



RICERCA NATIONAL CONFERENCE 2021

Research & Development For Nation Building

PROCEEDINGS

NATIONAL ONLINE RESEARCH PROJECT PRESENTATION

Multidisciplinary

05-10-2021 to 11-10-2021

Organized By



**IQAC & Research Committee, St Joseph's College for Women,
Alappuzha**

In Collaboration With
**Society for Biotechnologists India &
Kerala Sasthra Sahithya Parishath
Alappuzha, Kerala, India**



RICERCA NATIONAL CONFERENCE 2021

Research & Development For Nation Building

PROCEEDINGS

NATIONAL ONLINE RESEARCH PROJECT PRESENTATION

5-10-2021 to 11-10-2021

Editor-in-Chief: Dr Bhagya D

Organized By



**IQAC & Research Committee, St. Joseph's College for Women,
Alappuzha**

In Collaboration With

Society For Biotechnologists India

&

Kerala Sasthra Sahithya Parishath

Alappuzha, Kerala, India

2022

Ideal International E – Publication Pvt. Ltd.

www.isca.co.in



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

Title:	PROCEEDINGS OF RICERCA NATIONAL CONFERENCE 2021
Editor(s):	Dr Bhagya D
Edition:	First
Volume:	I

© **Copyright Reserved**
2022

All rights reserved. No part of this publication may be reproduced, stored, in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, reordering or otherwise, without the prior permission of the publisher.

ISBN: 978-93-89817-66-9



Rev. Dr. Sr. Annie Mathew

Manager, St Joseph's College For Women,
Alappuzha, Kerala, India

MESSAGE

The world today is witnessing an incredibly fast revolution in research and development. The very title of your webinar “RICERCA” means – search for or pursue something. “Research is to see what everybody else has seen, and to think what nobody else has thought” says Albert Szent Cryorgyi.

Before COVID 19 pandemic we could not think of bringing together students and scholars from other states to share their knowledge on online platform other than being physically present. Now educators and knowledge seekers have proved that nothing can come on their way of gaining knowledge and growing in creativity and moreover technology have made the impossible too possible.

The youth covering more than half of Indian population can do a lot through research and development for nation building through various initiatives like Start Ups, Incubation, 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 Committee of the College for fanning the flame of innovation – research and development for nation building. May your tribe increase.

With every best wish

Rev. Dr. Sr. Annie Mathew



Dr Rita Latha D'coutho
Principal, St Joseph's College for Women,
Alappuzha, Kerala, India

MESSAGE

It is being increasingly recognized that academic institutions need to take the initiative for building research capacity in students, and encourage them to engage in meaningful and relevant research projects and start ups at an early stage in their academic life. With a view to foster the spirit of research in the student community, the Research Committee of our institution is continuing innovative venture, RICERCA National Conference 2021 encompassing National Online Student Research Project Presentation Competition- providing a platform for students from higher education institutions all over the country to present their research projects undertaken in various multi disciplines. The response was overwhelming 180 entries were received covering 9 broad disciplines covering the allied areas: Botany, Chemistry, Commerce, English, History, Home Science, Mathematics, Physics & Zoology out of which 120 research projects covering 82 students, 27 research scholars and 11 faculty were presented after the preliminary screening. A special note of appreciation to the subject experts from various institutions who gave useful guidance to the student researchers for refining their project proposals.

I congratulate the Organizing Team of RICERCA 2021, headed by the Conference Organizing Secretary, Dr. Bhagya D., for their committed efforts to ensure the success of this venture. It is my belief that RICERCA 2021 has achieved its objective of igniting the spark of research motivation in our young researchers, and strengthened their resolve to embark on the research journey with renewed interest and focus.

Best Wishes

Dr. Rita Latha D'coutho



Prof Dr Edathil Vijayan, FNASc

Former ICMR-UGC Emeritus Professor in Biotechnology
President, Society for Biotechnologists India (SBTI)

MESSAGE

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 2021 on 5th October. The focal theme Research & Development for Nation Building 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.

