities, while continuing to make its presence felt in the co-curricular and extra-curricular scenario. The college leaves no stone unturned to foster the spirit of Research and Innovation. The newly emerging Research Block bears testimony to this. The IQAC & Research and Development Cell headed by a group of committed faculty disseminates information regarding research related events, call for proposals, availability of grants from various funding sources and organize workshops and seminars of relevance. The review committee examines and evaluates the viability, provides seed money, ethical compliance and probity, and methodological correctness of the research proposals submitted and motivates teachers, students and research scholars to undertake minor and major projects and participate and present papers at national and international conferences and focus on innovative researchpractices.

CONFERENCE COLLABORATORS

Kerala Sasthra Sahithya Parishath (KSSP)

KSSP played a lead role in making Kerala totally literate. KSSP has established a separate center to do research and in-depth studies in the field of education viz., Education Research Unit (ERU) with three campus, at Thiruvananthapuram, Thrissur and Kozhikode.KSSP has been involved in building up models for sustainable and equitable development; campaigning for decentralized planning and local level planning; initiating a large number of field experiments in local level planning; empowering the local communities through volunteer based resource mappings, socio-economic survey, data analysis etc; formulation of people's structures like "Neighborhood groups" and village committees for transparent democracy; analyzing the "Kerala Model" of development to arrive at general conclusions and seeking its improvement. With the help of its members and friends, KSSP undertakes regular studies on developmental issues of Kerala and publish papers, monographs and reference books.

KSSP uses several media to communicate; printed word, posters, spoken word, theatre and to a limited extent electronic media. It has organized massive leaflet campaigns on many subjects. KSSP is the India's largest science publisher, having published more than 1,000 titles and producing 30-40 new titles per year. KSSP is also publishing three Science Magazines separately for primary school students, high school students and the public. KSSP also organizes every now and then massive lecture campaigns on a variety of topics and each campaign will result in several thousand lectures, which reaches out to hundreds of thousands ofpeople.With a strength of several thousand teachers among its members, KSSP organizes in- service teachers training to make them enjoy teaching; promotes pedagogic innovations to make learning an enjoyable activity for children; assesses curriculum and text books; organizes massive children's science festivals, teacher exchange programmes and talent festivals for children; publishes science journals and books for children and organizes mass movement for quality improvement and mass literacycampaigns.

Kerala State Council For Science Technology and Environment

The Kerala State Council for Science, Technology and Environment (KSCSTE) is an autonomous body under the Ministry of S & T, Kerala, constituted in November 2002 to be an agency for change and development through Science and Technology. Formerly it was the Science, Technology and Environment Committee(STEC), established in 1972 in concurrence with the Science Policy of Government of India. The council promotes and activates programmes for increasing the stock of knowledge in science, and fine tunes policies which are significant and for the sustained development of humanity. The council prepares the road map for development through scientific research and innovation in technologies. Achieving excellence in basic research, academia-industry interactions,strengthening indigenous initiatives, and building strong infrastructure and developing a high quality science education system in the state are our targeted goals. This has been achieved through various schemes and programs and by the R & D organisations established by the council.

Institutions Innovation Council

The major focus of IIC is to create a vibrant local innovation ecosystem, Start-Up supporting mechanism in HEIs, prepare institute from Atal Ranking of Institutions on Innovation Achievements Framework, establish function ecosystem for scouting ideas and pre incubation of ideas, develop better cognitive ability for Technology students.

CSIR-IMMT

CSIR-Institute of Minerals and Materials Technology (IMMT) was established as a Regional Research Laboratory,Bhubaneswar in the eastern part of India under the aegis of the Council of Scientific and Industrial Research (CSIR), New Delhi. The institute has expertise in conducting basic research and technology oriented programs in a wide range of subjects to address the R & D problems of mining, mineral and metal industries and ensure their sustainable development. For the last one decade, the main thrust of R & D at CSIR-IMMT has been to empower Indian industries to meet the challenges of globalization by providing advanced and zero waste process know-how and consultancy services for commercial exploitation of natural resources through the public-private-partnership(PPP) approach. It is also carving out a niche in processing of advanced materials for greater value addition and working on resource use efficiency of critical raw materials.

CONTENTS

BOTANY

Won Excelsior Award

Dr. R. Beema Shafreen

Unraveling the bioactive potential of pitaya against *Candida albicans* biofilm and human disease network using a Network pharmacology based approach

R. Beema Shafreen
Dr. Umayal Ramanathan College for Women, Alagapappapuram, Karaikudi-630003
E. mailId: drbeema.shafreen@gmail.com

Abstract

The identification of drug-target interaction and systematic screening is an important step in drug discovery research. It is experimentally difficult and cost-effective to screen all the possible interactions. Hence, computational-based approaches are used as an alternative strategy to study molecular interaction and their associated pathways. Therefore, Network-based approaches have been used as an important tool in drug discovery. A protein-protein (PPI) network has enabled the understanding of multi-protein at target level and immunomodulatory effects information and in the key signaling pathways. Network pharmacology has a major impact on studying the drug response in the context of the cellular or phenotypic network. It is always crucial to study the mechanism of action of compounds involved in different molecular pathways. The network-based approach is envisaged to provide supporting evidence for designing and performing the experiments. In the present study, bioactive molecules obtained from pitaya have antibiofilm activity against *Candida albicans* biofilm. The extract subjected to GC-MS has revealed 18 molecules. Among the compounds, N-methylfuran-2-carboxamide was present as the major peak area. Thus, molecular interaction and target prediction reveal effective role ligands that have shown interaction 92 genes. Specifically, the top hit was observed as muscarinic acetylcholine receptors (mAChRs) which mediate acetylcholine-induced neurotransmission. Apart from the functional analysis, it was observed that proteins were involved in two disease pathways Diabetes mellitus, type 2, susceptibility, and Schizophrenia. Therefore, it is envisaged that the consumption of pitaya will have the potential biological activity to prevent and overcome diseases such as type 2 diabetes and neurodegenerative disorders.

Keywords: PPI network, pitaya, network pharmacology, schizophrenia, neurodegenerative disease

Won Second Prize

Prisho Mariam Paul

Insilico docking analysis of FDA approved drugs against Human AKR1 protein binding site of SARS CoV-2 membrane protein

Prisho Mariam Paul[1, 3] and Krupakar Parthasarathy[2]
[1]Research scholar, Centre for Drug Discovery and Development, Sathyabama Institute of Science and Technology, Chennai
[2]Scientist D, Centre for Drug Discovery and Development, Sathyabama Institute of Science and Technology, Chennai
[3]Assisstant Professor, Biotechnology Department, CMS College KottayamE-mailId: pmprisho@gmail.com

Abstract

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is responsible for an ongoing COVID-19 pandemic that has devastated mankind. The SARS-CoV-2 membrane protein plays a decisive role in the viral life cycle. In infected people, membrane protein impedes the conversion of testosterone from active form to its inactive form via its interaction with human Aldo-keto reductase family 1 member C2 protein. This leads to the high availability of active testosterone which in turn promotes the SARS-CoV-2 entry into the host cell. From the literature study find out the interaction site between membrane protein and Aldo-keto reductase family 1 member C2 protein. So targeting this conserved binding site with small drug-like molecules would inhibit the interaction which leads to inhibition of SARS-CoV-2 entry into the host cell. In this study we used several potential ligands which were FDA approved pharmaceuticals such as Hydroxychloroquine, Chloroquine, Favipiravir, Colchicine, Remdesivir, Nitazoxanide, Toremfene, Umifenovir were surveyed using PubChem database and its docking studies were done in order to get the best ligand. The docking simulations revealed that Chloroquine and Toremfene have high binding energy with SARS CoV 2 wild type and mutant E protein of SARS CoV 2 Omicron variant. This *insilico* data gives insights to test these high binding compounds in *invitro* studies to prove its efficacy and these pharmaceutical compounds are a potential alternative in the future for a novel drug development to treat several emerging variants of SARS CoV 2.
Keywords:Hydroxychloroquine, SARS CoV 2, Aldo-keto reductase

Won Third Prize

Deepa Mohan

Bioprospecting of Cow Dung Microflora As Plant Growth Promoting Microbes

Deepa Mohan[2] & Jaseela F[1]

[1]Assistant Professor, Department of Botany, Maharaja's College, Ernakulam
(jesialmanar@gmail.com)

[2]Research scholar, Department of Botany, Maharaja's College, Ernakulam
(deepamohan1818@gmail.com)

Abstract

Healthy lifestyle begins with healthy diet. The ever growing population demands increased food production. To meet the target yield, crops require a comparatively higher nutrient input. Relative proportion of the harvest will also be affected by the pathogens. This results in extensive fertilization of soil and application of pesticides in an uncontrolled manner. This extreme use of chemical fertilizers and pesticides is an existing threat to food safety and has adversely affected the soil microbiota. An environment friendly sustainable agriculture is a pressing priority to guarantee quality food for all. The use of Plant Growth Promoting Microbes (PGPM) as biofertilizers and biocontrol agents is very vital to this endeavour. PGPM are the beneficial microbes that actively colonize the root zone and maintains a positive relationship with the plants. PGPM improves the natural nutrient cycling capacity of the soil, thereby enhancing the nutrient availability and also ensures efficient use by the crop. PGPM also act antagonistically against plant pathogens. They can effectively minimize the fertilizer input, pesticide application and inimical environmental implications that came up from the incremental use of the chemicals. Cow dung, an excrement of herbivorous bovine animals, is a constantly available and cheapest bioresource on the Earth. Application of cow dung for plant growth promotion is a living tradition in India. Cow dung retains and attracts its own microflora that offers favourable agricultural traits. Therefore, better understanding about the cow dung microorganisms involved in plant growth promotion is the need of the hour. Multidisciplinary research for isolation, identification and bioformulation of cow dung PGPM involved in plant growth promotion, biocontrol of pathogens, biofertilization, plant-microbe and microbe-microbe interaction is very significant as we move towards sustainable agriculture. This studyfocuses on the possible application of cow dung PGPM and its significance as we move towards an ecofreindly crop production.

Keywords: Plant growth promoting microbes (PGPM), Cow dung, Sustainable agriculture, Biofertilizer, Biocontrol

Won Excelsior Award

Feba P. B.

Diversity and determination of atmospheric heavy metals using lichen species in Eloor-Edayar industrial belt, Ernakulam, Kerala

Feba P.B.

Department of Botany; Maharaja'sCollege, Ernakulam, Kerala-682011, India.
*E-mail Id:febapb@gmail.com

Abstract

Eloor-Edayar industrial beltwas declared as the toxic hotspot and Kerala's largest industrial cluster. So far, no studies have been undertaken on the impact of environmental pollution on lichens from Kerala. The study aims to characterize the epiphytic lichens and thereby evaluate the pollution sensitive and pollution tolerant species in the study area, to determine the biomonitoring capacity through active as well as passive methods, and analysis of heavy metal accumulation in lichens. The study area was divided into 4 zones of concentric circles with Edayar area as the central point. A survey was conducted in the Eloor –Edayar industrial area to determine the diversity of lichens in the polluted study area. To assess the air quality in the study area, lichen transplanting technique was employed. Foliose species like *Parmotrema tinctorum* and *P. indicum* were transferred to the test area and exposed for 28 days. The accumulation of four heavy metals such as Cu, Zn, Pb, and Cd was analyzed by using atomic absorption spectrophotometer. Chlorophyll degradation and chlorophyll stability index were also analysed.Among the lichens collected from the study area, the species *Dirinariaapplanata, D.picta*and *Pyxinecocoes*were found to be distributed in all the zones indicating their tolerance to atmospheric pollution. From the survey, it was evident that the speciesof*Dirinaria*were more pollution tolerant because of its wide distribution in the study area. AAS results shows transplanted lichens in the outer zone shows the lowest content of metal levels. Peak concentrations of copper(7ppm), Zinc (260.62 ppm), Lead (376 ppm) and Cadmium (13 ppm) in lichens were found at the core zone. From the optical densities obtained, the higher chlorophyll content is detected in control samples while in the transplanted samples of the core zone, the chlorophyll is degraded to a lower level. There exists a general trend of increase in chlorophyll degradation from the outer zone to the core zone.It is clear from the study that air pollution has more existing in the core zone of the study area and could understand the air quality of the study area, diversity of lichens especially the pollution tolerant species in the polluted area and also the physiological responses of lichens. The present study serves as a baseline record regarding the level of heavy metals for conducting biomonitoring studies in the future.**Keywords: Air pollution, Biomonitoring, Chlorophyll degradation, Heavy metals, Industrial area**

Won Second Prize

Aravind P M

Study of the effect of Plant Growth Regulators and UV-C irradiation on callus induction of *Brassica oleracea var. Capitata* and *Brassica juncea*

Aravind P M[1]**&**Jinu John[2]

[1]Department of Biotechnology, CMS College (Autonomous), Kottayam, Kerala-686001, India.

[2]Department of Biotechnology, CMS College, Kottayam
Email Id:aravind05_2022@cmscollege.ac.in, jinu@cmscollege.ac.in

Abstract

Common vegetables like cabbage (*Brassica oleracea var. Capitata*) and mustard (*Brassica juncea*) of family Brassicaceae are major dietary sources of antioxidants and anticancer phytochemicals like glucosinolates. The 70% Ethanolic extracts of the plants screened to identify phytochemicals and analysed antioxidant potential using DPPH scavenging assay. Extract from *B. oleracea var. Capitata* showed higher antioxidant potential than *B. juncea* extract. The study investigates a faster and cost-effective protocol for callus induction and organogenesis by utilizing effect of varying concentrations of Plant Growth Regulators (PGRs) and effect of UV-C radiation in callus development and organogenesis. In both species, hormone compositions; NAA (0.1 mg/L): BAP (1 mg/L) and 2,4-D (0.5 mg/L): BAP (1.5 mg/L) were most effective for rapid shoot proliferation and 2,4-D (0.5 mg/L) alone or with BAP (0.5 – 1.5 mg/L) were most effective for rapid callus induction. Higher concentrations of 2,4-D (>1 mg/L) slowed down the callus induction and higher concentrations of BAP (>1.5 mg/L) reduced or inhibited shoot induction. These effects of PGR concentrations mostly remained effective in explants irradiated with 2 minutes of UV-C light and also in callus subcultures of mustard. However, UV-C irradiation reduced the survivability of cabbage cultures with mature leaf explants to 60% and delayed callus induction for around 5 days in both species. 100% of young hypocotyl explants of mustard survived UV-C irradiation.

Key words: 2,4-D, BAP, NAA, UV-C, Brassicaceae

Won Second Prize

Aveline Feyona Faber

Chitosan Coating as Water Barrier Property of Bag Made from Water Hyacinth

Aveline Feyona Faber*, Anirudh G Nair, Dr.David B Jayasheelan

Department of Microbiology, Nehru Arts and Science College

EmailId :avelinefaber123@gmail.com

Abstract

The increase of plastic waste has become the world's major problem. Every year , 8 million tons of plastic are deposited into oceans which brings severe effects on marine life. Although people have become aware of the plastic waste problem , it is still difficult to get rid of plastic wage in daily life as many conventional products are made of plastic .The idea of using biodegradable materials as an alternative for plastic in making shopping bags has been their such as water hyacinth bags , but when exposed to water they no longer hold their shape and tear apart. Therefore the water barrier properties of the bag should be enhanced. The chitosan which is biodegradable product can be given as a coating to the water hyacinth bag their by increasing water resistance capacity. This study offers solution to the problem of non durability of the paper bags and also an alternative biodegradable material.

Key words: Water hyacinth , Biodegradable, Chitosan

Won Third Prize

Aiswarya P

Piolt Study on the Effect of Waterlogging in the Paddy Fields of Kavalam Panchayath of Kuttanad Taluk and Stress Analysis in Selected Rice Varieties

Aiswarya P & Bhanupriya S
Post-graduate Department of Botany, Sree Narayana College,S.N Puram P.O Cherthala, 688582
Email Id: bhanupriya290@gmail.com

Abstract

A pilot study on the effect of waterlogging in the paddy fields of Kavalam panchayat and on waterlogging resistant paddy varieties from the cultivated fields of Kavalam panchayat of Kuttanad taluk of Alappuzha. And a comparative study to understand the effect of salinity on two different rice cultivars. The study went through Kavalam panchayat based on severe waterlogged areas by GIS mapping. Primary datas were collected through field study which comprises questionnaires to farmers, survey, sight-seeing etc. Secondary datas obtained from panchayat office and Krishi bhavan. UMA D1 is the common rice variety. UMA D1 is efficient and strong with needle like leaf and have only short harvesting period of about 90 to 120 days. It is a commercial dwarf variety. UMA D1 have some sort of waterlogging resistant than other crops. Jyothi, Manuratna and Kanchana are other short duration variety used in cultivation. Most fields have only 'Punja' cultivation. The second cultivation is during July. Madaveezhcha is common during that period as it is rainy season. Major threat of farming is waterlogging caused as result of bund beaching. Farmers in Kavalam demand more effective techniques to prevent bund beaching and crop loss due to waterlogging. On soil analysis, Kavalam field shows acidic pH. NPK concentration needed for rice cultivation are determined through soil test. Soil pH is regulated by adding lime provided by Krishi bhavan. More number of cases and samples need to evaluate for getting significant results.Salinity is a serious concern when soluble salts occur excess in soil or water. Onam and Dhanya are two rice cultivars selected to study the effect of salinity. The rice cultivars are collected from Onattukara Regional Agricultural Research Station, Kayamkulam. Salinity affects the physiology and biochemistry of plants. Salt stressed rice cultivars showed decreased growth rate than normally grown rice cultivars (without salt stress). The total chlorophyll content is decreased in case of salt stressed rice cultivars whereas the total protein content is increased in case of salt stressed rice cultivars. The salt stressed Onam rice variety have increased total carotenoid content than normally grown Onam variety while salt stressed Dhanya variety have low concentration of total carotenoid content than normally grown Dhanya rice variety. The present study suggest that the increased protein content shows some sort of salt tolerance of Onam and Dhanya rice cultivars. It can confirm only by further detailed study through treating two rice cultivars with various concentration of NaCl.

Key words: Kavalam, water logging, salinity, UMA D1, soil pH

Dilna Chandran

Biological efficacy and assessment of dye yielding potential of macro lichens from Western Ghats,India

Dilna Chandran
Department of Botany; Maharaja's College, Ernakulam, Kerala-682011, India.
*E-mail Id: dilnachandran010@gmail.com

Abstract

Lichens are symbiotic association between a photobiont and a mycobiont and the secondary metabolites produced by the mycobiont have many biological properties and colouring property. Based on the current environmental conditions, the products from natural resources are eco-friendly and without harmful side-effects. The present study is to analyse the biological efficacy and dye yielding properties of lichen species *Parmotrema tinctorum, Parmotremasubthomsonii*and *Roccella montagnei*collected from different areas of Western Ghats, India. Antioxidant assay were done in methanol extracts by DPPH free radical scavenging activity method in which, ascorbic acid was taken as standard. Lichen showed considerable antioxidant activity in which *Roccella montagnei*show higher antioxidant activity. Both cytotoxicity and insecticidal property were tested by using lichen in 5 solvents – methanol, ethanol, acetone, chloroform and distilled water along with negative controls. *Artemia salina* cysts, *Aedies aegypti* larvae were selected as experimental organisms in cytotoxic and insecticidal studies respectively. Highest level of cytotoxicity was observed in the case of *Parmotrema tinctorum* in acetone and chloroform extracts with lower LC50 values. Insecticidal activity was high in methanol extracts of *Parmotrema tinctorum* and *Parmotremasubthomsonii*. Dyes were extracted using Ammonia Fermentation Method (AFM) as well as Dimethyl sulphoxide Extraction Method (DEM) and it were experimented on natural fibres like mulberry silk fiber, banana fiber and woolenfiber. The stability and fastness of dye were tested by exposure in sunlight with a definite period of time and washing separately with detergent and shampoo. Most of the colours were stable. Mostly the colours obtained were shades of purple or pink in AFM and shades of yellow or orange in DEM. These results indicate the presence of different secondary metabolites in different amounts in lichens. **Key words: Lichens, Antioxidant, Insecticidal, Cytotoxicity, Dye**

Athira M V

Isolation and characterisation of the endophytic bacteria from the in vitro germinated medicinal plant *Andrographis paniculata*

Athira MV

Department of Botany, Maharaja's College, Ernakulam, Kerala-682011, India

*E-mail Id: athiramvxyz@gmail.com

Abstract

Endophytes are a group of microorganisms that can live inside the plant. It may be bacteria or fungi. They show a symbiotic relationship with the host plant. They promote the growth and development of the plant. Majority of the medicinal plant shows the presence of the endophytes. *Andrographis paniculata* is one of the medicinal plants used to treat diseases like malaria, dysentery and diarrhoea. The bacterial endophytes present in them have a role in the medicinal properties of the plant. Metabolites produced from them have pharmaceutical value. Due to the over exploitation of them, the plant population decreases drastically. A detailed study should be required on the endophytes. For the isolation of them, the plant leaves are used. To confirm the endophytic origin the in vitro propagated plant's leaves are used. Seeds are taken as the explant. Surface sterilised the seeds. Washed with water, detergent and later with running tap water. Then treated with Mercuric chloride and rinsed with distilled water. Seeds germinated in the aseptic condition for the endophytic isolation. Leaves are used. Nutrient agar using as the medium. Morphologically different bacterial isolates are obtained. Pure colonies are obtained by continuous streaking. They are used for further characterisation of the endophytes. Morphological and biochemical characterisation are done. The result indicates that the plant *Andrographis paniculata* contains different types of endophytic bacteria. The metabolites produced by them have medical values. So, these can be used in pharmaceuticals.