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

All the Best

Prof. Dr. Edathil Vijayan

**Dr T Pradeep**

Chairman, Alappuzha District Sub Committee, KSSP

MESSAGE

I am happy to be a part of RICERCA 2021, organized by St. Josephs college, Alappuzha. Research is the first step towards development of a nation. Sustainability is the key aspect when we mold 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 sidelining 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. As Louis Pasteur pointed out “In the field of experimentation, chance favors the prepared mind”. Louis Pasteur was a French chemist and microbiologist renowned for his discoveries of the principles of vaccination, microbial fermentation, and pasteurization. His research in chemistry led to remarkable breakthroughs in the understanding of the causes and prevention of diseases, which laid down the foundation of hygiene, public health and much of modern medicine. Promotion of research is very important in colleges among teachers and post graduate students. The need of the hour is multi-disciplinary research. For example, nanotechnology spans over physics chemistry and bio sciences. To study the role of metabolisms we need the help of all the tree experts. I am working on laser Raman spectroscopy, which now a days finding applications in every walk of life. Chemistry, Physics , material science forensic science biology explosive detection so on and so forth.

I wish you a good carrier in research.

Best wishes**Dr T Pradeep**



Dr. G. GopaKumar
Former Vice Chancellor, Central University of Kerala

INAUGURAL SPEECH

Research and Development for Nation- Building

Research and Innovation are powerful tools for the development of a nation. Advancement of modern Education , Science and Technology plays an important role in this process. It has a direct bearing for nation building because without making progress in research ,spiritual and material development of a country cannot be visualized. Therefore, creating an eco system for progressing and sustaining sound research is required. Both the government and non-governmental agencies have major responsibilities in this matter. In a well inter- connected world of the 21st Century, it has become most significant . Research process, viewed in this context , is a universal activity. The gaps and differences in the eco system for research can be reduced with sound policies and planning so that the benefits percolate down to all sections and regions of the world.

Today, however, we find so much of variation between developed world and developing world. Industrial progress had reached the western world much ahead and faster than non-western parts and this trend was visible since the 18th century. This had affected progress not only between industrial and non-industrial nations but also within the regions of developing countries. For instance, digital divide, gender divide, rural-urban divide had made the situation in Afro-Asian countries much complex. Therefore, this negative trend has to be arrested. Indeed, developing countries had missed the Industrial Revolution since most of them were under colonial rule while the Revolution progressed. Today, we do have the successful march of Internet Revolution but here also the internet penetration is weak in rural India. The situation is similar in other developing countries also.

Education and research can become great levelers in this context. It is gratifying to note that the National Education Policy (2020) in India has earmarked 6 % of GDP for all-round Educational advancement with special support for Research and Innovation in the form of National Research Fund. However, we need firm commitment to transform the new education policy into reality. This also requires sound leadership, perseverance and effective management in radically upgrading our educational system and its infrastructure besides promoting industry-academia tie ups and

international collaborations. One major factor to be highlighted in this context is the paucity of sufficient scientific laboratories and research institutions in India, in addition to the shortage of high quality human resource. We lost our brilliant scientists and technocrats to the developed world in the form of *brain-drain*. Only through a radical and effective research up gradation and *reverse brain gain*, a proper eco-system for research and sustainable development can be achieved in the country. This is going to be a fundamental challenge for our policy makers and government in the coming decade. Dr. Kasturirangan, the architect of the National Educational Policy, had underlined this point very well. The progress of Research will enable India to address the crucial issues of poverty, malnourishment, illiteracy, chronic diseases and underdevelopment. Research findings will be of significant value to address the problems of climate change, pollution and environmental degradation, overpopulation, gender divide, unemployment, besides problems of ill conceived urbanization, marginalization of the rural areas and the uneven regional divisions. Growth of research would promote scientific temper among the people and particularly the youth to develop a positive vision about the future. Emphasis on interdisciplinary methods and skills and bringing out the virtues of social science research, especially in the context of pandemic and other challenges of deprivation, are also to be highlighted in this context.