Key words: Endophytes, Medicinal plant, Invitro germinated, Morphological, biochemical characterisation

Adithya S B

Analysis of phytochemical composition and antibacterial effect of methanolic extract of *Simarouba glauca* on multidrug resistant uropathogens

Adithya S. B and Ramya R Prabhu

P.G. Department of Biotechnology, Government Arts College, Thycaud P. O., Trivandrum

Email Id: adithyasbgokulam@gmail.com, ramyarprabhu@gmail.com

Abstract

Bacterial infections are responsible for large number of diseases worldwide. The major remedy for this is use of antibiotics, but currently the major threat faced on a global basis is the emergence of antibiotic resistant strains. Most of the disease-causing bacteria are multidrug resistant and possess beta lactam resistance genes. This calls for search of alternative compounds or drugs, preferably from natural sources like plants to combat multidrug resistant bacteria. Such plant-based medicines are widely used and are comparatively beneficial with lesser side effects. The secondary metabolites produced by the plants can inhibit the microorganisms.This study aims for the search of such a plant extract with an antimicrobial effect on antibiotic resistant clinical isolates. We have prepared the methanolic extract of the leaves of the paradise tree, *Simarouba glauca* and studied its antibacterial effect on five clinical isolates namely; *E.coli, Proteus, Enterococci, Klebsiella* and *Staphylococcus,* which are multidrug resistant and are the causative organisms of urinary tract infections. Methanolic extract of *S.glauca*was subjected to phytochemical screening and the presence of metabolites is confirmed by thin layer chromatography technique. The antibacterial effect of the extract upon antibiotic resistant clinical isolateswas studied using standard agar diffusion method. This study demonstrated that the methanolic extract of *S. glauca* leaves possess antimicrobial activity against the clinical isolates and the activity was increased in a concentration-dependent manner. The alkaloids and terpenoids present in the extract might be responsible for the antibacterial activity of the extract. This study is the first of its kind to have demonstrated the effectiveness of this plant extract as a potent antimicrobial agent against the multidrug resistant uropathogens obtained from infected patients. This preliminary study is promising as it would offer a better option for designing of plant-based drugs against such multidrug resistant pathogenic bacteria.

Keywords: S.glauca, methanolic extract, clinical isolates, uropathogens, multidrug resistance

Drishya D.

A systematic review on the Wound Healing plants used by Kani Tribes, Thiruvananthapuram District, Kerala

Drishya D, Cathy Surya, Thomas Antony, Pinkie Cherian, Lekshmi Prakash, Sunija P, Sheethal Raj, Ardra Emilia Jackson
St. Joseph's College for Women, Alappuzha, Kerala-688001, India.

Maharaja's College, Ernakulam, Kerala-682011, India

*E-mail Id: pinkie.cherian@yahoo.co.in

Abstract

Kani tribes use indigenous medicinal plants for different ailment. The present study focus on the literature search of plants used by Kani tribes from Kerala. From the study, scopus indexed, Pubmed and Web of Science indexed journals many medicinal plants are used for wound healing by the tribe were categorized. The plants include *Curcuma longa, Mimosa pudica, Azhadirachta indica, Nigella sativa, Chromolaena odorata, Hemigraphiscolourata*and *Tectona grandis*. These plants were subjected to preliminary phytochemical screening. Majority of plants showed presence of secondary metabolites like Sterols, Tannin and phenolic compound. The study also give a review on the medicinal or biological activity of these plants like anti-inflammatory, anticancer and antimicrobial effect. Thus, it can be concluded that these plants used by Kani tribes are rich with phytocompounds. These phytocompounds have good remedial activity due the presence of active compounds.

Key words: Phytocompound; Kani Tribe: Anti-inflammatory

Kavya Sadan

A Bibliometric Studies on the Pharmaceutical Efficacies of *Rosmarinus officinalis* L.

Kavya Sadan, Jeeshma L. R., Devika J., R. Nisha Nair, Pinkie Cherian*
Department of Botany, St. Joseph's College for Women, Alappuzha, Kerala-688001, India.

*E-mail Id:pinkie.cherian@yahoo.co.in

Abstract

A bibliometric study was conducted to evaluate the pharmaceutical potentialities of *Rosamarinusofficinalis* L. From the Pubmed database, 2800 Journal was downloaded and viewed under Vos Viewer software. The research work from 2014 to 2022 of reputed journal indexed in scopus were evaluated based on the keywords. The result indicated that 79 key words forming 7 clusters having 703 links and total link strength as 709. The cluster 1 shows keywords related to phytotherapy, Romaric acid, cancer, cell signaling and secondary metabolites.Cluster 2 shows the research of Rosemary in relation to human diseases and neuroprotection. Cluster 3 showed the relationship of research to biological activity like antioxidant, anti-inflammatory, antimicrobial and anticancer. Cluster 4 showed 12 keywords having relationship with plant extracts showing antioxidant, better oxidative stress. Cluster 5 showed 9 keywords stressing on essential volatile oil and antimicrobial activity. The cluster 6 indicated 8 items with therapeutic property. Cluster 7 showed 5 items with research done in relationship with anti-oxidant, anti-microbial and gastro-intestinal health. The research done during the year 2014- 2022 significantly stressed the therapeutic property and biological activity of *Rosmarinus officinalis* L.

Key words: Antioxidant, Cancer, PubMed, Volatile oil, Therapeutic

CHEMISTRY

Anjana Anil R A

Antileukemic activity of plant derived compounds from *Artocarpus Heterophyllus* and *Artocarpus Communis* using molecular docking

Anjana Anil R A[1],Barakala Pushpa[1]*, Gigin Pullemkunnel[2]
[1]Post Graduate Department of Chemistry, St. Joseph's College for Women, Alappuzha (affiliated to University of Kerala), Convent Square, Alappuzha-688001, Kerala, India
[2]UniBiosys Biotech Research Labs, Kochi-682022, Kerala, India

E-mailId: pushpa@stjosephscollegeforwomen.ac.in

Abstract

CML is one of the dangerous cancers in the world, with only 22% survival rate. BCRABL protein is responsible for CML. *Artocarpus heterophyllus* and *Artocarpus communis* are common among the premises of south Asia. Several components with medicinal properties are present from top to bottom of these plants 20 different ligands from these plants were used for molecular docking with BCR-ABL protein. Autodock 1.4.6, Autodock 4 &Autogrid 4 were used for docking studies. Chemsketch, Pubchem, Chemspider, keggdatabase, Rcsb-pdb, chimera were the softwares that aided the docking studies. Among the 20 ligands five shows better binding energy with the protein. This can be used as a lead for further studies of CML. Softwares such as Molsoft and SWISS ADMET were used to check the drug likeness, Lipinski rule and ADMET. Among the 20 ligands selected Isoartocarpin, Isobavachalcone, Artocarpanone, Albanin A, Isobavachromene show better binding affinity towards BCR-ABL protein that is responsible for CML. All of these ligands possess drug likeness. They can be used as a lead drug against CML.

Keywords: CML, Cancer, Protein, Docking

Won Third Prize

Akhila Pillai

Molecular docking studies of selected antiviral drugs for COVID 19 targeting nsp12 protein

Akhila Pillai[1],Barakala Pushpa[1]*, Gigin Pullemkunnel[2]
[1]Post Graduate Department of Chemistry, St. Joseph's College for Women, Alappuzha (affiliated to University of Kerala), Convent Square, Alappuzha-688001, Kerala, India
[2]UniBiosys Biotech Research Labs, Kochi-682022, Kerala, India

E-mail Id: pushpa@stjosephscollegeforwomen.ac.in

Abstract

Covid19 which is declared as the global pandemic by WHO caused by the SARS-COV-2C virus. It had taken away millions of lives for the past two years by spreading among the humans through three variant waves, till now an appropriate drug is not invented against it. Several studies are still being carrying out in the corners of the world in order to find an apt one. Molecular docking is one among them. In our docking studies,17 ligands are selected from different journals and the particular protein responsible for this disease is nsp12.Several softwares such as PubChem, KEGG pathway, chemsketch, Autodock tool, open babel etc. helped our docking process. Docking studies are carrying out using this target protein and the 17 receptor ligands. Among these five ligands having better binding energy and thus they can be considered as potential lead molecules against Covid19 virus for carrying out further studies. Since an effective and appropriate drug is not yet found that completely cure covid-19, hence this study is more relevant in the current situation.

Keywords: COVID 19, SARS CoV2C, nsp12

Won Excelsior Award

Elsa P Magdhalin

Identification of *Annona muricata* derived compounds as potential lead by *in-silico* molecular docking approach for Glioma

Elsa P Magdhalin[1],Barakala Pushpa[1]*, Gigin Pullemkunnel[2]
[1]Post Graduate Department of Chemistry, St. Joseph's College for Women, Alappuzha (affiliated to University of Kerala), Convent Square, Alappuzha-688001, Kerala, India
[2]UniBiosys Biotech Research Labs, Kochi-682022, Kerala, India
Email Id: pushpa@stjosephscollegeforwomen.ac.in

Abstract

Glioma is a kind of tumor usually develop in brain and can also grow to spinal cord insidiously. Sometimes fast growth of this tumor is also discernible. As this can affect both adults and children there is no any difference in their egregious effects on affected people. Astrocytomas Ependymomas, and Oligodendroglioma are different kinds of gliomas on the basis of their histological appearance. Annona muricata (GRAVIOLA) is a worldwide known medicinal plant that have strong anticancer effect on different kinds of cancers. The present study is intended to carry out molecular docking interactions with the compounds derived from Annona muricata and corresponding protein of glioma. Twenty Annona muricata derived ligands were subjected to docking. The targeted protein used for docking is EGFR. The protein ID is obtained from PDB. KEGG pathway is utilized for the identification of protein. The different structure of plant derived ligands procured from Chem Spider and the drawing of structures has completed by make use of tools like Chem Sketch. Auto Dock was used for docking. visualization is done by using UCSF chimera and studied the properties using Swiss ADME. Among the 20 ligands used for docking 5 ligands exhibit least binding energy than the others indicating that they are druglike and act as a potential lead. Coclaurine, Annocherine B, Dielsinol, Cliestopholine, and Dielsiquinone shows low binding energies.

Key words: Docking, *Annona muricata,* Glioma

Shilpa A S

Molecular docking studies on *Passifloracea incarnata* as a potent natural therapeutic agent against breast cancer

Shilpa A S[1],Barakala Pushpa[1]*, Gigin Pullemkunnel[2]
[1]Post Graduate Department of Chemistry, St. Joseph's College for Women, Alappuzha (affiliated to University of Kerala), Convent Square, Alappuzha-688001, Kerala, India
[2]UniBiosys Biotech Research Labs, Kochi-682022, Kerala, India

EmailId: pushpa@stjosephscollegeforwomen.ac.in

Abstract

Breast cancer is most commonly caused in women and it is more reported in U.S. Breast cancer can be treated in the early stage. This type of cancer is orginated from breast tissue due to the inner lining of milk ducts. The main aim of this study is to dock the 20 ligands of *Passiflorarace* family with a protein associated with breast cancer. Several tools such as ChemSpider, Pubchem, were used to find out the structure of ligands. Chemsketch software were used to draw the structure of ligands. The protein associated with breast cancer named BRCA2 were collected by using KEGG Pathway.BRCA2 is a protein which decreases the uncontrolled growth of tumors in Breast Cancer and regulate the DNA. Autodock 1.5.6 were used to study the docking score. Among 20 ligand taken five of them shows a better binding energy. Edulan I shows a minimum binding energy of +10.05 with run 2.The results of the present study indicated that Edulan I can be used as a lead for the treatment of breast cancer in future.

Keywords: Breast Cancer, Passifloracea, BRCA2, Edulan I

Won Second Prize

Siyona E S

A Study on drug repurposing with selected molecules for HIV treatment using T-Cell surface glycoprotein CD_4 as target protein for docking

Siyona E S[1],Barakala Pushpa[1]*, Gigin Pullemkunnel[2]
[1]Post Graduate Department of Chemistry, St. Joseph's College for Women, Alappuzha (affiliated to University of Kerala), Convent Square, Alappuzha-688001, Kerala, India
[2]UniBiosys Biotech Research Labs, Kochi-682022, Kerala, India

EmailId: pushpa@stjosephscollegeforwomen.ac.in

Abstract

HIV (Human Immunodeficiency Virus) is a virus that affects body's immune system and deplete the immunity power. In this present study, molecular docking is performed to get a desirable antiviral drug by the docking of an antiviral ligand with a target protein. T-Cell Surface glycoprotein, CD4 is selected as the target protein in this study. Twenty antiviral ligands were selected for the docking process. The antiviral ligands selected for this present study are Braco-19, sofosbuvir, c-exNDI, pds, pdp, gleevec, qav680, navarixin, caffeine, lopinavir, abacavir, mexiletine, guanadrel, resiquimod, doxycycline, cipargamin, darunavir, tcmdc125163, oseltamivir, esmolol. Among these ligands, five ligands of lowest binding energy were selected. They are; qav680, doxycycline, cipargamin, darunavir, resiquimod. The molecular docking studies provides detailed information about the drug-receptor interaction and has created a new rational approach to drug design and development. QAV-680 is suitable for the molecular docking with the target protein T-cell surface glycoprotein CD_4. This QAV-680 is an antiviral ligand which is used in the treatment of Asthma, Allergic Rhinitis and Seasonal Allergic Rhinitis. Hence from this study we can says that, an anti-viral ligand which is used in the treatment of the disease namely Asthma, Allergic Rhinitis and Seasonal Allergic Rhinitis can also be used in the treatment of the disease HIV.

Keywords: Human immunodeficiency virus (HIV), T-cell surface glycoprotein CD_4, QAV-680

Molecular Docking of UCH-L1 Using Plant Derived Natural Ligands: An Investigation for The Management of Parkinson's Disease

Swathi Lekshmi C[1],Barakala Pushpa[1]*, Gigin Pullemkunnel[2]
[1]Post Graduate Department of Chemistry, St. Joseph's College for Women, Alappuzha (affiliated to University of Kerala), Convent Square, Alappuzha-688001, Kerala, India
[2]UniBiosys Biotech Research Labs, Kochi-682022, Kerala, India

* E-mail: pushpa@stjosephscollegeforwomen.ac.in

Abstract

Parkinson's disease is the second most common neurodegenerative ailment, is becoming more and more prevalent and poses a series threat to the aged population. Evidences from studies suggests that multifactorial oxidative neurodegeneration plays a role in Parkinson's disease. With its high concentrations of neuromelanin, polyunsaturated fatty acids, iron and dopamine that can be oxidised as well as its rapid metabolic rate and insufficient antioxidant complement, the SNpc is particularly susceptible to oxidative injury. UCH-L1 is the selected protein, which is present in brain causes Parkinson's disease due to its increases in oxidative stress. Since Protein-Ligand interactions play a key role in structure-based drug design, therefore in this study 19 ligands were chosen for molecular docking. These ligands are obtained from some of the medicinal plants such as *Gingko biloba, Nerium oleander, Amaranthus viridis.* Protein Data Bank and KEGG Pathway are used for collecting 3-D structures and properties of targeted proteins. Software like ChemSpider, PubChem are used for retrieving physical and chemical properties with molecular structures.Among the 19 ligands selected 5 of them show better binding energy with the protein receptor: Allicin, Ethyl gallate, L-dopa, Beta-eudesmol, Gingerol were the ligands whose shows lowest binding energies, -6, -3.98, -1.76, +3.43, +7.30 respectively with protein. They obey Lipinski rule of five also possess ADMET properties. These ligands from plant derived phytocompounds can be used as lead drug compound against Parkinson's disease. **Keywords: Parkinson's Disease, UCH-L1, Allicin, Ethyl Gallate**

Varsha Chandran

Molecular docking of Ebola viral protein, vp35 using selected antiviral drugs

Varsha Chandran[1],Barakala Pushpa[1]*, Gigin Pullemkunnel[2]
[1]Post Graduate Department of Chemistry, St. Joseph's College for Women, Alappuzha (Affiliated to University of Kerala), Convent Square, Alappuzha-688001, Kerala, India
[2]UniBiosys Biotech Research Labs, Kochi-682022, Kerala, India

Email Id: pushpa@stjosephscollegeforwomen.ac.in

Abstract

Ebola virus (EBOV) is a single stranded negative sense, RNA virus belongs to the Floviridae family and it is a severe type of haemorrhagic fever due to Ebola virus. It is an immune destroying disease. Initial symptoms like high temperature, throat pain, body pain which similar to normal flu. The first outbreak was found in 1976 and again it was found in 1994. In this work, VP35 protein is selected as target protein. 20 antiviral ligands are found out and retrieved from the software such as pubchem, chemspider or drugbank. Then the selected protein VP35 is downloaded from RCSB, PDB. Then the selected target protein is docked with antiviral ligands using software such as autodock, autogrid. And also 20 ligands were used in this work. Docking of VP35 was done with several ligand compounds. The ligands are apigenin, rutin, luteolin, chrysin, chloroquine, donepzil, tetryzoline, forodesine, isoquercetin, permethrin, tretamine, artenimol, amodiaquine, dapsone, doxycycline. Among these ligands apigenin, rutin, luteolin, donepezil, artenimol are selected based on Lipinski rule & drug-likeness score. They obey Lipinski rule of 5 and drug-likeness score. All shows lipinksi 0 violation. Among these antiviral ligands, five of ligands which show better binding energy compared to other. They are apigenin, luteolin, donepezil, chrysin and artenimol.

Keywords: Ebola Virus, Antiviral, Docking

Won Excelsior Award

Achutha S

Neem oil incorporated biodegradable polymer film for food packaging application

Achutha S[1], Kumari Nisha S [2]*

[1]Post Graduate Department of Chemistry and Research centre, Sanatana Dharma College (affiliated to University of Kerala), Alappuzha, Kerala, India-688003
[2] Post Graduate Department of Chemistry, St. Joseph's College for Women, Alappuzha, Kerala-688001, India.
E-mailId:s.nishabijoy@gmail.com

Abstract

Azadiracta indica(neem) is well known for its antimicrobial properties. This property of neem oil finds application in the field of food packaging. In the current study, a polymer film made up of poly vinyl alcohol was synthesized via solvent casting method. In order to bring antimicrobial property to the polymer film neem oil extracted from neem seed is incorporated into the polymer matrix during film preparation. The antimicrobial property of the synthesized film is evaluated by comparing the fungal growth on a piece of bread covered with this film and other covered with ordinary plastic packaging. It was observed that the synthesized film could delay the formation of fungus on the bread piece, therefore finds application in active packaging. To confirm the antimicrobial property of the film the activity of the film was tested against microorganisms like *Aspergillus niger, Rhizopus, Pseudomonas aeruginosa and Escherichia coli.* Results confirmed that the polymer film impregnated with neem oil showed antibacterial and antifungal activity against the tested organisms. **Keywords: Antifungal, Neem Oil, Food Packaging, Polymer**

Won Excelsior Award

Dr Shamsheera K O

Inhibitory effect of guar gum and synergistic ionic surfactant additives for mild steel corrosion in 0.5M HCl

Dr. Shamsheera K. O[1], Abraham Joseph[2]
[1]Department of Chemistry, KAHM Unity Women's College, Manjeri, Kerala, India.

[2]Department of Chemistry, University of Calicut, Kerala, India.

Email Id: drabrahamj@gmail.com

Abstract

The corrosion inhibition effect of Guar Gum (GG) on mild steel in 0.5 M HCl solution was evaluated at different concentrations and temperatures using weight loss, electrochemical impedance spectroscopy (EIS), potentiodynamic polarization (PDP), scanning electronmicroscopy (SEM), atomic force microscopy (AFM) and quantum chemical analysis. Inhibition efficiency was found to increase with increase in concentration of GG but decreased with increasing temperature. Inhibitory effect of GG mixed with minimal concentration of ionic surfactants, Sodium dodecyl sulphate (SDS) and cetyl pyridinium chloride (CTAB) was also evaluated. GG gets adsorbed onto the mild steel surface via mixed type adsorption. Ea, ΔH, ΔSandΔG◦ads, the thermodynamic and activation parameters, were calculated and discussed. Adsorption of inhibitor on the steel/solution interface follows Langmuir adsorption isotherm. EIS suggests formation of protective layer over the carbon steel surface. Results of different experimental techniques pertaining to the inhibitory effect of GG and GG mixed with surfactants are in good agreement with theoretical quantum chemical investigation.

Key words: Guar Gum, Surfactants, Mild Steel, Corrosion inhibition, Non-Electrochemical and Electrochemical

Won Second Prize

Kajal Francis

Green synthesis of silver nanoparticles using Banana stem extract and its application

Kajal Francis[1], Barakala Pushpa[1], Ramya K[1*]
[2] Post Graduate Department of Chemistry, St. Joseph's College for Women, Alappuzha, Kerala-688001, India.
E-mailId: ramysbraj@gmail.com

Abstract

Banana tree is traditionally used as a medicinal plant and. This work aimed to prepare silver nanoparticles (AgNPs) using the ethanol extract from *banana stem* and test different biological activities. Fresh banana stem grinted and were subjected to extraction using ethanol, and this extract was used to synthesize AgNPs. AgNP synthesis was monitored by the change in color, UV spectrophotometry. Fourier transform infrared (FT-IR) spectroscopy was used to monitor the functional groups in the extracts. antibacterial, and insecticidal potentials of the extract and its prepared AgNPs were tested. AgNPs, is biologically safe on animal cells and has antibacterial, insecticidal, potentials.

Keywords: Nanoparticles, Green synthesis

COMMERCE

Won Excelsior Award

Aleena Maria Zacharia

Entrepreneurial Innovations and Public Acceptance: A Comparison of Rural and Urban Areas of Alappuzha District

Aleena Maria Zacharia[1], Nikhil. P. Kattatt[2]

[1] Assistant Professor on contract, [2] Assistant Professor on contract

[1, 2] Department of Commerce and Management, St. Michael's College, Cherthala, Kerala 688539, India

E-mailId: zaleenam1@gmail.com, nikhilpkattatt@gmail.com

Abstract

Entrepreneurship is the pursuit of opportunity beyond the resources controlled. It contributes to the overall development of the society it belongs to. Choosing a location is one of the mostimportantfactors while starting a business and success depends on public acceptance. Innovations bring changes to society which contributes to their betterment. The public should be ready to accept the changes. Reluctance to change can stag their development. Hence, the research study sheds light on why geographical regions tend to vary in terms of entrepreneurial activity. Thus, the study focuses on identifying the implication difficulties of entrepreneurial innovations in rural areas compared to urban areas. The study primarily aims to analyze the difference in perceived levels of the rural and urban public toward business innovations. The research also aims in identifying the factors affecting the acceptance of entrepreneurial innovations in rural and urban areas. The data supporting the study is collected from an equal proportion of the rural and urban public. The findings of the study thus imply that there exists a difference in the acceptance of new business ideas between rural and urban areas. The main reason may include living style differences between the two with cultural differences, spending behavior, traditional mindset, etc., contributing to it.

Keywords: Entrepreneurship, Innovation, Business Culture, Public Acceptance

Excelsior Award

Krishna Babu

India Post Payment Bank services: An Analysis on its Effectiveness

Krishna Babu, Helga Joseph

Guest Faculty, Department of Commerce and Management, St. Michael's College, Cherthala, Kerala 688539, India

Email Id: krishnababu2997@gmail.com, helgajoseph1996@gmail.com

Abstract

In the recent years India Post has entered into core banking services and provides all types of banking services like commercial banks. While its services are available to all citizens, the IPPB primarily focus on serving social sector beneficiaries, migrant labourers, un-organised sector, Micro Small and Medium Enterprises (MSME's), Low- income households in rural and urban areas. The research study shed light on the capability of India Post as a Postal Bank in rendering the banking and financial services .The study primarily aims at understanding the awareness among customers about services of India Post Payment Banks. The research also aims at identifying the level of satisfaction about the various services and the most preferred and dominant banking service provided by India Post Payment Bank. The data supporting the study is collected from residents of the Cherthala Taluk. The finding of the study implies that the customers are aware about the services rendered by India Post Payment Banks and are satisfied with the various services.

Keywords: **India Post bank, banking services**

~~Corporate Social Responsibility~~

Priya R&**Anantha Krishnan M***
Assistant Professor in Commerce, *Post Graduate Student
Sanatana Dharma College, Alappuzha

EmailId : priya.r@sdcollege.in, ananthakrishnanm706@gmail.com

Abstract

"Creating a strong business and building a better world are not conflicting goals – they are both essential ingredients for long-term success" –Bill Ford. Corporate Social Responsibility (CSR) is a form of business self-regulation which aims to contribute to societal goals of a philanthropic, activist, or charitable nature by engaging in or supporting volunteering or ethically oriented practices. CSR is local community intended and inclusive. The study aims to provide a brief analysis of CSR practices of automobile industry in India and also to find explanation to the key trends in Indian Automobile Industry and CSR practices. This study fully based on Secondary data. CSR plays a crucial role in both the development of automotive companies and the development of economy. This study focus on 'Triple Bottom Line' also known as People, Planet and Profit. People refers to fair labor practices, the community and region where the business operates. Planet refers to sustainable environmental practices. Profit is the economic value created by the organization after deducting the cost of all inputs. The study provides a detailed analysis of the impact of Corporate Social Responsibility in automobile industries. It shows how CSR helpful for automobile companies such as Maruti Suzuki, Tata Motors, Hero Motor Corp, Mahindra & Mahindra, Honda Motor Company. This study is also helpful to know how CSR issues can affect product innovation in an automobile industry.

Keywords: **Automobile industry, Corporate Social Responsibility, Economic value Sustainable business practices, Triple Bottom Line**

Won Excelsior Award

Vishuja V

Innovative Entrepreneurship In Kerala -Evidence From Trivandrum District

Vishuja[1].,Suleena V S [2,]
[1]Research Scholar, Institute of Management in Government (IMG)
Thiruvananthapuram, Kerala, India
[2]Dr.Suleena V.S, Associate Professor and Head, Department of Commerce, St. Joseph's College for Women, Alappuzha and Research Supervisor Institute of Management in Government (IMG), Thiruvananthapuram, Kerala, India
E-mail id: vvishuja@gmail.com, drsuleenavs@gmail.com

Abstract

In recent years, Kerala government initiated a number of programmes for the promotion of innovation and entrepreneurship development among the people in the State. The available literature reveals that employment opportunities have been created in the field of travel and tourism industry, handicrafts, food industry, textile industry and other small scale industrial sectors. The study aims to understand the present status of employment opportunities opened through innovative entrepreneurship in Kerala State. Moreover, the study tries to examine the reasons for the success and failure of innovative entrepreneurs in Thiruvananthapuram district. The present search mainly depends on primary and secondary sources of data. Five entrepreneurs each from tourism, food and textile industry have been selected randomly from Thiruvananthapuram districts. Data have been collected through a structured questionnaire. The method of study includes review of literature, focus group discussion, case studies and telephonic interview. The reasons and failure of innovative entrepreneurship have been drawn from the case studies and sample surveys. The study reveals that inclusion innovative ideas plays a crucial role in the success behind the entrepreneurship development in the district.

Key words: Entrepreneurs, Entrepreneurship Development, Innovation, Textile, Tourism

Akhil Menon

A Study On The Adoption Of Digital Marketing Initiatives By Small Travel Agencies:- Evidence from Kerala

Akhil Menon

Research Scholar, Institute of Management in Government, University of Kerala.
*E-mail Id: menonakhil95@gmail.com

Abstract

In developing countries, the adoption of internet and various digital marketing tools have been slow. Since much of the population also lacked technological literacy, the use of digital marketing means in business was scarce. Towards the end of last decade, the business environment had become very competitive by the entry of more players to the tourism industry. This have indeed created survival challenges for small travel agencies which mostly operated at a local nature to survive the competition. Thus today many have been left with no options, but to integrate digital marketing practices in their business. This study therefore attempts to understand the adoption of digital marketing techniques by small travel agencies, the popular digital platforms used by the agencies and the perceived challenges faced by the agencies for adoption. This study becomes all the more important, as the perspectives of such entities fail to gather much attention among the academic community.

Key words: Digital marketing, Small travel agencies, Technology, Kerala

Won Excelsior Award

Malavika A

The Role of Food Handlers in Moulding Purchase Intention of Consumers with Special Reference to Alappuzha

Malavika. A & Vishnu KV,

Guest Faculty,Department of Commerce, Santana Dharma College, Alappuzha, Kerala-688003, India

E-mail Id: malavikaprasad01@gmail.com,vishnuvenugopalaranattu@gmail.com

Abstract

This study was conducted to know the role of food vloggers in creating purchase intention among the viewers. The Covid-19 pandemic has increased the popularity of food vlogs among digital citizens. The efficiency of incorporating influencer marketing in the food industry can be identified by studying the viewer's responses and reactions to food vlogs. The sample size for the present study is fixed at 150. Statistical tools like simple percentage analysis and Karl Pearson's correlation coefficient are used.

Keywords: Influencer marketing, Food Vlogging, Covid-19 Pandemic, Kerala, Alappuzha

Business Model: A Fundamental Study

Vishnu Govindan

Vishnu Govindan & Suleena V S

Research Scholar

Institute of Management in Government, University of Kerala

EmailId: vishnugovind001@gmail.com

Abstract

Over the years, business models have now been much better established. A business model establishes the framework for economic, social, cultural and other background to create, apply and capture value. The way business models are developed and updated is also referred to as business model innovation and is a business strategy. The term ' business model' has over the years been misunderstood and misused, and was therefore confused and applied to practitioners and university professionals alike. It is often confused with other popular terms, such as strategy, business concept, sales model or even management literature business process modeling. This paper attempts to clarify the meaning and use of the picture of the business model as well as to theorize its philosophical basis, based on a resource-based view and the cost economy of transactions.

Key words: business models, business strategy, sales model, economic model

Won Excelsior Award

Grace Abraham

A Study On Agricultural Insurance with Special Reference to Kainakary Panchayat of Alappuzha District

Grace Abraham, NeenaLaisa Sebastian, Angel Antony, AmithaShaji, Gopika K. B

Department of Commerce, St. Joseph's College for Women, Alappuzha, Kerala – 688001, India

E mail Id: graceabrahampg@gmail.com

Abstract

This research work is focused on ascertaining the awareness of agricultural insurance among paddy farmers, to find the problems faced by them in availing agricultural insurance and to arrive at necessary suggestions and recommendations regarding the problems. The study found out that 94.66 percent respondents out of the 75 respondents chosen for the study have heard about agricultural insurance. It takes a long time to settle the claims. The government is often slack in contributing their share of premium. The loss of an individual farmer is insignificant as loss is assessed on a wide area basis. Only 4 percent of the respondents were of the opinion that agricultural insurance helps to cover up their crop losses. The most prevalent reason why farmers discontinue farming is that income from agriculture is not always enough to meet the needs of the family. It was suggested that young farmers who achieve a certain level of production with regards to their land holding should be given special trainings and foreign collaborations to make the sector more attractive. The government should take steps to settle claims as soon as possible. **Key words: Agricultural Insurance, Claim Settlement, Crop Loss**

Won Second Prize

Alby Sebastian

Women Entrepreneurship in India: Obstacles and Opportunities

Alby Sebastian

BCom TAX, Carmel College

Abstract

Women Entrepreneurship plays a prime role in industrial development. India has always been a land of entrepreneurs and also occupied a strategic position in the Indian economy. Women are generally perceived as home makers with little to do with economy or commerce. The topic of women in entrepreneurship has been largely neglected both in society in general and in the social sciences. Not only have women lower participation rates in entrepreneurship than men but they also generally choose to start and manage firms in different industries than men tend to do. The transition from homemaker to sophisticated business woman is not that easy. But this picture is changing. In Modern India, more and more women are taking up entrepreneurial activity especially in micro, small and medium scale enterprises. Women across India are showing an interest to be economically independent. Gender equality and economic development go hand in hand. Though the entrepreneurial process is the same for men and women, there are however, in practice, many problems faced by women, which are of different dimensions and magnitudes, which prevent them from realizing their full potential as entrepreneurs. The purpose of this study is intended to find out various motivating and de-motivating internal and external factors of women entrepreneurship. It is an attempt to quantify some for non parametric factors to give the sense of ranking these factors. It will also suggest the way of eliminating and reducing hurdles of the women entrepreneurship development in Indian context.

Keywords: Women Entrepreneurship, Economy, Internal Factors, External Factors

Won Third Prize

Krishnanand JB

Cryptocurrency

Krishnanand JB &Gopikrishnan V

BCom CA, Carmel College, Muhamma

Abstract

Cryptocurrency, an encrypted, peer-to-peer network for facilitating digital barter, is a technology developed eight years ago. Bitcoin, the first and most popular cryptocurrency, is paving the way as a disruptive technology to long standing and unchanged financial payment systems that have been in place for many decades. While cryptocurrencies are not likely to replace traditional fiat currency, they could change the way Internet-connected global markets interact with each other, clearing away barriers surrounding normative national currencies and exchange rates. Technology advances at a rapid rate, and the success of a given technology is almost solely dictated by the market upon which it seeks to improve. Cryptocurrencies may revolutionize digital trade markets by creating a free flowing trading system without fees. A SWOT analysis of Bitcoin is presented, which illuminates some of the recent events and movements that could influence whether Bitcoin contributes to a shift in economic paradigms.

Keywords: Cryptocurrency, Technology, Barriers, Digital Trade

ENGLISH

Won Excelsior Award

Dr. Neethu Das K

Theatre as a Space of Resistance and Protest: Queer Politics and Colour of Trans 2.0

Neethu Das. K
Assistant Professor, Dept. of English
St. Joseph's College for Women, Alappuzha – 688 001
E-mailId: neethudas1992@gmail.com

Abstract

The proposed paper discusses the Indian play, *Colour of Trans 2.0* (2014) by Panmai theatre which exhibits certain testimonial, documentary and postdramatic features, as a contemporary example of queer activism on Indian stage. The play was performed by three transgender activists, Living Smile Vidya, Angel Glady and Gee ImaanSemmalar, who are very active in Indian public sphere. Panmai, which identifies themselves as "a space for excluded" is the first trans theatre group in India. All three of them are professionally trained performers who have significant roles in the history of queer movements in India. The performance text of the play got developed after a series of discussions among the performers and was further improvised after each performance. The play effectively narrates the lives of transgender community in India through their testimonies and by making use of documentary techniques like screening film clippings and newspaper cuttings. The narrative of the play primarily focuses on the episodes of gender identity, heteronormative society's expectations on body, gender affirmation surgery, social ostracization and abuse faced by the transgender community. The play also posits the body of the transgender performer as a cultural site which embodies the resistances against the pressures put forth by the heteronormative society. The traditional idea of body as the cisgendered perfect female/male body by the heteronormative spectator is subverted in the play by presenting the performativity of the trans body. Some of the key aspects of the play which conveyed the momentum of queer activism on theatre include the conversational style implied in the monologue of the performers, the techniques of postdramatic theatre used in the structure and the deliberate exhibition of the nude trans body. The play elevates the space of theatre as a platform of politics through its postdramatic framework and the politics of corporeality it presents.

Keywords: Queer, Trans body, Indian Queer theatre, postdramatic theatre, resistance

Won Excelsior Award

Navaneetha Suresh

Re-imagining the Bacon on My Plate: Analyzing 'Sustainable' Meat Production and Consumption through the Movie, *Okja*

Navaneetha Suresh
Birla Institute of Technology and Science–Goa, NH 17B, By Birla Institute of Technology and Science–Goa, NH 17 Bypass, Road, Zuarinagar, Sancoale, Goa 403726
E-mailId: p20190064@goa.bits-pilani.ac.in

Abstract

Kerala is discussing the moral and ethical dilemmas of killing and culling the street dogs left, right and centre. While animal lovers and animal rights activists would argue for the inherent value of stray dogs, the notionofour different/ indifferent approach to different species of animals keeps me glued to the discussion. Humanshave always tried to categorize different animal species and value them according to their use for us. Forexample, 1) 'Pets', 2) 'Domestic animals' 3) 'Wild Animals' etc. Humans have strictly maintained these dividesand augmented the borders of these categories to preserve human exceptionalism and consumption. In thispaper, I would like to analyze a Netflix original movie, *Okja* (2017) directed by Bong Joon-Ho. *Okja*portraysthe relationship of Okja-a genetically engineered super pig and her caretaker Mija, a teenager living in themountains with her farmer grandfather who keeps Okja for the Miranda Corporation, an agribusiness firm. Themovie also reveals the evils of livestock companies and meat production. Okja is an animal that evades theaforementioned strict categories as it possesses characteristics of each. It is wild, a pet and also belongs to thecategory of a domestic animal. The paper would analyze how humans deal with animals which blur theboundaries. The agribusiness firm, Mirando Corporation and its CEO Lucy Miranda advertise for a 'sustainable'meat production and consumption and advocate for the need to minimize the carbon footprint of the same. Theyuse the 'sustainability tag' for anything but their own benefits and to gain the support of animal rights activists. Iwould look into the reality of the 'sustainable' meat production in today's world and argue that 'sustainability','ecological consciousnesses' etc. are taglines for business firms to augment their sales. **Keywords: Meat production and consumption, animal rights, human-animal relationship, ethical and moral rights of animals**

Won Second Prize

Richa Varghese

Behind the Anonymous: A Foucauldian Study of Power in Select Indian Trolls

Richa Varghese

Research Scholar, Department of English, St. Thomas College, Kozhencherry, Pathanamthitta, Kerala- 689641 E-mailId: richavarghese2020r@stthomascollege.info

Abstract

Power has always been a term of constant debates and critical explorations. The ever- evolving theoretical investigations centred around 'power' makes it nearly impossible to provide an all- encompassing definition for the concept. Besides, as history and socio-cultural contexts mature there is a demand to reconsider perspectives. Power has, traditionally, been associated with a central source of authority. But when authoritarian systems fail to meet the popular needs the majority assumes power. This phenomenon paved the way for political trolls which target power structures and acquire power through ridicule. Thus, a power coming from the below is directed against a power coming from the above. Trolls are, primarily, forms of satire that aim at social change. India, being a democracy, offers plenty of opportunities for the growth of trolls in that people from diverse backgrounds gather at a common point and deliberate freely. The paper examines the elements of power in Indian political trolls and attempts to seek how it differs from the already existing notions of power. Drawing upon the French philosopher Michel Foucault's propositions on power the paper tries to maintain that trolls elicit a decentralized sort of power where it becomes difficult to locate the exact sources of power due to its anonymity. When trolls act as digital panopticons which put individuals and their activities under surveillance masking their own identities the power attains unlimited potential. The realization of being monitored and an awareness of its consequences prompt people to self- discipline. This establishes the presence of disciplinary power in trolls which turns productive. Trolls acquire power contextually and strategically. This identifies it as relational and helps break down the binary- powerful/ powerless. Simultaneously, the power to produce knowledge leads to an exclusion/ inclusion divide as well.

Keywords: Power, Troll, Foucault, Indian, Panopticon

Won Excelsior Award

Sruthy Rose Chacko

Literary Gaming: An in-depth analysis on the Creative Interface between Andy Campbell's Nightingale's Playground and the 3D game Backslide

Sruthy Rose Chacko

Postgraduate Scholar, Department of English, St. Joseph's College for Women, Alappuzha, Kerala – 688001.

E-mailId: sruthyrosechacko2017@gmail.com

Abstract

In the modern era, where digitalization is gaining primal importance in almost all mainstream arenas, texts tooare affected. The digital text thereby provides a multi-dimensional space that enables the reader to think out ofthe expected action. The effect of digital text on the reader and how its interpretation shows the considerablevariance in creating meaning out of it, as compared to ordinary text is closely analyzed in this paper. By takingAndy Campbell's digital fiction, *Nightingale's Playground*, and a 3D game named *Backslide*, this paper aims atthe analysis of processes of decoding and encoding done by the reader in digital fiction. The influence ofaffordance theory and risk theory in the contemporary digital world is also of primal focus in this paper.*Nightingales' Playground* is centered on the character of Carl Robertson, who is in a desperate search to find hislong-lost schoolmate and friend, Alex Nightingale. This digital work has four versions of it featuring CarlRobertson as its protagonist. Through these four versions, the different affordances offered by these fourversions show their distinctiveness in creating different platforms for the reader to interpret their meaning. The3D game Backslide is an example that shows the creative and encouraging innovation in the arena ofplaywriting through the platform of digital humanities. Based on Shakespeare's *Hamlet* and Tom Stoppard's*Rosencrantz and Guildenstern are Dead*, this game prompts and teaches everyone to think out of the context torightly interpret the logic of Hamlet. By focusing on these works, this paper aims at establishing the emergingimportance of digital humanities in the literature and its considerable influence on the reading process and thegeneration of meaning done by the reader. The creation of different affordances in digital space is also givenimportance in this paper. **Key Words: Digital Humanities, Digital fiction, Affordance, Digitalization**

Won Excelsior Award

Gouri Raj L.

From Pandora's Box to the Happiest Season: A Study of Queer Representation in WesternCinema

Gouri Raj L.

Postgraduate Scholar, Department of English, St. Joseph's College for Women, Alappuzha, Kerala – 688001. E-mailId: gourik2406@gmail.com

Abstract

The term 'queer' has been in use only for a few years, though the concept of queerness isnot new. Queer is an umbrella term that incorporates all the sexual identities regardless of anynorms, conventions or traditional notions of binary. Though the concept of queerness existedcenturies before, it is only now the idea is being openly discussed and analyzed. The stigmaassociated with being queer or belonging to LGBTQ+ community is widely debated nowadaysand films contribute heavily to such discussions. Films enabled ignorant masses to acknowledgethe existence of the queer community and to some extent their acceptance by the society.This project titled, 'From Pandora's Box to the Happiest Season: A Study of QueerRepresentation in Western Cinema' aims to attempt a study on representation of queer charactersin western cinema and to analyze the relativity of the characters to real life people. Two moviesbelonging to two different eras in western film history have been taken for a detailed study ofqueer representation and its evolution. The movies are Pandora's Box (1929) and HappiestSeason (2020). The former movie belongs to the Silent Film Era and the latter is a representativefilm of Modern contemporary Hollywood cinema. The movies have been studied to understandthe influence of films on the society and to analyze the role of media in shaping the society'sattitude towards the queer community. This project also traces the history and development ofqueer characterization in different media including web series, advertisements and cartoonsalong with films, and analyzes the effect of the changing queer characterization on the society.

Key words: Queer, Sexual identity, LGBTQ+ community, Notion of binary

Won Second Prize

NeelimaNepolian

Invasion of Machines: A Study of Metaverse in the Matrix Quadrilogy

Neelima Nepolian

Postgraduate Scholar, Department of English, St. Joseph's College for Women, Alappuzha, Kerala – 688001.
E-mailId:neelimapinks1998@gmail.com

Abstract

Metaverse is a real time rendered 3D virtual world. It can be traced on Neal Stephenson's cyberpunk novel, *Snow Crash* (1982). When Facebook CEO, Mark Zuckerberg changed the term as a household one with theconversion of his corporate brand name to Meta, the popularity of avatars and virtual world gained its peak.Metaverse is an augmented reality, which offers a virtual experience and outlook of the real world. In the Americanscience fiction series titled as The Matrix, a similar kind of virtual experience is being taken as the major theme. Theseries named as *The Matrix* (1999), *The Matrix Reloaded* (2003), *The Matrix Revolutions* (2003), *The Matrix Resurrections* (2021) by Wachowsky sisters had gained its popularity from 1999. The coded vision, Déjà vu, thebullet time sequences are the major contributions of Matrix Quadrilogy.The movies set its tone within the impacts of digitalized world under the control of AI, where the humanshide away from machines to save their life. The series are taken as the best example of today's world that will besoon under the control of AI. Metaverse is equated with Matrix series for its virtual experiences and unconsciousupheaval of humans to a virtual world. I am trying to focus on the movies as awareness to the present world aboutthe dark sides of virtual experiences and digital world. The growth of AI is analyzed for its unfavorable andunauthentic existence.