India is on its aspirational path, in the present globalized world, with the potentials of making use of the demographic dividend. We cannot afford to miss the Fourth Industrial Revolution. Historically, India had a strong base in education with sound culture and civilizational values. It was the source of cultural advancement and education for a long time. Students across the world had come to India for education and training in our traditional institutions and universities. But, over the centuries, we lost our intellectual and cultural prominence and was replaced by unscientific and inhumane practices. This include the rise of feudalism, patriarchy, gender-divide, caste system, slavery, superstitious beliefs etc. Particularly, the last 800 years were sensitive for the decline and sharp fall of India's cherished values and accomplishments. Foreign conquest and colonial rule further destabilized and estranged India's potential growth. Since Independence, there were remarkable progress but this is not sufficient for a country like ours with huge population, underdevelopment and complex value system. Higher Education, Skill development, quality Research and Innovation have to become the potential instruments for socio-economic development, in its challenging trajectory for nation-building. Proper infrastructure development and leadership training are required in this context at the regional and national levels. Emphasis on quality education with a sound eco-system for research and skill development has become the clarion call for human progress and resource building. The strengthening of Science, Information Technology and Communication will go a long way in building up a resilient civil society with human values and spiritual strength. The new generation has a special responsibility in this task.

Dr G Gopakumar

From Editors Desk



Dr Bhagya D

Welcome to the glimpses of National Conference Proceedings of RICERCA 2021 organized by Research Committee of St Joseph's College for Women, Alappuzha, in collaboration with Society For Biotechnologists India & Kerala Sasthra Sahithya Parishath, Alappuzha, Kerala, India. The National Conference RICERCA 2021 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 in spite of pandemic upheaval and exchange of research ideas nationally after undergoing rigorous review process. Among entries from 9 disciplines and allied areas 120 research papers were selected after peer review for quality and innovation and 82 students, 27 research scholars and 11 faculty presented their research papers. The online student project presentation was from 5-10-2021 to 21-10-2021 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 2021 have been beneficial for fostering research aptitude integrated with technology.

INAUGURATION RICERCA NATIONAL CONFERENCE 2021

Research & Development for Nation Building

National Online Research Project Presentation

Organized by

Research Committee, St Joseph's College for Women, Alappuzha 688001, Kerala

in collaboration with

Society For Biotechnologists India &

Kerala Sasthra Sahithya Parishath

PROGRAMME SCHEDULE

5-10-2021 Time: 10:30AM

- | | | |
|-----------------------------|----------|--|
| Opening Remarks | : | Ms Anjali George
Assistant Professor, Department of English |
| Welcome Address | : | Dr Anju M Neeliyara
IQAC Co-ordinator |
| Presidential Address | : | Dr Rita Latha D'coutho
Principal, St Joseph's College for Women, Alappuzha |
| Inaugural Address | : | Prof. Dr G Gopakumar
Former Vice Chancellor, Central University of Kerala

Kasargod |
| Felicitation | : | Prof Dr Edathil Vijayan, FNASc,
President, Society of Biotechnologists, India |
| Felicitation | : | Dr T Pradeep, Chairman,
Alappuzha District Sub Committee For
Education, Kerala Sasthra Sahithya Parishath |
| Vote of Thanks | : | Dr Sr Morris Marieli Antoinette
Assistant Professor, Department of Physics |

SCHEDULE OF RICERCA NATIONAL CONFERENCE 2021

(PARALLEL SESSIONS)

05-10-2021 to 11-10-2021

7-10-2021, Thursday

Session I : **CHEMISTRY** 2:00 PM-4:00PM

Co-ordinators : Dr Kumari Nisha S
Dr Ramya K

6-10-2021, Wednesday **ENGLISH** 3:00PM-4:00PM

Session II :
Co-ordinators : Ms Anjali George
Ms Nimisha F

8-10-2021, Friday **MATHEMATICS** 11:00 PM-1:30PM

Session I :
Co-ordinators : Ms Namitha Sara Mathew
Dr Binitha Benny
Ms Chithra K S