Key Words: Metaverse, Augmented reality, virtual existence, AI, matrix

Deepa P V

Traumatic Spatio-Temporality: A Study of the Quest for Self in Kazuo Ishiguro's *Never Let Me Go*

Deepa P V [1] S. Ramanathan[2]

[1]Research Scholar (Part-Time), Madurai Kamaraj University,Madurai,[2]V.H.N.S.N College, Virudhunagar.

E-mailId :pvdeeparesearch@gmail.com,theera1476@gmail.com

Abstract

This paper proposes an overview of Kazuo Ishiguro's *Never Let Me Go*. In the novel, the collective trauma of Kathy and other clones suffer from their identity anxiety, which is their provenance of psychological trauma.It can be seen as a metaphorical examination of slavery and exploitation. The paper investigates the varying levels of Self-awareness. Throughout the novel, Tommy, Kathy and Ruth search to find who they really are; while figuring out how they would manage their inevitable fate. The quest for self can be seen when students become interested in finding their possible human clones and the increased attention on artistic collections. The need to have artistic talents can be seen as a way of finding their real self.The Paper explores the issue of human cloning. The clones are in search of their self since they have no individuality. This makes it hard for them to pick the possible from they cloned. The longing for connecting the self has never totally, adequately fulfilled. Death and Life are faced alone.The whole concept of donation might be understood as a metaphorical expression for human life, as well as the omnipresent consciousness of its finitude. Ishiguro has prepared the ground for disturbing discussion where two ostensibly different groups of people - clones, whose only purpose is to donate their vital organs, and "normal people" as the recipients- suddenly appear to be indistinguishable in terms of mortality and the general experience of human existence.The article demonstrates how the text grapples with the effects of story-telling on individual psychologies, both as a constructive response to atrocity ad as a potentially dubious method of overcoming traumatic experience.The novel allows the reader to question the ethics of human cloning. *Never Let Me Go* picturizes the victims of an exploitative society who are used and abused because they aren't fully human.

Keywords: Psychological trauma, Clones, Anxiety, Mortality, Self

Reshma Nair R.

A Discourse on the Interrelatedness of Covid-19 Pandemic and Zombie Apocalyptic Movies: An Abysmal Study on the Movies,*World War Z, Train to Busan* and *#Alive*

Reshma Nair R[1],Arya Jose[2]

Department of English, St. Joseph's College for Women, Alappuzha.

Email Id :reshmanair1498@gmail.com,aryajose007@gmail.com

Abstract

This research work is focused to find an interrelatedness of Covid-19 pandemic and Zombie apocalyptic movies. The term 'apocalypse' has always an area of debate and inquisitiveness. At first, it was always associated with religious texts and its prophecies about the 'end of the world'. But now it has turned into a genre with many varieties including apocalyptic literature. Something that caught attention is the apocalyptic movies with the themes based on natural calamities like flood, tsunami or earthquake and other man-made calamities like virus or plague outbreak due to some mishap in a laboratory test. Film makers have incorporated fantasy to these genres to appeal to the audience who have an appetite for thriller and horror, and one that fits in this category is zombie apocalyptic movies. A genre that will be analysed in detail in this thesis in connection with the Covid-19 pandemic. The world recently witnessed a bizarre situation that wasn't anticipate. The Covid-19 pandemic turned the world upside down, which led many people to ponder about apocalypse. Especially the possibility of a zombie apocalypse which was only seen till that on the silver screen. The larger picture, whether political, economic or social in the movie seemed similar to the situation that was happening in the real world. The contents of zombie apocalyptic movies seemed to intersect with the situation of Covid-19 pandemic. The movies World War Z, Train to Busan and #Alive are scrutinized to find the aforementioned interrelation, it sheds light on social, political and economic areas which are the most crucial points of a society.

Key Words: Apocalypse, Zombie, Covid-19, Pandemic, Socio-Political, Economic

Paresh Modak

Jharkhand, India: *Aripan*, *Sohrai*, and *Khovar*Paintingof the District, Hazaribagh

Paresh Modak

Research Scholar, Department of Visual & Performing Arts, Mangalayatan University, Beswan, Aligarh, India.
EmailId:pareshmodak@gmail.com

Abstract

Indian tribal people have been seen living in harmony with their surroundings and taking good care of their pets and the jungle in the Jharkhand state's district Hazaribagh. Just after *Deepavali*, village women do the Sohrai ritual and decorate the muddy surface with floor art in the celebration of animals, Lord *Pashupati Shiv*, and Lord Lakshmi which is done at *Deepavali* (*Kali* in Hinduism). Only according to this pattern can their livestock reach the cowshed from the outside. Legends exist regarding this adoration of cattle. Additionally, paint fresh *Sohrai*and*Khovar* decorations on the freshly produced mud walls. The procedure of preparing mud walls takes many days; after the heavy rainfall, the mud walls are truly repaired. Nature, animals, diverse customs, and traditional beliefs are used to mark this day. On this festival day, they cook special food and arrange colours for the floor and wall art that are utilized as a true colour for the ground, wall, and in worship. Cook another dish by combining many grains for their livestock and the household to consume like *Vhog* or *Prasad* of God. The primary economic activities of the population, who have traditionally regarded both animals and the environment as divinity, are agriculture and cattle breeding. They have historically worshipped and revered the animals. There are legends about this devotion to cattle. On these occasions such as festivals, ladies perform singing and dancing to a multitude of melodies in gratitude to cattle, mentioning that it is because of the cows that they are affluent and in good health. The symbols and wall paintings closely resemble the prehistoric cave paintings from the Mesolithic era in Hazaribagh. These days, people still practice the classic mural-painting technique on paper and other utensils as well.
Keywords: *Sohrai, Pashupati*, Cattle, Cowshed, Aripan

Anjaly O S Nair

Rendezvous of Trauma and Postcolonial Theories: An Analysis of TsitsiDangarembga's Novel, *Trilogy*

Anjaly O S Nair

Guest Faculty. Department of English, SDV College of Arts andApplied Sciences, Alappuzha, Kerala**,** EmailId: anjalymukesh122@gmail.com

Abstract

Trauma theories and postcolonial theories have been part of interpreting and analysing a literary text since the two field has provided groundbreaking insights. But the fact is that both maintained a relation of uneasy bedfellows because one followed a Eurocentric traditional model and another a disciple of post structuralism rejecting notions of a centre. The efforts of theorists like Frantz Fanon, Homi Bhabha etc resulted in the dismantling of this centre enabling the incorporation of postcolonial concepts like racism, hybridity, minority etc which can also be a reason for trauma. This decolonised trauma and its theories can be better understood from the application of such concepts into the literary works from postcolonial literature which will interpret and analyse such works on the basis of insidious trauma and resulted alienation from self and society. This paper concentrates on the novel trilogy namely, *Nervous Conditions* (1988), *The Book of Not* (2006) and *This Mournable Body* (2018) written by Zimbabwean writer TsitsiDangarembga from the theoretical background of postcolonial trauma and has made an attempt to analyse the interpersonal and intrapersonal relationship among various woman characters like Tambudzai, her cousin Nyasha and her mother with regard to alienation of self in a colonial and postcolonial society their by exploring the condition of postcolonial trauma.

Keywords: Trauma, Colonialism, Postcolonialism, Racism, Hybridity, Feminism

Amritha C

Water Scarcity: Comparing the Indispensable Roles of Water in the Light of Eugene O'Neil's *Thirst* and AdwaithaMallabarman's*A River Called Titash*

Amritha C
Postgraduate Scholar, Department of English, St. Joseph's College for Women, Alappuzha – 688001**,** Email Id: amrithac907@gmail.com

Abstract

The paper intends to study the indispensable role of water and the power it exerts over the human mind. In spite of continuous rains in Kerala, some of the districts face acute drinking water shortage. Alappuzha or Alleppey is taken as a case study. Though surrounded with backwaters and abundant in rainfall, the residents of Alleppey has to borrow or buy drinking water. Hence, the situation influences their lives, both their physical and mental health. Literature portrays such situations which shows us how helpless are humans during nature's wrath. Like what Coleridge had said in his *Rime of the Ancient Mariner*, 'water water everywhere, All the boats did shrink, water water everywhere not a drop to drink' (31). The major argument of this paper is how something which is regarded as the greatest boon can turn into a curse due to greed and callousness of human beings. A comparison of complex human behaviour projected through Eugene O'Neil's one act play, *Thirst* and the cons of modernisation presented in AdwaithaMallabarman's*A River called Titash* will be done in this study to prove how water is presented in literature in different ways and it's relation with humans. The increasing water pollution and lack of technology for effective recycling of wastewater has added to their woes. The subsequent droughts and instances of flooding are indicators of nature's agitation. Water pollution is oft heard term yet we allow it to happen almost every second. Various human activities pollute surface water resources but they also damage groundwater. The ineffective rainwater management and sad state of the public roads pave a way for breeding mosquitoes and diseases but they also take people's lives. The major objective of this work is to compare the works ,*A River called Titash* and "Rime of the Ancient Mariner" and realise the strong presence and importance of water elements in these works. This nature of water, the essential elixir of life taking a destructive and life threatening form and its consequences on human beings are conveyed in this study.

Keywords: Water, Water scarcity, Water pollution and flood

Julia Thomas

Enmeshed in a Grid of Politics and Patriarchy: An Ecofeminist Scrutiny of *Sherni* and *Whale Rider*

Julia Thomas
Postgraduate Scholar, Department of English, St Joseph's College for Women, Alappuzha, Kerala - 688001, India
Email Id: juliathomaskvl@gmail.com

Abstract

Throughout the centuries, an irreplaceable idea that can be seen in the society is the subjugation of women. They are often considered to be the victims who are only needed to satisfy the hidden agendas of male chauvinism. Most of the men inherit some sort of superiority complex and consider women as a material object for their personal gains. The society has constructed several stereotypical norms which are followed even in the contemporary society. The individuality and freedom of women are being restricted.Nature too has been under the dominance of man and is being exploited day by day because of the increasing greed of men. The environment is often anointed as 'mother earth' because of its procreation ability, but the actions of man have led to the degradation of that aspect. The major forces that assert their dominance over women and nature in the male-dominated society are Patriarchy and Politics. The dissertation tries to analyze the superior impact of Patriarchy and Politics through the implication of two films *Whale Rider* and *Sherni.* Both the movies portray different elements of suppression and oppression faced by women and nature. Though there has been some sort of upliftment in the attitude of women against the perils, a complete growth has not yet been observed. From 2002 to 2021 the issues that are faced by women and the environment remains the same which include the ideas of male superiority, exploitation and tradition. The movies analyze the position of women and nature in a male-dominated society and portrays the interconnectedness through an ecofeminist lens.

Keywords: Ecofeminism, Patriarchy, Politics, Suppression, Environmental degradation

HISTORY

Won Excelsior Award

Vinitha Anna John **Parvathy N. V**

75 Years of India's Independence: Economy, Society, and Polity

Vinitha Anna John*, Parvathy N V.**
*Research Scholar, Centre for Economic and Social Studies, Hyderabad, Telangana
**Guest faculty, NSS Arts and Science College, Parakkulam, Palakkad, Kerala
*E-mailId:vinithaannajohn@gmail.com , parvathynv1994@gmail.com

Abstract

We are celebrating "Azaadi ka Amrit Mahotsav", the 75th anniversary of independence. The journey from a poor nation to one among the largest democracies of the world was eventful. The country and its population experienced several milestones as well as challenges. The changing governments have a great role in this scenario. They have contributed a lot and are also responsible for India's achievements and drawbacks. The nature of the leadership decided the future of the country. There was a visionary leadership that could bring the nation as a role model to the entire world. And there was also a leadership that could bring the economy into bankruptcy. The success and failures of the government was also of the country. Now when we think about the future, there are a lot of things to be done if we wish to make India a 'super power'. This period of the diamond jubilee can be considered as a new opportunity to build an India of our aspirations and to make positive contributions to the ever-changing dynamic situations of India. It will depend upon the people's willingness to change, ensuring the equal participation of women in the workforce, including marginalized communities in our economic growth, and also having a liberal, progressive and unbiased attitude. This essay tries to look into the major events and situations India have gone through since its independence.

Keywords: Super Power, Marginalised Communities, Democracy

Dr. Geetha K.L.

Historical Perspectives On Violence Against Women

Geetha K.L.*
*Guest Faculty, St. Xavier's College Thumba
Email Id: *drgeetharaja@gmail.com

Abstract

Violence against women continues to be a widespread and serious problem .Attitudes and beliefs that condone or ignore violence, as well as social conditions such poverty and lack of resources contributes to the continuation of violence. As a part of culture perpetuated by ideologies and traditions leads to violence towards women was seen as a natural expression of male dominance. Male domination stemming from the views of male superiority.This paper contains three main themes. The first establishes patriarchy as an early pattern of military societies and the subsequent emergence of the Judeo-Christian, Greek and legal cultural paradigm as ideological justification. The second provides evidence as to how the above attitudes were interwoven in European and American values. The third theme is gender inequality and norms on the acceptability of violence against women are the root cause of violence against women.

Keywords: Gender Inequality, Patriarchy, Violence

HOME SCIENCE

Mixed Methods Research For Health-Nutrition And Social Sciences: Principles And Applications

Prof (Dr) Shubhada Kanani

Adjunct Professor, Parul Institute of Public Health, Parul University, Waghodia, Vadodara, India

As applied nutrition and health researchers, we aim for carrying out a well plannedresearch which adds to new knowledge towards addressing the nutrition and healthchallenges facing the nation. Depending on the research problem being investigated,wechoosetheappropriateresearchmethodsandtools,collectandanalysedataandpresent ourfindings invariousforums andpublications.

A very important link in the chain of the research process is the research methodsweuse. In this presentation, I aim to focus on mixed method sre search in the field of nutrition-health and social sciences: why mixed methods research (MMR), variousapproaches of integrating qualitative (QL) and quantitative (QN) research tools, examples of some of the QL and QN methods with examples from my experience.

A. Why mixed methods research?

Quantitative methods (QN) are usually a part of epidemiological research studieswhile qualitative methods (QL) are usually used in culture-people focused anthropological research studies. Neither approach is superior to the other; each stream has strength and weaknesses; integrating them adds to the richness and validity of data.

QL methods help us to explore the people's perspectives, known as the **emic view.** QN methods are more oriented towards the expert's perspectives or the outsideresearcher's perspectives, known as the **etic view**. For successful health-nutrition ordevelopment programs and interventions, it is important that they are based onscience (etic view) but also take into account the community beliefs and practices(emic view), For example, under pregnancy anemia control program, iron-folate (IFA)supplements are given, but unless we understand the reasons why women accept totake IFA or why they do not accept or complete the IFA course, the impact will beminimalonanemia reduction.

Mixed methods are particularly valuable in gender-based studies as genderdiscrimination has socio-cultural roots and understanding women's constraintsrequiresthat weadoptopenended QLtools.

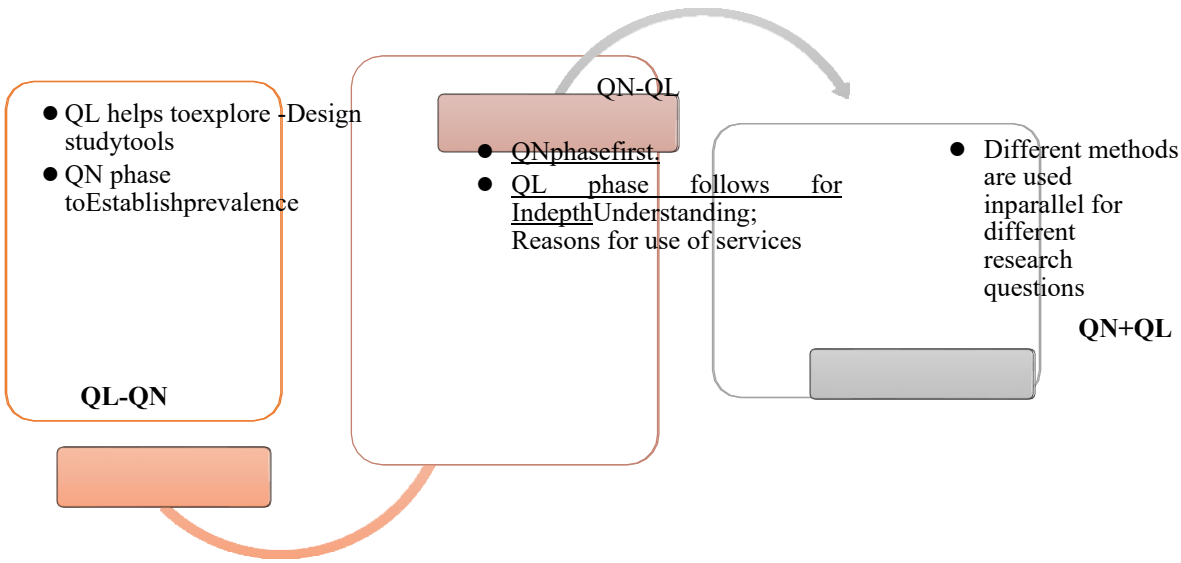
B. Advantages of integrating QL and QN methods and models ofintegration

When we integrate QL and QN methods in our research, we make the most ofthestrengths ofboth.Comparingthe twotypes ofmethods:

Quantitative (QN) methods	**Qualitative (QL) methods**
Has Etic Focus	Has Emic Focus
Establish Prevalence : How Many? What is the spread of the problem?	Help us understand the underlying reasons forpractices; increase depth Of Understanding– Why?
Examples are RCTs, Surveys,. Hererandom Sampling is possible	Usually are smaller Indepth Studies, Purposive Samplingis common, based on criteria.
Data expressed more in numbers, Less innarratives and text	Usually has more text, descriptive andnarrative
Data collection tools usually have Structured Qs; with options	Data collection tools have usually open-ended Qs, so people can express their views freely.
Outcome Focused	Process Focused

However, we must remember that there is no strict compartmentalization between the attributes of QN and QL; there are overlaps as well.

C. Models or approaches of QN and QL integration



- In the first model, QL studies in first phase helps to understand the researchproblem in more detail, especially the emic view, which can then help todesign QN tools for the next phase to understand prevalence and otheraspectsofthetopic being studied.

- In the second model, QN phase data is collected and studied, followed by QLphase for more indepth understanding of certain aspects of the results, suchaswhysomeservicesareused and not others; reasons underlying practices.
- In the third model, QN and QL are use dinparallel; methods chosen depend on the research questions beinganswered.

ExamplesofresearchstudieswhereQLandQNtoolscanbeintegrated

- Barriersandfacilitatorsofbreastfeedingandcomplementaryfeedingpractices
- PerceptionsofanemiaamongadolescentgirlsandacceptanceofIFA
- Whatisroleoffamilysupportinmaternal-childcare
- Howdoeswomen'ssocialstatusimpactonherhealthandwellbeing
- Whydowomennotseekearlytreatmentfortheirhealthormentalhealthproblems?

D. TowardseffectiveuseofMMR-mixedmethodsresearch

1. Depending on the research objectives, carefully choose a set of QL andQN methods. More methods do not necessarily mean better results; it'sthechoiceofmethod andhow it isused thatis important.
2. Type of study designs: descriptive, analytical, experimental, interventionbased –theseinfluence choiceofmethods.
   Designs can also be longitudinal, cross sectional, quasi-experimental.Choose methods most likely to give data to fulfil research objectives basedonthedesignand the time-resourcesathand.
3. Research team trains itself well to use the methods properly. Quality ofdatais important.
4. Examples of methods: Observation method to study the quality of servicesand acceptance of services; Indepth interviews or focus group discussions (FGDs)for designingeducation-communication strategies; ranking methods to understand preferences of study participants; such asthe various meals served under school feeding program or the types ofmedia they prefer for getting health information; nutrition-health statusassessment studies using QN methods; followed by QL methods to understand reasons for specific groups having specific problems.

E. Conclusion

- Plan and implement MMR such that it is meaningful, well conducted,analysedanddocumented
- Spare 50% time or more for data analysis and writing it up and 50% fordata collection. No point in collecting good data which is poorly analyzedandnotwellwrittenor presented.
- Get properly trained by good mentors and do self-study to improve yourresearchskills.
  A good research study ultimately depends on the researcher; methods are onlytools.

Won Third Prize

Aparna K H

Problems Faced By Parents Of Children With Special Needs

Aparna K H; Archana K H; Fitha N; Athira Giri; Resny Roby; Ann P Samuel; Shefi Varghese; Fathima M R; and Jiby Abraham

PG Department of Home Science, St. Joseph's College For Women Alappuzha.

Abstract

The study in Alappuzha was undertaken to identify the problems faced by parents of children with special needs and to study the needs of the parents. A total of 25 differently abled both boys and girls aged 10-25 years were selected as samples from BudschoolPunnapara and Special Education School, Alappuzha. Interview schedule and questionnaire were the tools used for collecting data from the samples.In the study majority of parents (81%) of differently abled comes under low income family. 40% of the parents faces problems during feeding the disabled children. According to the survey 48% of the parents need professional advice on parenting. Majority of the parents need financial assistance. Among the disabled children 88% are obedient to the parents but 12% are disobedient. Among the parents of the disabled one of the partners, especially mothers are taking care of the child.In the study ,majority of the disabled girl children face problems during menstruation and need special attention during that period. Some of the parents faces problems while traveling with their children in public transport. Many of the parents lack social support in bringing up their disabled children.The study helped in understanding various problems faced by parents of children with special needs and to develop greater understanding and empathy for parents of children with special needs.