6-10-2021, Wednesday

Session I : **ZOOLOGY** 10:00PM – 12:30PM

Co-ordinators : Ms Remya James
Ms Febby Payva
Dr Archana Das

7-10-2021, Thursday

Session II : **PHYSICS & ELECTRONICS** 3:00PM-5:00PM

Co-ordinators : Dr Sreekala G
Dr Sr Morris Marieli Antoinette

9-10-2021 & 10-10-2021

Saturday & Sunday

Session I : **HOME SCIENCE** 11:30AM- 12:30PM

Co-ordinator : Dr Bhagya D

6-10-2021, Wednesday

SESSION II : **BOTANY&** 2:30PM - 5:00PM

Co-ordinators : **Allied Sciences**

Dr PinkieCherian

Dr R Nisha Nair

Dr Diana K J

8-10-2021, Friday

Session I : **HISTORY** 10:00AM-1:30PM

Session II : **ECONOMICS**

POLITICS

Co-ordinators : **Ms Sandya AK**

Ms Meenu Treesa Joseph

9-10-2021, Saturday

COMMERCE 10 :00PM – 11:30PM

Session I :

Co-ordinator : **Dr Suleena V S**

Project Presentation Time : **8 minutes**

Discussion : **2 minutes**

Platform : **Google Meet**

RICERCA NATIONAL CONFERENCE 2021
ONLINE RESEARCH PROJECT PRESENTATION COMPETITION
EXPERT PANEL (Parallel Sessions)
05-10-2021 to 21-10-2021

Day	Date	Time	Subject	Expert Panel
Tuesday	5-10-2021	10:30PM-12:30PM	INAUGURAL ADDRESS	Prof. Dr G Gopakumar Former Vice Chancellor, Central University of Kerala, Kasargod <i>Research And Development For Nation Building</i>
Wednesday	6-10-2021	2:30PM -5:00PM	BOTANY PRESENTATIONS	Dr Anju T R Assistant Professor, Department of Biotechnology, Newman College, Thodupuzha <i>The Possibilities And Challenges Of Nano Biotechnology</i> Dr Naijil George Assistant Professor (Joint Treasurer, SBTI), Department of Biotechnology, St Joseph's College, Irinjalakuda, Thrissur
Thursday	7-10-2021	2:00 PM- 4:00 PM	CHEMISTRY PRESENTATIONS	Dr Prema K H Associate Professor, Department of Chemistry, SD College, Alappuzha <i>Current Research Topics In Chemistry: New Gen Materials In Chemistry</i> Dr Sarika Sivakumar Assistant Professor, Department of Chemistry, St Joseph's College for Women, Alappuzha
Saturday	9-10-2021	10:00 AM -11:30 AM	COMMERCE PRESENTATIONS	Dr. S. Santhosh Kumar Professor, School of Management Studies Cochin University of Science and Technology Cochin, Kerala

				<i>Open Banking</i>
Wednesday	6-10-2021	10:00 AM-11:00AM	ENGLISH PRESENTATIONS	Ms Anchitha Krishna Assistant Professor, English And Cultural Studies (BGR) School of Arts And Humanities, Christ University (Deemed), Bangalore Campus <i>Literature & Sustainability</i>
Friday	8-10-2021	10:00 AM- 1:30 PM	HISTORY PRESENTATIONS	Mr Pratheesh P Assistant Professor, Department of History, St Michael's College, Cherthala <i>Historical Writing; Issues, Challenges and Prospects</i>
Saturday & Sunday	9-10-2021 10-10-2021	3:00 PM-8:00PM 11:30AM-12:30PM	HOME SCIENCE PRESENTATIONS	Dr Rashmi H Poojara Assistant Professor St Teresa's (Autonomous) College for Women, Ernakulam <i>Research Opportunities In Home Science</i> Dr Hemangini Gandhi Assistant Professor (CES) Department of Foods And Nutrition, MS University of Baroda, Vadodara, Gujarat Dr Krishnaja U Assistant Professor, Department of Community Science, College of Agriculture, Vellayani, Thiruvananthapuram
Friday	8-10-2021	11:00AM-1:30 PM	MATHEMATICS PRESENTATIONS	Dr Zeenath K S Professor (Rtd), Department of Mathematics, School of Distance Education, University of Kerala <i>Applications Of Coding Theory In Data Compression</i>

Thursday	7-10-2021	3:00 PM -5:00PM	PHYSICS PRESENTATIONS	Dr Smijesh N Assistant Professor, School of Pure And Applied Physics, Mahatma Gandhi University,Kottayam <i>Recent Trends In Physics: High Harmonic Generation</i>
Wednesday	6-10-2021	10:00AM -12:30PM	ZOOLOGY PRESENTATIONS	Dr E V Radhakrishnan Former Principal Scientist & Head Crustacean Fisheries Division, CMFRI, Kochi ICAR Emeritus Scientist <i>Conceptual And Technological Advancements In Modern Scientific Research</i>
Thursday	21-10-2021	3:00PM -5:00PM	VALEDICTORY ADDRESS	Dr Gabriel Simon Thattil Prof & Head, Department of Commerce, University of Kerala <i>Research In Higher Education</i>

RICERCA NATIONAL CONFERENCE 2021 SELECTED PRESENTATIONS SUBJECT WISE

Sl No	List of presenters from each subject covering allied areas	UG (100)	PG (100)	RS (200)	Faculty (400)	TOTAL
1	Botany	8	4	8	4	24
2	Chemistry	6	0	1	0	7
3	Commerce	1	2	4	1	8
4	English	0	1	0	0	1
5	History	5	3	4	3	15
6	Home Science	3	15	4	0	22
7	Mathematics	2	2	0	3	7
8	Physics	7	11	1	0	19
9	Zoology	5	7	5	0	17
	TOTAL	37	45	27	11	120

Undergraduates 37, Post graduates 45, Research Scholars 27 & Faculty 11

Total Presentations: 120 *Subjects & Allied Areas

*(Botany, Chemistry, Commerce, English, History, Home Science, Mathematics, Physics, Zoology)

Organizing Committee

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

Dr T Pradeep, Chairman, Alappuzha District Sub Committee For Education, Kerala
Sasthra Sahithya Parishath

Dr Anju T R, Assistant Professor, Department of Biotechnology, Newman College,
Thodupuzha

Dr Kumari Nisha S, Assistant Professor, Department of Chemistry

Dr Sr Morris Marieli Antoinette, Assistant Professor, Department of Physics

Dr Pinkie Cherian, Assistant Professor, Department of Botany

Dr Sreekala G, Assistant Professor, Department of Physics

Dr Suleena V S, HOD, Department of Commerce

Ms Anjali George, Assistant Professor, Department of English

Ms Nimisha F, Assistant Professor, Department of English

Dr Ramya K, Assistant Professor, Department of Chemistry

Ms Sandya A K, HOD, Department of History

Ms Meenu Treesa Joseph, Guest Lecturer, Department of History

Ms Remya James, HOD, Department of Zoology

Dr Archana Das, Guest Lecturer, Department of Zoology

Dr Diana K J, Assistant Professor, Department of Botany

Ms Namitha Sara Mathew, Assistant Professor, Department of Mathematics

Ms Chithra K S, Assistant Professor, Department of Mathematics

Ms Akshara S, Management Lecturer, Department of Home Science

Advisory Committee

Rev Dr Sr Annie Mathew, Manager, St Joseph's College for Women, Alappuzha, Kerala

Dr Rita Latha D'coutho, Principal, St Joseph's College for Women, Alappuzha, Kerala

Prof. Dr G Gopakumar, Former Vice Chancellor, Central University of Kerala, Kasargod

Prof Dr Edathil Vijayan, FNASc, President, Society of Biotechnologists, India

Dr Gabriel Simon Thattil, Prof & Head, Department of Commerce, University of Kerala