Keywords: Differently Abled Children, Emotional Problems, Need of Parents, Financial Assistance

Won Second Prize

Karthika P **Nikhila C P**

Development And Evaluation Of Extruded Products Incorporated With Selected Green Leafy Vegetables

Karthika P, Nikhila C P, NihalBinthNazer,HarshaC,FathimaSuhaila N V, Bushaira V.*

PG Department of Home Science KAHM Unity Women's College.

E mail Id:karthikapcheruparambu@gmail.com, nikhilajyothicp@gmail.com

Abstract

Extrusion cooking technology is very efficient state - of - art technology adopted by snacks food industries . GLVs are considered as natural caches of nutrients for human beings as they are a rich source of vitamins, minerals and antioxidants . To develop innovative extruded recipes with the incorporation of selected green leafy vegetables , to calculate the nutrient content , to find out the acceptance of developed recipes , to popularize the developed recipes by preparing a booklet . Green leafy vegetables selected for the study are red amaranth and drumstick leaves. Extruded items like pasta, spaghetti, noodles and vermicelli were developed . Red amaranth and Drumstick leaves were added to the basic batter . The prepared products were evaluated for their nutrient contents and sensory quality . Ten recipes were developed with green leafy vegetables which include Spicy pasta , Spicy spaghetti , Drumstick coiled spicy noodles , Yummy Amaranth leaves vermicelli payasam , and Drumstick leaves mixture, Amaranth pasta, Butter spaghetti, Amaranth egg pepper noodles , Tasty Drumstick leaves vermicelli upma , Crunchy amaranth murukku. The prepared products were evaluated for their nutrient contents and sensory quality . The calorie content was highest for butter spaghetti and least for amaranth pasta . The protein content was highest for spicy spaghetti and lowest for amaranth pasta . Drumstick coiled spicy noodles and Drumstick leaves mixture received highest score for overall acceptability and it was least for Crunchy amaranth murukku and Amaranth pasta The developed extruded products were popularized among the adolescent girls of KAHM Unity Women's College ,Manjeri . Thus it may be concluded that inclusion of these kinds of foods in our daily diet may add variety and incorporation of green leafy vegetables enhances the nutritional quality in the diet.**Key words: Extruded Products Incorporated, Green Leafy Vegetables, Acceptability, Snacks**

Nutrition And The Health Profile Of Intellectually Disabled Children

Navya Reji ., RiniyaThaj., Anupama Saju., Parvathy B., SairaNavas.,Akshara S *

P G Dept. of Home Science, St. Joseph's College for Women, Alappuzha, Kerala

Email:navyareji18@gmail.com

Abstract

The study was undertaken to find out the challenges faced by the parents in relation to nutrition for the intellectually disabled children. The objectives were to determine the impact of nutritional programmes, to identify the eating habits and importance of balanced diet for children with special needs and to suggest some measures to improve the nutritional status of the intellectually disabled children. A total of 25 intellectually disabled children between the age group 10-20 years were selected from Snehatheeram Buds School, Cheriyapozhi by purposive sampling method. Out of them 14 were boys and 11 were girls. Personal information, food habits, food allergies and information about financial aid availing from the government were collected by questionnaire method. The salient findings of study are as follows. About 72% were in the age group above 15 years and 28% of Intellectually Disabled children belonged to the age group 10-14 years. 72% of intellectually disabled children prefer non vegetarian food and only 28% prefer vegetarian food. About 52% of intellectually disabled children prefer junk food and 48% do not prefer it. Majority (88%) of intellectually disabled children have not consulted any dietitians; only a very few (12%) have consulted a dietitian. Majority (76%) of intellectually disabled children have not attended any Nutritional Awareness Programmes and only 24% attended such Programmes. In the study 56% of intellectually disabled children were getting financial help from the government and 44% were not getting any financial support for buying medicines and diet specific food. It is concluded that severely disabled children are at high risk for malnutrition, and this may partly explain the growth retardation in the study group. It is important to aim at providing an optimal diet. Proper care during pregnancy and lactation, intake of nutrient supplements and attending nutrition awareness programmes are suggested.

Key words: Intellectually Disabled, Malnutrition, Health Profile, Children

Thasleema S A

A Study On The Impact Of Covid 19 And Lockdown On The Mental Health Of Children Between The Age Group Of 10 – 16Years

Thasleema.S.A, Athira L, AryalekshmiS,Anju K, Greeshma P Jayakumar,Karthika B, Rajalekshmi R S,Shilpa B S, Sreedhanya B S., Lekshmi R P.

Department of Home Science HHMSPB NSS College For Women, Neeramankara.

Email- thasleemajavad1@gmail.com

Abstract

This study has been carried out to find out the psychological distress faced by the children during covid 19 pandemic and to understand the mental health management techniques adopted by the children during covid pandemic. The sample consisted of 100 children from Thiruvananthapuram district. Random sampling method was used. Questionnaire method was used to collect data. From this study we can understand that 82% of the children felt bored and lethargic during the pandemic. This denotes to the fact that children experienced constant monotony being confined inside the house. Around 71% invested their time wise fully and invested in acquiring a new skill. This shows that the respondents diverted their energy and used it to improve their ability. It is also noted that 56%of the respondents are still fearful of the issues from pandemic. The study showed that the impact of covid 19 in all our participants reported considerable impact of pandemic on various aspects of their life. We discovered 82% of previously healthy children had an increase in stress and depression symptoms. Even majority of the children experienced stress, they had tried to overcome those problems through communication and acquiring new skills and activities.**Key words: Covid 19, Mental Health, Children, Stress**

Won Excelsior Award

Neha Vijayagopal OR

Developing a Zero Waste Concept in Textile Laboratories

Neha Vijayagopal, Anjana Pauly, Ashwathy K Madhu, Karthika Babu, Deepthy E S, Sruthy, Serin Jaison, Kavitha C J.,Thomas Ruby Mariamma
PG Department of Home Science, Vimala College, Thrissur
EmailId: symphonyhousevijayan@gmail.com

Abstract

Textiles satisfies one of the basic necessities of mankind hence it finds a unique place in our lives. Zero waste fashion refers to items of clothing that generate little or no textile waste in the production. To study the amount of waste generated in the lab, collect them and create new products based on zero waste concept and access utility. The textile laboratories of department of Home Science Vimala College was selected as the sample. For the assessment of products 20 women consumers were selected. An interview was conducted among teachers in charge of the laboratories to know about the amount of waste generated and the classes. 7 questions were included in the interview schedule in which 4 of them were open ended questions and the rest were multiple choice. The upcycled products were assessed based on utility, creativity and aesthetic appearance on four point scale (Excellent, Good, Fair, Poor). Products upcycled from the waste materials. Approximately around 3.7 kg of waste was generated every academic year. Waste materials are being disposed either by burning or landfilling. The products generated are useful and were rated by selected students. The products developed are : Keychain, Pillow cover, Table cover, Charge holder, Mini pouch, Pin cushion, Hair scrunchies, Earphone pouch, Bookmark, Pouch, Mat, Pillow, Bow scrunchies, Head band. The value of the products were calculated by adding labor charge and profit margin. The products developed had high product economics. Out of all products Bow scrunchies, Charger holder and headband were popular.The research helped the students to be aware of the waste generation and the importance of the zero waste concept.

Key words: Zero Waste, Upcycle, Textile

A ABHIRAMI

Knowledge attitude and practices regarding vitamin D deficiency among women (30-60years) in Thiruvananthapuram

A Abhirami., Meera Sunil
Department of Home Science,
Govt College for Women, Vazhuthacaud, Thiruvanathapuram, Kerala -695014
EmailId:vaiduryaami88@gmail.com

Abstract

Vitamin D deficiency is an endemic in India despite of the sunshine available. Therefore, this study is aimed to identify the population's knowledge attitude and practices (KAP) towards vitamin D deficiency .This study is an attempt for sensitization of women's knowledge regarding vitamin D and prevention and treatment of its deficiency .A cross sectional study was conducted among middle aged women aged (30-60yrs). Questionnaire was used to assess the socio-economic status of the families, knowledge regarding vitamin D deficiency, attitude and practices towards it. Nutritional awareness was imparted to the respondents through the direct interactions. Likert scale was used to assess the attitude of the samples on vitamin D deficiency. The survey will be conducted through direct interaction. It was found that the only 7 percent were having a good knowledge regarding vitamin D deficiency in the pretest but it increased to 82 percent in the post test .In case of attitude no respondents had a poor score instead most of them (51%) had an average score in the pretest and in the practices most of them (78%) had an average practice in the pretest only 9 percent had a good practice. The age was not a determinant factor in the knowledge attitude and practices of the respondents. But the attitude changed in accordance with the residence. Most of the respondents were engaged in indoor activities. About 31 percent of the respondents were overweight. The loss of hair was noticed among 82 percent of the respondents and 30 percent had an irregular menstrual cycle. The dietary intake of vitamin D is difficult as it is limited to only a certain foods like fishes, eggs and mushrooms. The major source of vitamin D is sunlight and 41 percent exposed to sunlight only for 10-15 minutes. The findings from this assessment will provide important information to determine what next steps will be necessary to promote sufficient levels of vitamin D among the society .So we can conclude thatalong with education and research strategies, vitamin D supplementation and fortification may be effective in improving vitamin D health among women.

Key words: Knowledge, Attitude, Practice, Sunlight, Fortification

Won Second Prize

Abirami A K

Development Of Sensory Cards From Banana Stem Fibre For Children With Learning Difficulties

Abirami A Kand Dhanya N

Department of Home Science, St. Teresa's College (Autonomous) Ernakulam, Kerala-682011, India.
*E-Mail Id:abiramiak20@gmail.com

Abstract

The pandemic definitely had affected all the sectors which had an impact on human beings and primarily the educational sectors had to undergo several modifications to adjust to the situation. The online mode of education which was adopted as part of this has definitely impacted the student's educational outcome. Students with learning difficulties are the ones who were hard hit due to online education due to the fact that they are majorly kinesthetic and virtual education is not suitable for this type of learners. The present study includes various domains which impact the development of a child, hence it can be inferred that the study effectively identifies the difficulties experienced by students with learning difficulties. The study also brings out a solution to the problem of introducing pre reading skills to children through the development of appropriate tool. The present study investigates the possibility of using banana fibre as a substrate for developing the sensory cards, which will be of immense use to children with learning difficulties. The efficiency of the developed tool was evaluated by experts working in the field of special education. The results indicated the sensory cards would be of immense benefit to children with learning difficulties. The developed tool can be used by a wide range of user and it can be produced under low cost as well.

Key words: Learning Difficulties, Banana Fibre, Sensory Cards

Angela K Thomas

A Study On Frailty During Ageing And Its Influence Over The Health Of Elderly

Angela K Thomas., Jiby Abraham

PG Department of Home Science, St. Joseph's College for Women, Alappuzha, Kerala-688001, India

E-mailId :angelakthomas1999@gmail.com, jibyabrahams24@gmail.com

Abstract

This research work is focused on frailty and its influence over nutritional status, Covid 19 and dietary intake of elderly. The study was conducted in Ayyankunnu Grama Panchayath situated in the Kannur district of Kerala. 100 samples of age group 70-80 were selected purposively to fulfill the inclusion criteria. Personal interview was conducted to collect data. A well structured questionnaire was used it includes Kuppuswamy scale, anthropometric measurements like mid upper arm circumference, waist to hip ratio and calf circumference, 24hour dietary recall and tools like Edmonton frail scale (EFS), Mini nutritional assessment (MNA), Dietary diversity questionnaire (DDQ) . The study found that 51% of the elderly were frail. 22% of the elderly had poor socio economic status. Anthropometric measurements revealed that majority of the elderly were obese. 53% of the elderly were malnourished. Malnourished elderly were frail (p value <0.001). 50% of the elderly were covid positive. Covid positive elderly had frailty (p value <0.001). Majority of the elderly had co-morbidities. Comorbidity increases the risk of covid and frailty. 25% of the women had low dietary intake than men. The elderly with low dietary diversity had severe frailty (p value <0.001). Low dietary intake increases the risk of frailty. Socio economic trait has an impact over dietary diversity. Nutritional deficiency acts as a risk factor in elderly. Ageing leads to physiological and psychological changes in old age. Frailty is a major concern in the geriatric population. Frailty and ageing is a predominant factor in geriatric nutrition.**Key words: Frailty, Dietary Diversity, Mini Nutritional Assessment, Edmonton Frail Scale**

Won Third Prize

Ankita Agrawal

Assessment Of Ante-Natal Factors, Age Appropriate IYCN Practises & Weight Gain Pattern of Young Infants In Selected Block Of Kachchh District

Ankita Agrawal** &Gandhi H.*
Department of Food and Nutrition, Faculty of Family and Community Science, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat- 390002, India.

*E-mail Id:hgandhi1950@gmail.com, agrawalankita1210@gmail.com

Abstract

This research work was conducted to understand the maternal ante natal factors, health status of women residing in Ganeshnagar area of Gandhidham block of Kachchh district. Information collection from women was done via interview using pretested semi structured questionnaire and referring their Mamta Card (MCH card) and/or medical file. Uptake of region specific ante-natal care services and prevalence of infant and young child nutrition practises was assessed. In the region 21% women were underweight at 1st trimester while 44.2% were overweight or obese. During 1st trimester 76% women were anaemic. Prevalence of low birth weight of infants was assessed along with weight monitoring. In the region only 18% infants were breastfed within an hour of birth and exclusive breastfeeding under six months was done by 90.4% women. It was found that 25% of young infants were undernourished. Significant association of gestational weight gain was found with social group (ST) and overweight/obesity. A significant association was found between low birth weight and social group, maternal education status, above poverty line family, health issues experienced during pregnancy, normal BMI of mother, anaemic underweight undernourished pregnant women. Significant association of infant nutrition status was found with colostrum feeding, and presently breastfeeding. There is a need for improving focus on health and nutrition to improve maternal and child health outcomes.**Key words: Ante-Natal Care Services, IYCN Practices, Malnutrition, Infant Nutrition, Low Birth Weight**

Won Second Prize

Arshida Noushad Shameena

Valorization of Watermelon Rind into Value-Added Cookies

ArshidaNoushadShameena., Dr.Anju M Neeliyara*
Department of Home Science, St. Joseph's College for Women, Alappuzha, Kerala-688001, India
*EmailId: anjuneeliyara@gmail.com

Abstract

Watermelon rind is an underutilized by-product which is largely discarded, inspite of being rich in several nutrients. This research work is focused to optimize watermelon rind through their incorporation in value added cookies. Freeze-drying method was adopted for processing watermelon rind into rind flour. Cookies were developed by adding rind flour into wheat flour in 10, 20 and 30 percent level. Sensory evaluation of all the three variations and consumer acceptability of the best accepted sample was obtained. DPPH assay was used to assess total antioxidant activity of the best accepted product. Developed product was popularized in SHGs along with the distribution of leaflet that highlighted the significant points and recipe of product. Sensory evaluation and consumer acceptability scores revealed that cookie with 10 percent rind flour scored highest mean score with an overall good acceptability rate of 4.23. From DPPH assay of cookie, low IC50 value of 118.38µg/ml indicates high antioxidant activity of cookie. The nutrient composition of best accepted cookie contains 13.85g protein, 124.5g carbohydrate 40.2g fat, 4.31g fibre, 112.01mg calcium, 5.12mg iron and 179.29mg magnesium. Hence, it can be concluded that underutilized by-product of watermelon such as rind can be effectively reutilized by developing nutritional, antioxidant and fibre rich cookie, which in turn increase the demand and optimization of such parts. This offers variety and sustainability. Food waste minimization has been recognized a key strategy for building a sustainable food future. Huge proportion of food waste produced by its processing and consumption can be thus reutilized effectively in food application thereby tackling the issue of underutilization and disposal concerns.**Key words: Rind, Sustainability, Total antioxidant activity**

Chandana Raghuraj

Assessing Carbohydrate Quality Index among Adult women and its relation toObesity

Chandana Raghuraj.,.BhagyaD*
Department of Home Science,St Joseph's CollegeforWomen,Alappuzha,Kerala 68800,India
EmailId: chandanaraghuraj@gmail.com, bhagyasjcw@gmail.com

Abstract

The majority of research conducted in India considers only the total amount of carbs consumed, ignoring importanceof carbohydrate's type and quality. Women in their early adult years have also been seen to have a wide range ofmetabolic illnesses that negatively impact their quality of life. The Carbohydrate Quality Index (CQI), which iscalculated using factors like the glycemic index, dietary fibre, solid to total carbohydrate ratio, and whole grain tototal grain ratio, is a score that is used to assess the quality of carbohydrates consumed. As subjects, 200 samples ofadult women between the ages of 18 and 35 who resided in coastal areas of "Thumpoly" were chosen. An interviewschedule incorporating sociodemographic data, health status, the PCOSOQL, anthropometric, biochemical, clinical,and nutritional assessments, including a 24-hour recall and food frequency questionnaire, was used to collect thedata.CQI, Diet Quality Index and B-complex Vitamin Score were determined from FFQ. The food consumed bysamples monthly and their energy, carbohydrate, protein, fat, and dietary fibre per day and month were computedusing NutriCAL3.1version software. The dietary glycemic index was obtained from databases, and the foods werecategorised according to GI. There was a significant relation between CQI and BMI ($p<0.05$). This suggested thatwomen who consume low-quality carbohydrates are at a high risk of acquiring obesity and other metabolic illnesses.Study concluded that quality of carbohydrate is also important and has significant association to that of obesity and women consuming good quality car bohydrate had normal range of BMI.

Keywords:Carbohydrate Quality,Diet Quality,Dietary fibre,PCOSOQL,GlycemicIndex

Won Excelsior Award

Denisha M Parmani

Ayushman Bharat -School Health And Wellness Programme : Capacity Building Of HEALTH AND WELLNESS AMBASSADORS in Primary Schools To Promote Health And Wellness Activities to create effective learning for Children in selected schools of Dwarka block of Devbhoomi Dwarka District

Denisha M Parmani ** ,.Hemangini Gandhi*
Department of Foods and Nutrition, Faculty of Family and Community Sciences
The Maharaja Sayajirao University of Baroda ,Vadodara – 390001
Email Id - denishaparmani@gmail.com hgandhi1950@gmail.com

Abstract

This research work is done with the purpose to initiate health and nutrition activities in the schools to promote the wellbeing of school children."Ayushman Bharat School Health and Wellness program" is launched with intent to improve health and nutritional well being of children in schools. In all 44 Health and Wellness Ambassadors[HWA] and 88 Health and Wellness messengers were identified from the schools .A training module was developed to build the capacity of the HWAs, there was a sharp improvement in knowledge between pre training and post training regarding aspects of sources of various nutrients, normal Hb levels of students, the amount of fruits and vegetables to be eaten recommended by WHO and also regarding AB-SHWP. Various activities like rallies ,Drawing ,Essay writing, story writing ,Snakes and ladders game on healthy eating habits, Maze game on various food groups, nutrition corners, preparing charts and many others were carried out in schools, the monitoring of the activities was carried out by the CRC coordinators, and also self report by the teachers and researcher was maintained.A positive improvement in knowledge related to AB-SHWP was seen after the twelve weeks of research. Sixty percent of the HWAs opined that AB-SHWP is a good initiative and activities can be carried out in schools to inculcate healthy lifestyle amongst students. It can be concluded that this study can be a roadmap to initiate various activities under AB-SHWP involving the HWAs with the messengers ,enhancing their knowledge and perception towards the healthy practices. AB-SHWP can facilitate in improving adolescent health and help achieve the targets of SDG-3.The supportive supervision and continuous monitoring of the help in giving the better outcomes.

Keywords :School Health ,Children , Ambassadors , Capacity Building, Ayushman Bharat

Fathima Noushad

Efficacy of Enteral Feed and It's Type in Terms of Length of Stay in Critical Care

Fathima Noushad*, Neethu Jose

PG Department of Home Science, St. Joseph's College for Women, Alappuzha, Kerala-688001, India

E-mail fathimannn1@gmail.com

Abstract

This is a clinical based study which is carried out in India that compares the efficacy of commercial feed, Blenderized feed, and the combination of both which is used in the critical care setting. The main objective of this study is to compare the length of ICU stay and length of hospital stay among the different feeding groups and to determine the correlation between length of stay and NUTRIC score. A total of fifty samples were collected exclusively on those who are staying a minimum of three days in the ICU through convenient sampling. The results of the study indicate that the average length of ICU stay is not same for all type of feeds with a p value of 0.018. Patients completely relying on commercial feed have faster recovery from the ICU units. Recovery rate is found to be slower in patients who are on Blenderized feed, otherwise known as kitchen feed. But there is no significant difference found while comparing the length of hospital stay in different feeding groups. From this study, a strong positive correlation was found between the two variables (i.e. Length of stay in hospital & NUTRIC score), r (50) =0.703, p=0.000<0.01.

Key words: Commercial feed, Blenderized feed, NUTRIC score, length of stay, ICU

Gopika P. Nair

Impact Of Covid 19 On The Nutritional Well Being Of Sports Women (18 - 25 years)

Gopika P. Nair., Mini Joseph

Department of Home Science, Government College for Women, Thiruvananthapuram

E-mail: gopunair99@gmail.com

Abstract

Improvement of anyone's athletic performance doesn't start at the gym rather at home, with a healthy meal which is well rounded with optimal amount of all the macro and micronutrients. Consuming the right amount of food and hydration, through a well formulated diet plan will shorten the distance of winning the dream of a medal in the respected sports of an athlete that set him apart from the competition. The purpose of this study was to study the socioeconomic profile, to assess the Anthropometric measures, to detect clinical deficiencies, to assess the dietary intake, to impart nutrition awareness for enhancing sports performance and study the impact of covid 19 on the sports performance. Data was collected from 100 female athletes aged between 18 to 25 years. The study was conducted in Thiruvananthapuram district. Samples selected for the study was by purposive sampling. A well-structured digital questionnaire was framed to collect the necessary details needed for the study from athletes. Online survey method was used to collect the data. Details regarding socio-economic status, anthropometry, immunization, nutrition of samples was taken using this tool. Also, the athlete's level of knowledge, attitude was studied. The results revealed that majority of the athletes faced difficulty because of Covid 19. They faced difficulty to do outside exercise and mental pressure faced because of match cancellation. Covid 19 affected the nutritional wellbeing of female athletes and majority of the athlete's performance was reduced. It was found that 87 percent of respondents reported a reduction in performance as compared to performance in post covid times. 43 percent of athletes got excellent support from family members during lockdown. Anthropometric profile of respondents showed that majority (75%) of sample had normal BMI. Assessment of clinical signs and symptoms showed that, majority (70%) of respondents have normal hair. 95 percent of respondents had normal eyes. All respondents had normal face, majority (97%) of sample have normal nail and it was found that 58 percent had normal skin and 27 percent had dry skin. Majority (96%) of the respondents had normal teeth. 52 percent of respondents did not skip their meals and 48 percent of athletes skipped their meals. Majority of the sample consumed 2-3 litre of water per day and 25 percent of samples consume less than 1 litre of water.

Key Words: Covid 19, Anthropometry, Clinical, Awareness, Sports Performance

GOURI A. R

Developing Millet Based Supplementary Snack Mixes For Pre School-Children

Gouri A. R., Jyothy H
Department of Home Science, Govt. College for Women, Thiruvananthapuram, Kerala-695001, India.
*E-mailId:gourigouriar@gmail.com

Abstract

The study entitled **"Developing Millet Based Supplementary Snacks Mixes for Preschool Children"** was undertaken for the development of millet based supplementarysnacks mixes for preschool. These studies conclude that all developed mixes were equallyacceptable with respect to their macro and micronutrient composition and cost of the mixes.A sensory evaluation of millets mixes shows better organoleptic qualities. All thesupplementary snack mixes were low cost and have high shelf life and be supplemented inthe local population for computing energy malnutrition. Developing multi flour mix at household levels and it is incorporating the recipesprepared by it will be a good strategy of dietary diversification thereby combatingmalnutrition. Because Millets are highly nutritious and rich in both vitamins and minerals which are under exploited. They provide various health benefits and use din the prevention and treatme t of various Life style diseases. Based the organoleptic evaluation, nutrient value and shelf life and the opinion ofpanelistthat, mix3 (finger millet with cowpeared and coconut) is the best developed mix from other mixes. The main aim of the developing mixes is an innovative energy packed supplementarymixes for preschool children giving emphasis on the traditional snack pattern using locally available ingredients.

Key words: Supplementary Snacks, Organoleptic Evaluation, Nutrient Value, Shelf Life

Won Third Prize

Salini S

Development of geo specific ready to eat calcium rich cookies from Anchovy (Stelophorus*heterolobus*) fortified with Pumpkin seed flour

Salini S., Bhagya D.*
Department of Home Science, St. Joseph's College for Women Alappuzha Kerala 688001, India
***E-mailId:** salinias33@gmail.com, bhagyasjcw@gmail.com

Abstract

Now ready to eat foods are gaining importance and consumer demands are increasing but there is a need to improve the nutrient contribution with available resources with less wastage, which promote health. Geo specific products like anchovy can be utilized to combat malnutrition and promote dietary diversification, food and nutrition security and sustainability. Despite being a highly nutritious byproduct of pumpkin, pumpkin seeds are frequently wasted. The study's goal was to determine the best way to add pumpkin seed flour to a ready to eat product in order to increase its nutritional value.Due to the high nutritional content and protective qualities of its seeds, pumpkin has attracted a lot of attention lately. Obtaining fresh anchovies from the wholesale fish market of Trivandrum were used for the study. The preparation of anchovy fish powder and its use in the preparation of cookies. The purpose of this study was to assess the sensory, biochemical, and microbiological qualities using pumpkin seed flour and anchovy-based (Stelophorusheterolobus) calcium rich cookies. The results showed that adding pumpkin seed flour at a ratio of 30% to anchovy powder did not change the consistency or flavour of cookies, enhancing the nutritious value for human consumption. Cookies enriched with raw pumpkin seed flour had increased iron and calcium contents, measuring 116.4 and 4.76 mg/100g, respectively. According to the findings of the cookies shelf life evaluation, the product was acceptable up until the conclusion of the assessment period (1 months) and was safe for consumption by people.In short, the processing of developed products were found to be economical, with less wastage, nutrient dense in terms of vitamins and minerals, higher acceptability, and longer shelf life. Fortification with vegetable seeds to products serves as a good alternative in promoting dietary diversification and sustainability.

Key words: Anchovy, Sustainability, Pumpkin Seed Flour

Soorya Selinda K

Quality Evaluation of Instant Dosa Mix Developed FromProso Millet (Panicum Miliaceum L) Enriched With Flaxseed and Carrot

Soorya Selinda K., JibyAbraham.*

Department of Home Science, St. Joseph's College for Women, Alappuzha, Kerala-688001, India.

*E-mailId: sooryaselinda618@gmail.com, jibyabrahams24@gmail.com

Abstract

Recently the demand for Ready-to-cook (RTC) food is in rapid rise because of the convenience attached to their utilization. RTC items are processed or prepared foods that require only minimal processing to make. The main objective of the study is to formulate and standardize nutrient rich RTC instant dosa mix using Proso millet. Proso millet is considered as an underutilized grain with rich source of nutrients. Development of millet-based products helps to meet sustainable development goals mainly SDG2 Zero Hunger, SDG3 Good Health and Well-being, SDG12 Sustainable Consumption and Production. For developing instant dosa mix; proso millet, rice flour and carrot powder are taken in different ratio (4.5:1:2, 4:2:1.5 and 3.5:3:1 respectively) and flax seed and black gram is kept constant. Sensory analysis of the sample is done with nine-point hedonic scale. Nutrient analysis such as energy, protein and calcium were analyzed. Water Absorption Capacity (WAC) and Oil Absorption Capacity (OAC) was determined by centrifugation method. Organoleptic evaluation of the instant dosa mix was carried out in which sample A (4.5:1:2:1.5:1) is most acceptable with mean score of (8.4±0.54). The energy content of the proso millet incorporated instant dosa mix is 363.46kcal, protein content is 11.78g and calcium is 23.56mg in 100g sample. Sample A has the highest WAC and OAC of 49.06±0.05, 250.03±0.05 respectively. Millet based foods are increasingly recommended for a healthy diet. UN general assembly declared 2023 as international year of millet. It is important to develop schemes which would emphasize uplift the utilization and incorporation of millets in our daily diet.

Keywords: Proso Millet, Ready-to-Cook

Varsha Sunil B

Impact Of Covid 19 On The Health Behaviour Of Adolescents (16-18Years)

Varsha Sunil B .,Mini Joseph

Department of Home Science, Govt college for women,Vazhuthacaud, Thiruvananthapuram, Kerala EmailId:varshasunilb5@gmail.com

Abstract

Nutritionduringadolescenceisveryimportantforgrowthandcanhavelongtermhealthimplications.Thecoronavirusdisease (covid 19) is an infectious disease caused by a coronavirus called SARS-CoV-2. Most people infected withthe virus will experience mild to moderate respiratory illness and recover without requiring special treatment. TheCOVID 19 caused significant changes in everyday life including in children's and adolescents. The study entitled 'IMPACT OF COVID19 ON THE HEALTH BEHAVIOUR OF ADOLESCENTS (16-18YEARS)' was conducted with the objectives to understand the socio-economic status, to assess the anthropometric assessment, to assess theclinical assessments, to assess the dietary intake, study the changes in dietary habit, to assess the eating disorder of adolescence. The area selected for the study was Thiruvananthapuram district. The sample of 100 adolescents from the age group of 16-18years was selected for the study.Both male (50) and female (50) respondents were included in the study. Due to the covid-19 pandemic the survey wasconductedinonlineplatform.Awell-structuredquestionnairewas preparedtoassess the socio-economic status (age, gender, place of residence, types of family, parents'educationand employment details, income of family) anthropometric measurements (height, weight, BMI), clinical data,changes in dietary habits. Food frequency questionnaire was used to identify the eating pattern of adolescents. Eating attitude test was given to identify the eating disorder among the adolescents. The COVID 19 has both positively andnegatively impacted dietary practices and lifestyle pattern of adolescents. School closures along with the COVID 19 restrictions have disrupted the everyday routine of adolescents leading to changes in their eating behaviors and physical activities. Their physical activity has been decreased, with subsequent increase in screen times and sedentary behavior, changes in food choices are described with both increased in take of healthy food as well as increased in take of unhealthy food. It is important to encourage the adoption of healthy diets among adolescents.

Keywords: COVID19, Adolescent, Food Consumption, Food Choice, Dietary Change, Eating Behavior, Health Behaviour

Capacity Building Of Health & Wellness Centre Functionaries And Impact Of Their Counselling On NCD Patients About Knowledge And Service Utilization Under Ayushman Bharat In A Selected Block Of Vadodara

Vasudha Vyas, Hemanagini Gandhi
Department of Foods and Nutrition, Faculty of Family and Community Sciences,
The Maharaja Sayajirao University of Baroda. Vadodara 390012, Gujarat.

Email Id:vasudha11026@gmail.com

Abstract

The global burden of Non-communicable diseases is increasing. The Government of India launched Ayushman Bharat scheme to deliver comprehensive health care services, at primary, secondary and tertiary level. This study was carried out by focusing on the service provided under **Ayushman Bharat Health and Wellness Centre** (AB-HWC), 'screening, prevention and control of NCDs'.The broad objective was capacity building of health and wellness functionaries and the impact of their counselling on NCD patients about knowledge and service utilization under Ayushman Bharat in a selected block of Vadodara. The study was conducted in a rural block of Vadodara district through random selection. In this block, one Primary Health and Wellness Centre (PHWC) and one Sub health and wellness centre (SHWC) was selected randomly. The study was divided into three phases; The knowledge of total 39 AB-HWC functionaries [Including Community Health Officer (CHO), ASHA facilitator and ASHAs], and total 96 NCD patients was assessed regarding basic knowledge of NCDs , it's prevention, management and service delivery under AB-HWC using semi-structured questionnaire. In phase II, a training module and counselling cards for capacity building of functionaries were developed. An one-day training program was conducted for functionaries. All the aspects of NCD prevention and management were covered in the training programme. At the end of the training program, one hard copy of the training module was given to functionaries. Activities for prevention and management of NCDs were planned and monitored for 12 weeks for a period of 3 months. After 12 weeks impact of training and counselling on knowledge of functionaries and patients was assessed. As per AB-HWC guidelines, in the selected PHWC and SHWC facilities were there; HWC functionaries had basic knowledge about NCDs but had poor knowledge regarding management and knowledge improvement was found in HWC functionaries regarding management of NCDs and NCD service delivery. 58% ASHAs were conducting counselling session whereas post training 81% ASHAs responded that they conduct counselling session at HWC for NCD patients (t= -2.11, df=30, p-value= 0.043, mean df =). There was keen improvement was found in the knowledge and practices regarding management of NCDs among NCD patients. Among diabetic patients, frequency of visit to HWC was increased from19% to 35%. Majority of patients reduced the intake of calorie dense foods such as sugar, jaggery, refined flour(11%,) High fat, sugar, salt foods (HFSS)(60%,). There was an improvement in the regular millet consumption as 96% of patients responded that they consume millets regularly. Only 19% of patients were doing extra physical activity (35.5%), after counselling improvement was found as 40% of patients responded that they do exercise / extra walking every day. It can be concluded that there is a need to sensitive HWC functionaries CHO, ASHA facilitator, and ASHAs on NCD related risk factors, it's management, need for promoting healthy diets and NCD related activities to be carried out regularly. There is a need to integrate NCD related aspects in their weekly meeting or trainings for effective delivery and utilization of services related to NCDs to achieve target of SDG 3.

Keywords: Non- communicable diseases, Ayushman Bharat, Primary Health and Wellness Centre, Sub -Health and Wellness Centre

Aiswarya S Kumar

Development Of Nutritious Instant Soup Mix, Its Determination Of Physiochemical Properties And Nutrient Analysis

Aiswarya S Kumar., Kavitha Vijayan
Department of Family And Community Science, CMS College Kottayam, Kerala
E-mailId: aiswaryasreekumar201@gmail.com, kvkavithavijayan@gmail.com

Abstract

The commercially available instant soup mixes are loaded with additives and are less in nutrients. Therefore, this study aimed to develop a nutrient-rich instant soup mix using sprouted garden cress seed, red kidney beans, and amla, and to conduct an analysis of its nutrient and physicochemical properties. The recipe was standardized for 20 grams of instant soup mix powder in 200ml of water. Four alternative formulations were created with various component ratios. The formulation with a larger ratio of sprouted garden cress seed powder, along with equal amounts of red kidney beans and amla powder is selected as the best variant. Proximate composition and nutrient analysis were done in the experimental analysis along with its physiochemical properties such as water absorption capacity, swelling capacity, soluble solids, total ash, and acid insoluble ash. In the determination of proximate composition the energy, protein, fat, carbohydrate, and moisture content of the developed instant soup mix is 365.32kcal,28.81g/100g, 3.0g/100g, 55.77g/100g, 8.83g/100g respectively. In the nutrient analysis, iron and calcium are 23.148mg/100g and 282.02mg/100g. The total antioxidant activity is 567mg/kg. The physicochemical properties such as water absorption capacity, swelling capacity, and soluble solids are 18%, 10%, and 0.7% respectively. The total ash and acid insoluble ash are 3.59g/100g and 0.09g/100g. It can be concluded that the developed instant soup mix is more nutrient dense and healthier than the commercial instant soup mix.

Key words: Instant Soup Mix, Garden Cress Seeds, Red Kidney Beans, Amla, Physiochemical Properties.

Denciya K Mathew

Development Of A Weaning Mix, Its Determination Of Physio chemical Properties And Nutrient Analysis

Denciya K Mathew., KavithaVijayan
Department of Family And Community Science, CMS College Kottayam, Kerala
EmailId: denciyamathew@gmail.com,kvkavithavijayan@gmail.com

Abstract

This study aimed to develop a nutrient rich and low cost weaning mix using bengal gram, green gram, carrot, soyabean, almond, sesame seed and different dried leaves suchas *Boerrhaviadiffusa, Talinumcrassifolium,* tender green gramleaves, drumstick leaves, amaranth leaves, and to conduct an analysis of its nutrient and physiochemical properties. The weaning mix was formulated and standardized for 100g. Five variants were developed with incorporation of five different driedleaves. The formulation with dried leaves of *Boerrhaviadiffusa*is selected as the best variantusing organoleptic evaluation with five point Hedonic scale. Proximate composition and nutrientanalysis were done in the experimental analysis along with its physiochemical properties such aswater absorption capacity, swelling capacity, soluble solids, total ash, and acid insoluble ash. In the determination of proximate composition the energy, carbohydrate, protein, fat, fibre and moisture content of the formulated weaning mix is 414.3kcal, 80..11g/100g, 17.0g/100g, 8.1g/100g,13g/100g and 3.96g/100g respectively. In the nutrient analysis, iron and calcium are 6.5mg/100g and103.9mg/100g. The total antioxidant activity is 132mg/kg. The physic chemical properties suchas water absorption capacity, swelling capacity, and soluble solids are 12%,50%, and 0.75% respectively. The total ash and acid insoluble ash are 2.59g/100g and 0.07g/100g. It can be concluded that the formulated weaning mix is more nutrient dense and healthier than the commercial weaning mix.

Keywords: weaning Mix, Bengalgram, *Boerrhaviadiffusa,* drumstick leaves, Physiochemical Properties

Won Excelsior Award

SreekuttyVS

Influence Of Pms Symptoms On The Day-To-Day Activities, Academic Performance, Social Relationships And Work Productivity Among Women Of 18-25 Years In Kollam District

[1]**Sreekutty V S&**Bhagya D[*]

[1]Research Scholar, Post Graduate Department and Research Centre of Home Science, Government College for Women, Thiruvananthapuram, University of Kerala

[*]Assistant Professor, Department of Home Science, St Joseph's College for Women, Alappuzha, Kerala

Email Id: sreekuttyvs1996@gmail.com , bhagyasjcw@gmail.com

Abstract

Premenstrual Syndrome is a cluster of symptoms both physical and emotional which occurs during the luteal phase of the menstrual cycle. Symptoms begin shortly after ovulation, increase in severity, and peak during the last 5 days before menstruation. The aim of the study was to determine the influence of PMS symptoms on the daily life activities, academic performance, work productivity and social relationships and to determine the effect of duration of menstruation and cycle length among women aged 18-25 years in Kollam district. The study was conducted on 100 women (18-25 years). The women were then classified according to the BMI using Asian Pacific Guidelines (2000). Participants were asked to prospectively complete questionnaire, which included information about demographic data, menstrual patterns, and symptoms recorded on a daily calendar of premenstrual experiences according to the diagnostic criteria proposed by the American College of Obstetricians and Gynecologists (2000). Statistical analysis was carried out using SPSS Amos 2023 version software and Multi – layer analysis. The study reported that there was significant impact of PMS symptoms on the daily life activities, academic performance, work productivity and social relationships of women belonging to 18 – 25 years. The influence of duration of menstruation and cycle length on the overall productivity of women was about 34.2%. The greater influence was on the home responsibilities followed by social activities, educational performance and work productivity. From the results it was found that each and every PMS symptom assessed are closely related and influence the involvement of women in their day-to-day life activities. So, this may greatly affect the overall quality of life of women. **Key words: Premenstrual Syndrome, Symptoms, Work Productivity**

MATHEMATICS

Won Second Prize

Vaishakh K. J.

Analysis on Topological Groups

Noufal A. and **Vaishakh K. J.**

Department of Mathematics, Cochin University of Science and Technology Cochin - 22, Kerala, India.

Abstract

A subfield of mathematics called harmonic analysis is concernedwith the generalised ideas of the Fourier series, and Fourier transformsas well as the representation of functions as the superposition of fundamental waves. It has numerous uses in quantum physics, signalprocessing, representation, and number theory. The study of topological groups is one of the harmonic analysis's more recent subfields.In this effort, we hope to generalise the ideas behind Fourier analysismoreabstractly.Commutative and non-commutative harmonic analysis are the twocategories. Here, we go through the commutative harmonic analysisnotions. A group having a topology such that the product and inversion maps are continuous is referred to as a topological group. Alongwith topological qualities, topological groups also have group properties. In the generic topological configuration, translation and inversion are typically not possible. However, an identical result can beobtained in a topological group by translating and inverting open sets(or closed sets). Most separation qualities, including Hausdorfness,regularity, and complete regularity, are also satisfied in topologicalgroups.The development of the left Haar measure on a locally compactgroup is crucial to the success of this effort. The radon measure thatis left invariant is the left Haar measure. We demonstrate the existence and singularity of a left Haar measure on a locally compactgroup using the Riesz representation theorem, Urysohn's lemma, Tychonoff's theorem, and the Fubini-Tonelli theorem. We opened up a space for generalisation by demonstrating the existence and originality of the left Haar measure. From this point forward, we can redefineevery term from traditional Fourier analysis, including convolution,approximation identity, and others in a locally compact group.The study concludes by providing an association between a locallycompact abelian group and its dual. Specifically, "Every locally compact abelian group is its dual group" Pontryagin duality theorem is awell-known theorem studied in a locally compact abelian group. **Keywords : Topological group, Haar measure, Dual group**

Won Excelsior Award

Arun J. Manattu

On Geodesic Leech Labeling of Cycles and Wheels

Aparna Lakshmanan S. **and Arun J. Manattu**

Department of Mathematics, Cochin University of Science and Technology Cochin - 22,

Kerala, India.

E-mailid : aparnals@cusat.ac.in, aparnaren@gmail.com

Abstract

Let $f : E \rightarrow \{1, 2, 3, \ldots\}$ be an edge labeling of G. The geodesic path number of G, $t_{gp}(G)$, is the number of geodesic paths in G. An edge labeling$f$ is called a geodesic Leech labeling, if the set of weights of the geodesic paths in G is $\{1, 2, 3, \ldots, t_{gp}(G)\}$, where the weight of a path P is the sum of the labels assigned to the edges of P. A graph which admits a geodesic Leech labeling is called a geodesic Leech graph. Otherwise, we call it a nongeodesic Leech graph. In this paper, we prove that cycles C_n, $n \geq 5$ are non-geodesic Leech graphs. The geodesic path number of the wheel graph W_n is obtained and the geodesic Leech labeling of W_5 and W_6 is given.

Keywords: Leech Labeling, Geodesic path number, Geodesic Leech Labeling, Geodesic Leech Graph

Won Third Prize

Navaneeth K.

Different Energies of p-Splitting and p-Shadow Graphs

Binu M.*, **Navaneeth K.**

Department of Mathematics, St. Albert's College (Autonomous), Ernakulam, Kerala-682018, India.

*E-mail Id: binum@alberts.edu.in

Abstract

The spectral graph theory is a major area of study and energy of graphs has numerous applications in our present life. Energy of a graph depends on eigen values of its adjacency matrix. It is extensively used in drug design, network analysis, problems of air transportation, pattern recognition, and so on.This project concentrates on the study of certain energies of p-splitting and p-shadow graphs derived from connected simple graphs. Related results are obtained and it will be an add on to the existing research in this area.