Dr EV Radhakrishnan, Former Principal Scientist & Head, Crustacean Fisheries Division, CMFRI, Kochi, ICAR Emeritus Scientist

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

Dr Smijesh N, Assistant Professor, School of Pure and Applied Sciences, MG University, Kottayam

Editorial Board



Dr Bhagya D
Editor in Chief

Associate Editors



Dr Pinkie Cherian
Assistant Professor,
Department of Botany



Dr Kumari Nisha S
Assistant Professor,
Department of Chemistry



Dr Suleena V S
Head of the Department,
Department of Commerce



Dr Anjali George
Assistant Professor,
Department of English



Ms Meenu Treesa Joseph
Lecturer,
Department of History



Namitha Sara Mathew
Assistant Professor,
Department of Mathematics



Dr Sreekala G
Assistant Professor
Department of Physics



Ms Remya James
Assistant Professor
Department of Zoology

Technical Co ordinators



Mr Akhil A O



Ms Akshara Kozhichira

RICERCA NATIONAL CONFERENCE 2021

NATIONAL ONLINE STUDENT RESEARCH PROJECT PRESENTATION

Organized by

IQAC & Research Committee, St Joseph's College for Women, Alappuzha

In Collaboration with

Society For Biotechnologists India & Kerala Sasthra Sahithya Parishath

VALEDICTORY PROGRAMME

Opening Remarks	:	Ms Nimisha F Assistant Professor, Department of English
Welcome Address	:	Dr Bhagya D Research Co ordinator
Presidential Address	:	Dr Rita Latha D'coutho Principal, St Joseph's College for Women, Alappuzha
Valedictory Address	:	Dr Gabriel Simon Thattil Prof & Head, Department of Commerce, University of Kerala
Announcement of EXCELSIOR AWARD	:	Dr Sreekala G Assistant Professor, Department of Physics

Feedback from Winners & Presenters

Felicitation	:	Dr Anju M Neeliyara IQAC Co ordinator
Vote of Thanks	:	Dr Pinkie Cherian Assistant Professor, Department of Botany

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 Promotion Committee 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 research practices.

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 of people.

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 literacy campaigns.

Society For Biotechnologists India (SBTI)

Society for Biotechnologists (India) is an association of professionals working in relation with Biotechnology dedicated to the advancement of Biotechnology especially to unite scientists, students, academicians, doctors, industrialists and professionals. The society also serve as a link between various specialized fields of theoretical and applied Biotechnology and promote the exchange of scientific information through workshops, conferences and publications in emerging areas of biotechnology.

SBTI maintains an atmosphere of friendliness and cordiality that is evident at the annual meetings and special conferences. The society was formed and registered in 1995 and functions as a non-profit organization. The society maintains its national headquarters in Department of Biotechnology, Cochin University of Science and Technology, Kerala, India.