Key words: Graph Energy, Simple Connected Graph, Regular graph, p-splitting graph, p-shadow graph

PHYSICS

Won Excelsior Award

M. ASISI JANIFER

Comparative Study On The Synthesis And Characterization Of Tio_2 /Yttrium Iron Garnet/Activated Carbon, Reduced Graphene, Carbon Nanotubes Ternary Nanocomposites For The Removal Of Heavy Metals And Its In-Vitro And In- Vivo Toxicity Assessment

M. Asisijanifer

Department of Physics, Stella Maris College, University of Madras, Chennai-600034, India

E-mail Id: asisijanifer@stellamariscollege.edu.in

Abstract

This research work presents the importance of adsorption mechanism by YIG/TiO_2/AC, rG, CNT ternary magnetic nanocomposites for the removal of heavy metals from water. YIG ferrite was incorporated for retrieving the adsorbent after operation. To further enhance the adsorption capacity of the above mentioned magnetic nanocomposite, carbon compound was used as a support system for the remediation process. So, the systematic workability of TiO_2/$Y_3Fe_5O_{12}$ / AC, rG, CNT at 3:1:3 ratios were chosen. Initially, TiO_2, YIGand carbon compounds were prepared using hydrothermal, sol- gel and carbonization methods respectively. Ternary nanocomposites were synthesized using ultrasonication assisted hydrothermal method. The co-existence of titania, YIG and other carbonaceous materials are confirmed through various characterization studies and its crystal structure, morphology, elemental composition and chemical analysis of the samples were systematically investigated using X-ray Diffraction (XRD), Fourier Transform Infrared Spectroscopy (FT-IR), Raman Spectroscopy, High Resolution Scanning Electron Microscopy (HRSEM), Energy-Dispersive X-Ray Spectroscopy (EDAX), High Resolution - Transmission Electron Microscopy (HR-TEM) and X-ray Photoelectron Spectroscopy (XPS) respectively. The sample was investigated for the removal of heavy metals such as chromium, lead and copper metal ions using Atomic Absorption Spectroscopy (AAS). After the remediation process also, there may be fine traces of adsorbent that remain in the treated water. Hence, the potential adsorbent TiO_2/$Y_3Fe_5O_{12}$ /AC was investigated for its in-vitro toxicity analysis before commercialization. Therefore, the sample was analyzed for its toxicity in normal vero cell line. TiO_2/ YIG /AC showed 97.53% of cell viability which proves its non-toxicity behavior. Moreover, the sample was also assessed for the Histopathology of adult zebra fish based on acute toxicity study. No mortality and toxicity was observed in the control and treated group during the experimental period which is also confirmed with histopathological report.

Keywords: Adsorbent, activated carbon, cell viability, histopathology

Won Excelsior Award

Elizabeth Thomas

Solar Activity And Rainfall: A Distinct Relation

Elizabeth Thomas[1], Irene Joseph[2,] Punnya. S. Kumar[1], Noble P. Abraham[1] *

[1]Department Of Physics, Mar Thoma College, Tiruvalla, Kerala-689103, India.

[2]department Of Physics, Devaswom Board Pamba College, Parumala, Kerala, India

'Present Address: School Of Physics And Astronomy, University Of Glasgow, Glasgow, Scotland, United Kingdom, E-mail Id: noblepa@gmail.com

Abstract

Understanding the solar activity cycle has become very important as solar variations can affect the Earth's space environment in many ways, even damaging it. Quantification of solar activities is done with the help of several indices, most of them are highly correlated with each other and vary with the 11-year cycle. In this work, we review the status of studies related to the influence of solar activity/ sunspots on the rainfall pattern over India. We summarize the earlier studies in the recent part. A discussion on different tools employed by various authors in quantifying solar activity and it's possible connection with climatic parameters, were also included. Then, we explore the influence of solar activity on rainfall over Kerala, India. Sunspot number, a proxy for solar activity and rainfall over Kerala in mm, during 1871-2016 are used for the study. Correlative studies are performed for various seasonal months and the corresponding correlation coefficients and their significance are computed. We find that Kerala rainfall is correlated with solar activity, with varying significance. January - February (JF) and June - July - August - September (JJAS) seasons show a significant correlation for short time scales. Wavelet analysis were performed on the rainfall and sunspot number time series to determine dominant periods. These analyses give an insight on common periodicities. Common features in the wavelet power of the two-time series were visible at 8-12 years with varying significance, suggesting a relationship among them.**Keywords: Solar Activity, Rainfall Over Kerala, Sunspot Number, Correlation, Wavelet Analysis**

Won Excelsior Award

Rohith Prathap

Influence Of Metal Ions On Luminescence Properties Of Graphene Quantum Dot-Rhodamine 6G Complex

Rohith Prathap[1], Dhanya P Jacob[2] ,Sree Sankar S S[3], Subin Thomas[4], K N Madusoodanan[3], Dr. Savitha Nalini*[1].

[1]Department of Physics, Sree Narayana College, Cherthala , Kerala-688582, India.
[2]Department of Physics, Cochin University of Science and Technology, Kerala-682022, India.
[3]Department of Instrumentation, Cochin University of Science and Technology, Kerala-682022, India.
[4]Department of Physics, St Joseph's College, Moolamattam, Kerala-686512, India.
*Email Id: nsavitha01@gmail.com

Abstract

Detection of heavy metal ions in the environment and biological samples is essential because of their adverse effects on the ecosystem. Novel sensing technologies for the selective and sensitive detection of metal ions have now become a concern. A fluorescence-based sensing platform is a viable and established approach in this regard. Graphene quantum dots (GQDs) are widely accepted fluorescence probes for detecting heavy metal ions. In this project, GQDs were synthesized from the carbonization of citric acid. The fluorescence of GQDs dissolved in water was analysed in detail. The blue emission of the quantum dots indicated the size of the quantum dot in the range of 16 nm. GQDs were characterized using Raman spectroscopy, Fourier transform infrared spectroscopy and UV-Visible spectroscopy. The average size of the particle was found to be 16 nm from dynamic light scattering analysis. A two-fluorophore system was established using graphene quantum dots and Rhodamine 6G. The energy transfer between two fluorophores was understood from the analysis of the fluorescence spectra of the complex when excited with different wavelengths. The influence of metal ions on the complex was understood from the photoluminescent spectra recorded from the complex. The system showed a selective response to Fe^{3+}. Thus, a ratiometric approach has been developed for probing the interaction of metal ions with two fluorophore complex using GQD. This work can be a stepstone for advancing a ratiometric approach to sensing heavy metal ions and biomolecules.

Key words: Graphene quantum dots, Photoluminescence, Rhodamine 6G, Sensing of ferric ions

Won Second Prize

Parvathy S

Trend Analysis Of Rain In Kochi

Parvathy S., and Gopakumar Ramakrishnan*.

[1]Department of Physics, Sree Narayana College, Cherthala, Kerala-688582, India.
*E-mail Id: gopakumar.ramakrishnan@gmail.com

Abstract

Rain plays a vital role in the lives of human beings, as it is the major supplier of water, the primary ingredient of life. Rain has also other effects on the day to day lives of people. For example, rain causes difficulties in the road traffic. Study of the trends in rain is therefore very essential. In this study, we have quantitatively analysed the rainfall in Kochi for the period 2006 to 2020. The rainfall over different months in a year has a specific pattern. The two major Monsoon seasons, the southwest and the northeast monsoons seem merged into a single rainy season in Kochi. The pattern is studied for different years separately.

Key words: Weather, Rainfall, Kochi, Monsoon, Meteorology

Arunima Shaji

Investigating The Effect Of Temperature On Efficient Formation OF Cu2ZnSnS4 Nanoparticle As A P-Type Absorber Material

Arunima Shaji[1], Bincy John[1*]

Email Id: bincyjohnfdcc@gmail.com

Abstract

The Copper Zinc Tin Sulphur (CZTS) is the quaternary compounds of stannite structure; which has a band gap of about 1.50 eV. CZTS is the direct band gap semiconductor material which has a high absorption coefficient and having a multilayer structure. It's abundant component elements in the earth crust are nontoxic and environmentally friendly can be used for in opto -electronic applications. Cu2ZnSnS4 nanomaterial were synthesized by solvothermal method and the physical properties of powdered nanoparticles as a function of temperature are investigated. The nanocrystalline powders of Cu2ZnSnS4 using source materials Cu, Zn, Sn, S in the ratio 2:1:1:4 are investigated. The structural and optical properties of the nano material where studied by XRD, UV, PL characterisations. The morphological studies can be carried out using FESEM & EDS techniques. Optical studies are carried out using UV-Visible-NIR Diffuse reflectance and Photoluminescence spectroscopy respectively. XRD & Raman results confirmed the presence of CZTS material in the final product of the material. The approximated width of the nanoparticle at high temperature by FESEM analysis is confirmed. By EDS analysis the uniform distribution and the compositional ratios of materials (Cu,Zn ,Sn ,S) consisting in the compound have been accessed. The optical bandgap have been find by tauc plot via UV-Visible method. The optimum condition suitable for synthesising high quality CZTS nanoparticle is at 220 ºC. The extend of optically excited radiation and the maximum peak value of intensity can be obtained by PL method. Cu2ZnSnS4 (CZTS) compound has the potential properties for PL applications. The influence of different temperatures (220 ºC, 230 ºC) and time in the nanostructure have significant effect on the crystal structure composition, morphology and bandgap.

Keywords: Quartenary, Semiconductor, Temperature, Nanostructure

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Ashwini S Pillai **NajiyaNazar**

Mathematical ModelingOf Rogue Waves In A Multi-Ion Cometary Plasma To Study The Effect Of Heavier Ions And Dust

Ashwini S Pillai[1], **Najiya Nazar**[1], **Sreekala G**[1*]

Department of Physics, [1]St. Joseph's College for Women, Alappuzha, Kerala- 688001, India

E-mail Id: sreekala@stjosephscollegeforwomen.ac.in

Abstract

We have studied the formation of rogue waves in a multi-ion cometary plasma by deriving the Korteweg de-Vries (KdV) equation and nonlinear Schrodinger equation (NLSE) by reductive perturbation method. The super thermal kappa distribution which provides an unambiguous replacement for a Maxwellian distribution in space plasmas is connected with non-extensive Statistical Mechanics and provides a continuous spectrum of energy. Hence, we model electrons by kappa distribution. We considered plasma composed of pair-ions (positively and negatively charged hydrogen ions), dust (positively and negatively charged) and electrons (cold and super thermal) which well satisfied with the coma of comet Halley and studied the effect of each component especially super thermal electrons and charged dust grains in the formation of solitary and rogue structures. For numerical study, the parameters observed in the coma of comet Halley are used.

Keywords: Rogue waves, Korteweg de-Vries (KdV) equation, nonlinear Schrodinger equation (NLSE), dusty plasma, kappa distribution

Sebesteena Xavier

Impact Of Interplanetary Magnetic Field On Earth's Magnetosphere Under Various Solar Activit Conditions

Sebesteena Xavier., & Remya Remanan*

Department of Physics, S N College, Cherthala, S N Puram, Kerala 688532

Email Id: sebesteenaxavier99@gmail.com, drremyaremanan@gmail.com

Abstract

In this study, we analysed the hourly variations of IMF B_z ,plasma speed and Dst index during the years 2009-2022. The yearly variation of these parameters shows strong dependence on solar activity variations and there exists a positive correlation between the product of IMF $B_z$and plasma speed with Dst index. Analysing the number of disturbed hours in the inclining phase of 24th solar cycle and 25th solar cycle, it is observed that the disturbances are very low in the current solar cycle which leads to the decreasing trend of the activity of the sun.

Key Words: Geomagnetic Storm, Plasma Speed, Interplanetary Magnetic Field, Solar Activity

Sethulekshmi B

Amla Juice Assisted Synthesis Of Silver Nanoparticles For The Study Of Photocatalytic And Antimicrobial Activities

Sethulekshmi B[1], Malu Somaraj[1]*

[1]Department of Physics,S. N. College, S.N. Puram P.O, Cherthala, Alappuzha, Kerala-688582, India.

*E-mail Id:sethulekshmib1999@gmail.com, malusandram@gmail.com

Abstract

The dyes used in textile, chemical and other similar industries cause great damages to the environment. The usually used methods for the wastewater treatment from these industries are ion exchange, foam floatation, filtration etc. which require advanced technology and are less economical. The Antimicrobial resistance (AMR) is recognised as one among the top 10 global threats by the WHO. The microbes are now more resistant towards the antibiotics used in the treatment of various infections. So, alternative methods have to be developed as a remedy to both situations. This work highlights the potential of silver nanoparticles to act as an antimicrobial agent and the photocatalytic activity exhibited by the nanoparticles in the degradation of the methyl orange dye. Silver nanoparticles are synthesized by co-precipitation method using amla juice as the capping agent. NaOH reduces the silver nitrate to silver nanoparticles in alkaline medium. The average particle size of the synthesized nanoparticles is 28.83 nm. The synthesized sample is added to a solution of methyl orange dye and is irradiated with UV radiation. It is observed that nearly 55% of the dye is degraded after 150 minutes itself. The zone of inhibition of diameter 9 mm is obtained for E. coli bacteria using filter paper disc diffusion technique. Hence the silver nanoparticles can be effectively used as antimicrobial agents and the catalysts of maximum activity can be developed by doping them with silver.

Key Words: Silver Nanoparticles, Synthesis, Photocatalytic Activity, Antimicrobial Activity, Methyl Orange

Anjali Antony

Neutrino Oscillation: A Study OfIcecube Experiment

Anjali Antony[1*], Rose Leena Thomas[1]

Assistant Professor & HOD of Physics

St. Joseph's College for Women, Alappuzha

Kerala - 688001, India.

*E-mail Id: anjaliantony02@gmail.com

Abstract

Neutrinos were known as 'the Ghost Particles' when they were conceptualized because of their peculiar properties and challenges in detection. Scientist believed that the neutrinos are elusive particles that may hold the key to many of our universe's mysteries. Even after 66 years of its discovery and a lot of experimental studies, they still remain as a puzzling member of the standard model. Neutrinos are extremely hard to detect because for them 'the matter' simply doesn't matter. This project aims at exploring the journey of neutrinos from detection and looks at some of its unique and mysterious properties under framework of existing and evolving theories. Here we take a look at the basis of elementary and particle physics, and a detailed study of standard model. We also concentrate on the neutrinos and concepts related to is discovery, production, important properties, various flavors, detection etc. Our main study focuses on the experiments carried out at the "The IceCube Neutrino Observatory" related to neutrino flavor transitions. Special emphasis is given to probability of neutrino oscillation and neutrino oscillations arises from mixing between the flavour and mass eigen states of neutrinos.

Key words: Standard model, Neutrino, Ice Cube Experiment

Vishnupriya V C

Study Of Uneven Rainfall In Thiruvananthapuram District

Vishnupriya V C., & RemyaRemanan*

Department Of Physics, S N College Cherthala, S N Puram, Kerala, 688523

Email Id: vishnu8075494179@gmail.com, drremyaremanan@gmail.com

Abstract

In this project, we studied the data of past 3 decades of Thiruvananthapuram district and analysed the changes in maximum temperature, maximum pressure and total rainfall from the year 1988 to the year 2018. Also, analysed the monthly variation in the amount of rainfall in the years showing heavy rainfall. The variations in the amount of rainfall during southwest and northeast monsoons of these years are analysed and found an abnormal increase in the amount of annual rainfall in the years 2015, 2016 and 2018. Further analysis is done for the changes in rainfall during each month of southwest monsoons in the selected years, analysed the changes in rainfall per day in the month of August of these years and a varying trend in the pattern of precipitation is observed. This is caused as a result of uneven rainfall which eventually lead to flood.

Keywords: Rainfall, Southwest monsoon, Northeast monsoon, Flood

Won Excelsior Award

Fidha Fathima

Thermoelectric Mini Refrigerator

Fidha Fathima[1], Morris Marieli Antoinette[1*]

[1]Department of Physics, St. Joseph's College for Women, Alappuzha, Kerala-688001, India

*EmailId:marieli.fdcc@gmail.com

Abstract

In recent years, with the increase in the awareness towards environmental degradation and due to the production and the use and disposal of Chlorofluorocarbons (CFCs) and Hydro Chlorofluorocarbons (HCFCs) as heat carrier fluids in conventional refrigeration and air conditioning systems have become a subject of great concern. This resulted in extensive research and the development of novel refrigeration and space conditioning technologies. The global increasing demand for refrigeration in field of refrigeration air-conditioning, vaccine storages, medical services, food preservation and cooling of electronic devices etc. led to the production of more electricity and consequently more release of CO^2 all over the world which is a contributing factor of global warming on climate change. Thermoelectric refrigerator is an alternative because it uses less amount electricity. It can replace conventional refrigeration cycles/methods with a doped semiconductor material and can convert it for useful cooling, also expected to play an important role in tackling today's energy challenges.

Keywords:Chlorofluorocarbons, Thermo Electric, Conventional, Refrigeration

Won Second Prize

Sofia Kora Joseph **Syamili.S**

Arduino Based Blind Stick

Sofia Kora Joseph, Syamili.S, Bincy John*

Department of Physics, St. Joseph's College for Women, Alappuzha, Kerala-688001, India

*E-mailId: bincyjohnfdcc@gmail.com

Abstract

Eminent scientist Stephen Hawking said once, "If you are disabled, it is probably not your fault, but it is no good blaming the world or expecting it to take pity on you. One has to have a positive attitude and must make the best of the situation that one finds oneself in." Technology is meant to make our life easier. Disabled people need not be entangled by their limitations, but can overcome their disabilities through technological innovations. Blindness is a very common disability among the people throughout the globe. The blindstick comes as a proposed solution to enable them to move safely through the world around. In this work we propose a solution, represented in a blindstick with a pair of ultrasonic sensor to detect any other obstacles in front of the user, within a range of 20 cm. Buzzer alarm is activated when any obstacle is detected. This proposed system uses the microcontroller ATmega328P embedded system. The stick is capable of detecting all obstacles in the range 20 cm during 10 microseconds and gives a suitable respect message empowering blind to move twice his normal speed because they feel safe. The blindstick is of low cost, fast response, low power consumption, light weight and easy to handle. The blind stick is integrated with ultrasonic sensors along with Arduino UNO. The ultrasonic sensors are used to detect obstacles ahead using ultrasonic waves without any contact with the obstacle. While developing such an empowering solution, visually impaired and blind people in all developing countries were on the top of our priorities.

Key words: Blindstick , Arduino , Ultrasonic Sensor

Ahalya Ravi

Aqua – Hover: A Novel Integrated Water Filtration System That's Runs On Solar Energy

Ahalya Ravi , Amrita Vijayan , Sidharth Vinod, George Thomas*
Department of Physics, Catholicate College, Pathanamthitta, Kerala -689645, India.
*E-mail Id: geonce@gmail.com

Abstract

India is a country enriched by majestic ocean bodies, gigantic rivers, mammoth waterfalls and beautiful lakes. Unfortunately, these water bodies are getting polluted due to heavy industrialization and urbanization. Half of the world's inhabitants will live in water scarce areas by 2025, so every drop of polluted water today is an irreparable loss for tomorrow. In this scenario, we strive to foster a futuristic innovative idea which can tackle water pollution to a great extent. The proposed system, entitled "Aqua-Hover" is a filtration device that runs on solar energy which can be made to float over water bodies so as to improve the quality of water by removing the toxic organic matter dissolved in it. The mechanical energy required to run the system is produced out from solar energy using a solar thermal device, like that of a flat plate collector or a photovoltaic system. The body of the system can be made out of recycled plastic and the filter fiber required can be of any organic matter such that the system strictly abides to the 3R concept, i.e. Reduce, Reuse & Recycle. Since the system is made eco-friendly and non-polluting, it is an ideal stratagem that can be used both for commercial as well as domestic purposes, as it is made feasible as well as economical to buy. The proposed system shows a cutting edge over other methods in the sense that it is easy to drive as well as, it is feasible to confer even though it may not produce any sudden proliferating impact over the standard of water, but should definitely make the quality of water to foster over time. As a crucial step towards conserving water, the proposed system could have both environmental as well as economic knocks in the near future.

Key Words: Aqua-Hover, Water Filtration Device, 3R Concept, Recycled Plastic, Economic Feasibility

Anakha Somasekharan

A Study On Nanomaterials And Its Applications

Anakha Somasekharan, Anjana Soman, Harikrishnan .U, Shibin.S Parvathi
M.R Department of Physics, NSS College Cherthala, Kerala, India E-mailId;
parvathiabhin@gmail.com

Abstract

Miniaturisation has always fascinated humanity and making things smaller than what was possible has been a challenge. It is a trend that " small become beautiful rather than big" that brought focus on nano. Nanoscience is the major area of research today.This project is an outcome of our enthusiasm , curiosity as aspiring science students to study more about Nanoscience, Nanotechnology, Nanomaterials and its applications in present scenario. Here we have tried to make a review and knowledge about nanomaterials, history of its development ,methods of preparation , properties and its applications. The difficulties with nanomaterials arises from the fact that ,in contrast to conventional materials, a profound knowledge of materials science is not sufficient. Nanoscience is an emerging area of science which concerns itself with the study of materials that have very small dimensions and it involves chemistry, physics, biology, mathematics , cognitive science and life science. Nanotechnology is the engineering of functional systems at the molecular scale. It is very diverse and in its original sense, refers to the projected ability to construct items from the bottom up, using techniques and tools being developed to make complete high performance products. The nanoworld of nanoscience and nanotechnology provides scientists with a rich set of materials useful for probing the fundamental nature of matter.

Key words : Nanomaterials, Preparations , Properties and Application

ZOOLOGY

Oceans in Anthropocene: Climate Action and Sustainability

Riyas Rahman, Abhijith E. and **Sureshkumar S.**
Kerala University of Fisheries and Ocean Studies,
Panangad, Kochi 682 506, Kerala, India.

Humankind has been damaging the seas for decades by destroying coastal ecosystems and overexploiting fish stocks. Discharging pollutants into the water and other waterbodies that ultimately reach the sea threatens the ocean's health. Ocean warming and ocean acidification due to anthropogenic activities are new global-scale threats which affect the seas today. A framework for sustainable utilisation of oceans will be an exact requirement of the hour to develop appropriate environmental policy measures to be taken from now on.

After the Millennium Development Goals (MDGs) set by the United Nations in 2000, Sustainable Development Goals (SDGs) became the new framework for the world for sustainable development. The 17 goals described in SDG were designed to share forever a blueprint for peace and prosperity for people and the planet. The most important SDGs related to the aquatic systems are SDG 13, Climate Action and SDG 14, Life below water.

It is generally agreed in the scientific community that climate change's effects are being felt worldwide in the form of extreme weather events such as floods, droughts, landslides and so on. Consequently, there is increasing pressure to take necessary action. However, public perception is far from this scientific understanding, at least on a practical scale. A lot has been spoken about, but little action has been taken.In the 2015 Paris Conference (COP 21) on climate change, 194 member states of the United Nations Framework Convention on Climate Change (UNFCCC) signed the agreement, which envisaged to cover actions including climate change mitigation, adaptation, and finance to tackle the global crisis. The Paris Agreement's long-term goal was to keep the rise in mean global temperature to well below two degree centigrade (2°C) above pre-industrial levels and preferably limit the increase to 1.5°C, recognising that this would substantially reduce the effects of climate change. However, little progress has been made since COP 26, and hence the recently concluded COP 27 have reiterated these goals.

Major economies and, thereby, major polluters of the world have shown remarkable reluctance and resistance to any measures that would aid climate change mitigation. Developed economies such as the United States and other European powers have pointed at countries such as China and India and blamed them for being major polluters in terms of gross carbon emission figures. Countries such as those involved in the BASIC (Brazil, South Africa, India and China) grouping have, in turn, pointed out that developed economies have been historical polluters and that any emissions are a by-product of necessary economic activity to achieve prosperity for their population. Amid the back and forth, little efforts have come to fruition, and smaller and vulnerable nations, especially island nations, have been paying the price of climate change. Many countries are experiencing the impacts of extreme weather events, such as floods in Pakistan and continuous droughts in Africa. Climate refugees have become a reality and not just a part of science fiction.

Public perception is largely at the mercy of politicians and rarely subject to pressures from scientific communities in most parts of the world. This is especially true for India. While we generally perceive trees as important to our environment, we are unaware of the massive importance of oceans and ecosystems. People are generally aware of how trees are important for the oxygen we breathe but are unaware that more than 50 per cent of this oxygen comes from oceans. SDG 14 is important here because it hopes to create public awareness and protect oceans and ecosystems. It is important to remember that humanity is only a part of the Earth and that our existence is connected with the existence and well-being of our blue planet. To care for it is to care for ourselves.

Won Excelsior Award **Dr. Anusree V Nair**

Development of a novel multiplex-PCR technology for the simultaneous detection of five major aquaculture pathogens along with an internal amplification control

Anusree V Nair*., Sumithra T.G., Reshma K.J., N.K.Sanil
Marine Biotechnology, Fish Nutrition and Health Division; ICAR-Central Marine Fisheries Research Institute (ICAR-CMFRI), Post Box No. 1603, Kochi-682 018
* E-mail Id: anuadithya2004@gmail.com

Abstract

A novel multiplex polymerase chain reaction (mPCR) technology was developed which can concurrently distinguish five major aquaculture pathogens *viz. Vibrio parahaemolyticus*, *Vibrio anguillarum, Vibrio alginolyticus*, *Vibrio vulnificus,* and *Vibrio harveyi.* These pathogens are known to cause a major threat to the aquaculture industry. For the assay, *toxR* of *V. parahaemolyticus*, *amiB* of*V. anguillarum, col* of *V. alginolyticus*, *vvhA* of *V. vulnificus,* and *topA* for *V. harveyi* were targeted. Additionally, a primer set targeting the conserved region of prokaryotic *16S rRNA* gene was included to differentiate the false-negative results. The optimum conditions for mPCR were obtained at 55°C with 1.5 mM MgCl2 and 5 pmol of each primer. The sensitivity in terms of DNA concentration was 0.2 ng for *V. harveyi* and 1 ng for the other four pathogens per µl assay. While the sensitivity in terms of CFU was 1.2×10^2 for *V. harveyi*, 5.2×10^2 for *V. vulnificus*, 1×10^3 for *V. anguillarum*, 3.8×10^3 for *V. alginolyticus,* and 5.6×10^3 for *V. parahaemolyticus* per µl assay in a mixed template. The 100% specificity of the assay was confirmed upon evaluation of 56 bacterial strains belonging to 47 different species. This research work is the first report on the technology developed for the simultaneous detection of five major fish pathogens along with an IAC in a single PCR reaction. The optimized new mPCR tool can be used for the quick, sensitive, and specific identification of five major fish pathogens without producing false-negative results through a single PCR reaction. Furthermore, it is having applications in the early diagnosis and disease management of aquaculture systems, the food industry, and microbial ecological studies in the future.

Keywords: ***Vibrio parahaemolyticus; Vibrio anguillarum; Vibrio alginolyticus***; ***Vibrio vulnificus***; ***Vibrio harveyi;*** Internal amplification control

Amala P.V

Development of an efficient green strategy for the shrimp shell waste valorization through microbial co-fermentation approach

Amala P.V., Sumithra T. G*., Reshma K. J., Sayooj P., Sneha Surendran
Marine Biotechnology, Fish Nutrition and Health Division, ICAR-Central Marine Fisheries Research Institute, Ernakulam North P.O, Kochi – 682018, Kerala
Email Id: rosmiamala19@gmail.com

Abstract

The shrimp industry forms a major global economic and food production sector by producing high-quality protein for human consumption. The sector, however, generates a large quantity of shell waste (SW), most of which is usually dumped into the sea or landfill, posing a serious environmental challenge. Management of shrimp SW through an eco-friendly technique is an environmental obligation to control pollution and to maintain the sustainability of shrimp industry. The study describes shrimp SW valorization strategy through harnessing the potential of the selected proteolytic and chitinolytic microbes for the first time. Three potential chitinolytic microbes (*Bacillus subtilis, Bacillus megaterium,* and *Bacillus amyloliquefaciens*) were initially identified by the screening process using colloidal chitin. The process demonstrated the essentiality of 5% glucose supplementation for the maximal chitinolytic activity. Single-stage co-fermentation of one chitinolytic strain in combination with one fish proteolytic strain (*Paenibacillus alvei*) was then tested in the unprocessed shrimp SW. The presence of the functional gene corresponding to their selected characteristic in these isolates was confirmed by PCR and the obtained sequences were submitted to GenBank (NCBI), foreseeing future biotechnological applications. Remarkably, the single-stage co-fermentation efficiently degraded the shrimp SW (90.91 ± 1.84% weight loss), with high deproteinization (93.03 ± 1.48%) and demineralization efficiency (97.6 ± 0.56%). The analysis through scanning electron microscopy revealed the cracked surface of the shells with several pores after the fermentation, demonstrating the degradation. More importantly, there was high NAG release (up to 532 mg/g of shell) which is having great potential in the medical industry. Further, high quantities of amino acids (~4500 µg/g) were released, indicating the application in the biofertilizer production. In summary, the study depicts an efficient, eco-friendly bioprocessing strategy for shrimp SW utilization with prospective bioremediation and valorization applications.

Keywords: Degradation; Demineralization; Scanning electron microscopy; Biofertilizer; N-acetyl glucosamine

Won Excelsior Award **Sneha Surendran**

Morphological and molecular characterization of a new species of *ceratomyxa* (myxosporea: ceratomyxidae) from the masked triggerfish, *sufflamenfraenatum*Latreille, 1804off cochin,arabian sea

Sneha Surendran*., N.K.Sanil., P. Vijayagopal.,Aswin Raj C.
Marine Biotechnology,Fish Nutrition and Health Division, ICAR-Central Marine Fisheries Research Institute, Ernakulam North P.O, Kochi–682018, Kerala
Email Id: sneharugmini@gmail.com:9400451236

Abstract

Myxosporeans are a species-rich group of spore-forming metazoan parasites infecting predominantly fishes and sometimes amphibians and even higher vertebrates.They have a wide distribution, and more than 2400 species under 62 genera and 17 families have been reported so far.Myxosporeansexhibit complex life cycles with sexual reproduction occurring in invertebrate definitive hosts such as aquatic annelids or bryozoans, and asexual reproduction in fishes. The genus *Ceratomyxa*Thélohan, 1892 is the second largest genus of myxosporea, and usually infects the gallbladder, and sometimesthe urinary bladder.The present study describes a new species of *Ceratomyxa* infecting the gallbladder of the masked triggerfish *Sufflamenfraenatum* collected from the Arabian sea, off Cochin with a prevalence of 43%. Mature myxosporesobserved floating in the bilewere elongated with convex anterior and straight posterior ends. Spore valves two, unequal, joined by a straight, prominent suture. Spores (n=30) measured 8.51 ± 0.9 µm in length and 35.09 ± 3.34 µm in width. Polar capsules two,unequal, spherical,positioned anteriorly, adjoining the suture line, measured 2.33 ± 0.23 µm in length and 2.27 ± 0.24 µm in width, and enclosed three coils of polar filament. The posterior angle measured 177.14 ± 5.18^0. Early sporogonic stages appeared spherical while the monosporicplasmodial stages were spherical to irregular in shape. The partial SSU rDNA sequence obtained from the present isolate was 1440bp long. In BLASTN analysis, the sequence showed the highest identity (93.84%) and least genetic divergence (6.25%) with *C. barnesi*reported from *Siganuslineatus*.In phylogenetic analysis, the present species clustered within the *Ceratomyxa* clade. Considering the morphological, morphometric, molecular, and phylogenetic variations with the previously described speciesof*Ceratomyxa* along with the differences in host and geographic locations, the present species of myxosporean is treated as new and named *Ceatomyxafranaeti* n. sp.

Key words:Myxosporean, *Ceratomyxa*, *Sufflamenfraenatum*, Molecular phylogeny,Gallbladder

Remya B.

Antimicrobial resistance study of *Vibrio parahaemolyticus* isolated from bivalves along the Kerala Coast

Remya B.,Krupesha Sharma S. R.*, Reynold Peter
Marine Biotechnology, Fish Nutrition and Health Division, ICAR-Central Marine Fisheries Research Institute,Ernakulam North P.O, Kochi – 682018, Kerala
*E-mail Id: krupeshsharma@gmail.com; +919449810746

Abstract

Vibrio parahaemolyticus is a halophilic motile bacterium that inhabits oceans and estuaries. These are human pathogens that cause gastroenteritis, wound infection, and septicaemia in individuals who consume raw, undercooked, or mishandled marine products. Antimicrobial resistance is a global public health concern, with seafood serving as a potential reservoir of antimicrobial-resistant isolates in the aquatic environment. *V. parahaemolyticus* were found to be resistant to multiple antibiotics. A total of 114 *V. parahemolyticus* isolated from bivalves were studied for antibiotic resistance. The highest resistance was observed against ampicillin (78%). Chloramphenicol was found to be sensitive to all the isolates. A multiple antibiotic resistance index (MAR) value of 0.2 or higher was observed in 18% of the isolates. The highest MAR index value observed was 0.7, indicating that the isolate was resistant to eight different antibiotics belonging to five different classes. Molecular analysis of AMR genes identified the bla TEM and tetracycline efflux gene (tetC). An antagonistic study with *Bacillusmegaterium*, *Bacillus subtilus*, *Pseudomonas aerogenosa*, *Staphylococcus haemolyticus* 78HL, and *Staphalococcussciuri*39HL, indicated that these non-pathogenic isolates have the potential to resist the growth of *V. parahaemolyticus*. Further research into these antagonistic properties may provide an alternative to commercial antibiotics for treating bacterial diseases in aquatic environments.

Key Words: Multiple Antibiotic Resistance, Estuarine Environments, Bivalves, Antagonistic Property, Vibrio

Won Second Prize **Elssa Ann Koshy**

First Report of Tardigrade Milnesiumsp from the Nilgiris,Tamilnadu

Elssa Ann Koshy

Molecular Biodiversity Lab, Department of Zoology,Government Arts College, Udhagamandalam, Tamilnadu

E mail Id: koshyelssa@gmial.com

Abstract

Tardigrades are aquatic micro-invertebrates, known as one of the 'Toughest animal on Earth' which is classifiedas a separate Phylum Tardigrada, placed between Arthropods and Onychophorans but shows morphologicallysimilarity to Arthropods and molecularly to Nematodes. They have the ability to undergo a phenomenon knownas cryptobiosis (anhydrobiosis, cryobiosis, osmobiosis, and anoxybiosis) which acts as a protection to surviveadverse environment and can revive back after years in a thin film of water. These species overcome damage, byproducing various bioprotectants which helps them to maintain the morphology and genome integrity. In ourstudy, for the first time we report the presence of *Milnesiumsp*a genus of Order Apochela (Class: Eutardigrada)identified from the mosses in the high-altitude region of the Nilgiris (2500 msl) in Western Ghats andobservations on its clutch size and egg laying pattern.The genus is identified by cuticle sculpturing, cuticular structures, six peribuccal and two lateral papillae, sixperibuccal lamellae, bucco-pharyngeal bulb with no placoids or septum and unique claws when compared toother Order. *Milnesium*tardigrades were grown individually in scratched plastic petri dishes feeding on ciliatesand rotifers. We watched *Milnesium*moulting and laying between one to seven eggs at a time, which is seendeposited in exuvia. Studies has shown the immense potential of these species to tolerate extreme desiccation,sub-zero temperatures, pressure and ionisingradiation. These species has a high chanceofbeingusedasamodel as it has proved its ability to even survive space environment and reduce the DNA damage caused byradiationinhumans.**Keywords : Tardigrades, *Milnesium*, Eggs, Exuvia, Moulting**

Won Third Prize **Anjooriya Jose**

Identification of New species from the genus Folsomia (collembolan:Isotomoidea) from the Nilgiris

Anjooriya Jose*,SenthilkumarNarmatha, RaveendranathanpillaiSanil.

Molecular Biodiversity Lab, Department of Zoology & Wildlife Biology, Government Arts College, Udhagamandalam -643002, The Nilgiris, Tamilnadu, India

Abstract

Folsomia Willem, 1902 is the largest genera in Aurophorinae with 202 identified species in the world and 5 species from India. This genus strongly varies in morphological characters like Furca, number of ommatidia, Post antennal organ, chaetotaxy of body and antennae. The taxonomically important character to get in to the genus folsomia include 1) abdominal segment IV-VI will be fused, 2) absence of apical bulb, 3) maxillary lobe with 4 sublobal hairs, 4) presence of post antennal organ (PAO), 5) Absence of ventral setae on thorax I & II, 6) presence of ventro-apical setae on manubrium (Potapow 2001; Fjellberg 2007). The genus folsomia is distributed all over the world and most of them are described from holoartic regions, recently from Asia (Brezina and Potapov 2006; Ding et al. 2006; Ji et al. 2007; Potapov and Gulgenova 2013) and from Europe also (Schulz and Potapov 2010). Mountaintops and polar regions are abundant in folsomia. The specimens were extracted from the leaf litter from the soil samples collected from the grasslands of Government Arts College campus (11°41'N, 76°71'E), Nilgiri Hills, Tamil Nadu, India. The specimen posseses following characters. Head: Eye present, 2+2 large ommatidia anterior one is larger than the posterior. Post antennal organ (PAO) very long and slender with narrow shape 1.5 times longer than Ant I, constriction present with double outline and 4-5guard chaetae present at the base of PAO Length and width of PAO 10 and 3 micrometers. Labral setal formula 4/5,5,4, Maxillary palp bifurcate with 3 sublobal hairs and 1 basal setae, Labium with 4+4 proximal setae present on both sides, mouth parts consist of Mandibles slender and elongated with 4+4 teeth. Maxilla present. Ventral groove with 4+4 setae. Ratio Ant I:II:III:IV- 1:2:1.7:3.2. Sensillar formula : 3 3/2 2 2 3 (s),0 2 /1 0 0 1 (ms), Macrosetae smooth and well differentiated, Short sensilla is present on both dorsal and ventral position of all tergites, Thrx II with 2 dorsal and 1 ventral, Thrx III with 1 dorsal and 2 ventral, Abd I with 1 dorsal and 1 ventral, Abd II with 1 dorsal and 1 ventral, Abd III with 1 dorsal and 1 ventral, Abd IV with 2 dorsal and 1 ventral. Short sensilla significantly differ from normal sensilla. Macrosetae smooth and well differented, 0 8/ 2 2 2 many. Thorax III: Ventral side of Thx III consist of many setae. **Key Words: Collembola, Isotomidae, Folsomia, Morphology, New Species**

Won Excelsior Award **Anusha A S**

Effectofselectedconcentrationsof Di- (2-ethylhexyl) phthalateon life cycle duration, protein profile and expressionof two ecdysone-regulated genes in *Culex quinquefasciatus* Say.

Anusha A. S., Ayana Gayathri R. V.

Department of Zoology, University College Palayam, Thiruvananthapuram, Kerala – 695034, India

E-mail Id :anusha1898@gmail.com

Abstract

The southern house mosquito, *Culex quinquefasciatus* Say, is a geographically widespread, abundant mosquito and an epidemiologically significant vector. Rapid urbanization has resulted in the creation of suitable habitats for cosmopolitan vector mosquitoes. Plastic wastes laden stagnant water serves as a major breeding site for mosquitoes. Plastics contain, phthalates which are highly toxic, and are used as plasticizers. The present study shows the effect ofDi (2- ethylhexyl) phthalate, DEHP on the duration of stages of life cycle through changes in protein profile and gene expression of EcRA, E75A in *Culex quinquefasciatus* Say. The duration of lifecycle was shortened by the full lifecycle exposure to DEHP. Elevation of whole-body protein and reduction of total free amino acids are indicative of the 4th instar larvae adapting to the xenobiotic, DEHP. The study also revealed the expression of larval serum protein in DEHP exposed 4th instar larvae which may have aided in early development. Furthermore, DEHP also caused an upregulation of ecdysone receptor gene, EcRA and ecdysone inducible gene E75A which culminated in early pupation. DEHP facilitates rapid moulting in *C. quinquefasciatus* and as a result a greater number of generations are produced in a short time. For the control of *C. quinquefasciatus*, habitat manipulation remains as an effective controlling measure.

Keywords: DEHP, *Culex quinquefasciatus*, life cycle duration, larval serum protein, Ecdysone receptor EcRA, Ecdysone inducible gene E75A, moulting

Won Second Prize **Ms. Aswathy. A.Shenoy**

A study on role of bacteria isolated from cow dung in the maintenance of biodiversity

Ms. Aswathy. A.Shenoy , Mrs. Princy Varghese , Dr. Meera Menon

Department of Zoology, The Cochin College, Kochi

Abstract

The present study includes the collection, isolation and characterization of bacteria from the cow dung. The cow dung was taken and various cultural and biochemical tests were done to isolate, identify and characterize the bacteria present in the cow dung. The bacterial species isolated from the cow dung include *Bacillus megaterium, Bacillus cereus ,Corynebactrium xerosis, Staphylococcus aureus, Alcaligenes faecalis, Escherichia coli* and *Proteus vulgaris.* Out of these seven bacterial species, four of them were gram positive (*Bacillus megaterium, Bacillus cereus , Corynebactrium xerosis, Staphylococcus* aureus) and the other three were gram negative. Biochemical test indicated that all the bacteria except *E.coli* and *Proteus* showed negative results to the indole test. MR test was positive to *B.megaterium* , *S.aureus, E.coli* and *Pr.vulgaris.* Only *B.cereus* showed positive VP test. *Bacillus*spp, *Alcaligenes faecalis* and*Pr.vulgaris* were citrate positive. Except*S.aureus* and *Alcaligenes* spp., all the bacteria fermented most of the sugars that were used for identification. *B.megaterium , Corynebactrium xerosis, S.aureus*and *Alcaligenes faecalis* were obligate aerobes and the rest of them were facultative anaerobes. All the bacteria were catalase positive. Only*B.cereus* and *Alcaligenes faecalis* showed positive oxidase test. Urease positive bacteria include *B.megaterium* and *Pr.vulgaris* . *E.coli* and *Pr.vulgaris*were H2S producers . Extracellular enzymatic test showed the hydrolytic activity of bacteria and thereby their ability to degrade complex organic matter that is present in the cow dung. . All of them were negative to pectin test. *C.xerosis, Alcaligenes faecalis* and *Pr.vulgaris* degraded starch by producing the enzyme amylase. Protease enzyme produced by *B.cereus, S.aureus E.coli* and *Pr.vulgaris*hydrolyzed casein enzyme. All of them except*B.cereus* and *Alcaligenes faecalis* showed positive carboxy methyl test. Most of the bacteria isolated from the cow are non pathogenic and therefore cow dung can be used for various agricultural and medicinal purposes.Moreover when this cow dung are used as fertilizers they in turn help in the maintenance of biodiversity.

Keywords : Cow Dung, Bacteria, Biochemical Test, Hydrolytic Activity.

KICK START IDEATION FEST 2022 WINNERS

First Prize

Ms Ahalya Ravi

BSc Physics, Catholicate College,

Pathanamthitta

Second Prize

Aveline Feyona Faber

MSc Microbiology, Nehru Arts and

Science College,

Thirumalayampalayam, Coimbatore

ABOUT EDITOR

Dr Bhagya D: An academician with over 13 years of teaching and research experience in three specializations of Home Science: Food & Nutrition, Family Resource Management & Nutrition & Dietetics. She has organized several state, national and international workshops, seminars, conferences, medical camps and awareness programmes related to nutrition, research and extension for students and faculty. She has served as reviewer of SCI indexed journal; Womens Studies International Forum. She has over 22 publications to her credit with 129 citations, h index 5 and i 10 index 3. She has contributed three manuals for BSc Home Science and PG Nutrition and Dietetics, two books, 6 book chapters 4 national seminar proceedings and many E publications. She is an approved research guide of the University of Kerala. Her area of research specialization is Food, Nutrition and Biochemical Changes in Health and Disease. She is a member of BoS in UG and PG Home Science, University of Kerala. She is Vice President of Home Science Association of India, Kerala Chapter. She is a life member of IDA, NSI, HSAI, AFSTI and ISCA. She has won best poster, publication award and appreciation award for Best NSS Programme Officer 2018-2019 by University of Kerala

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