CONTENTS

BOTANY

Page No

1. **The possibilities and challenges of nanobiotechnology** 1
Anju T R.
2. **Micropropagation of *Syzygium myhendrae* (Bedd. Ex Brandis) Gamble – An Endemic and endangered tree species of Western Ghats, India** 2
Divya, C & Ramasubbu, R
3. ***In silico* mutational stability profiling and functional analysis of Spike protein in Indian SARS-CoV-2 delta variants** 2
Prisho Mariam Paul & Dr. Krupakar Parthasarathy
4. **Evaluation of *in-vitro* anti-inflammatory potential of ferulic acid – a bioactive phenolic compound from pineapple waste** 3
Lubaina A S
5. **Construction of recombinant bacterial clones for the applications in molecular surveillance of tetracycline resistance in microbes of various ecosystems** 4
Anusree VN, Mariya Sony, Sumithra TG, Reshma KJ & Amala PV
6. **Isolation and molecular identification of phosphate solubilizing bacteria, *Bacillus licheniformis* UBPSB – 07 capable of enhancing seed germination in *Vigna radiata* L.** 4
Smitha Thomas, Lizzy Mathew & K.S. Rishad
7. **Evaluation of *in-vitro* antioxidant, antimicrobial, antitubercular and *in-vivo* hepatoprotective activity of various Onion extracts** 5
Monika L. Jadhav & Pratima A. Tatke
8. **A clinically competent L asparaginase enzyme from *Bacillus megaterium* as a potential nominee for blood cancer treatment** 6
Lailaja VP., Sumithra TG., Reshma KJ., & Anusree VN
9. **Development and evaluation of functionalized Iloperidone nanoemulsions for nasal delivery** 7
Niserga D. Sawant, Namita D. Desai & Pratima A. Tatke
10. **Bioprospecting of Mangrove Plants** 7
Shameela Khadeeja A & Dr. R.Raghunathan
11. **Efficacy of Silicon based nutrients against Sheath blight of rice under pot-culture experiment** 8
Devi Shanthini V., Jaiganesh V& Brindhadevi S
12. **LAPACHOL- A Natural Inhibitor Of LDH** 8
Arya A R, Ritobrata Sengupta & Mani Shankar Babu
13. **Biosurfactant Production from Oil contaminated Soil** 9
Brinda CM & Dr R Raghunathan
14. **Micropropagation of *Santalum album* L. (Santalaceae):A Valuable Vulnerable Tree Species of Southern Western Ghats, India** 9
Divya, C. Gomathimala. T, Boojit. B. & Kalaikathiravan.P

15. **A Bioinformatics Approach for the Assessment of Potential Lead Molecules from *Ficus religiosa* and *Sida cordifolia* for Use in the Treatment of Rheumatoid Arthritis**
Lhea Blue* & Anisha S. 10
16. **Molecular Characterization of Okra [*Abelmoschus esculentus* (L.) Moench] Against Yellow Vein Mosaic Virus (YVMV)**
 Bhalrao S. R., Puneet S. B., Rahul K. & Rahul G 10
17. **Evaluation Of Variations Among Portulaca Species**
Lakshmiraj & Sreeranjini S 11
18. **Assessment Of Covid-19 Gender Susceptibility and Impact of Citrus Fruit Consumption During Pandemic**
Anupa K Babu, Elisabeth Vincent, Elseena Thomas, Vishnu K B & Anju T R 12
19. **Exploration of prodigiosin producing rhizosphere bacteria, *Serratia marcescens* isolated from the paddy fields of Kuttanadu for natural and organic agricultural practices'**
Jaseena T, Anagha U, Anupama Shiji, Neeraja M, Safna A & Roshmi Thomas 12
20. **FTIR studies of selected *Ficus* L. species from Alappuzha district Kerala, India**
 Pinkie Cherian*, Athulya Praveen, Sangeetha K & Lina Varghese* 13
21. **GC-MS Analysis of Bioactive Compounds from Leaf Essential Oil of *Eugenia rottleriana* Wt. & Arn. and It's Antimicrobial and Antimalarial Activity**
S. Shanmugarevathi & G. Manikandan 14

CHEMISTRY

1. **Unraveling the Electro chemical Behavior of Plant Material Containing Biologically Active Components as an Electrolyte for Safer All-Solid-State Lithium-ion Batteries**
Vengadesh Krishna M., Malaichamy Ilanchelian, Selvasekarapandian S., Nandhini K 14
2. **Extraction of Cellulose Nanofibers from Agricultural Waste as Future Nanomaterials**
Arsha M R, Parvathy D. S., Shilpa R. A., Surya R.B., Vrisanka J., Poornima Vijayan P 15
3. **In Silico Docking Studies Done on Fluorinated Derivatives of Chrysin -Potent Healing Agent against Breast Cancer**
Shilpa A. S, Arya G.S, Arya Krishnan A.S, Muhammad Thanseer S., Lucky M.V. 16
4. **Solvent Extraction of Mango Seed Kernel Oil**
Varsha Chandran, Anet P. Kurian, Megha T. Thomas, Josna Jose, Reni Mary Varghese, Anu James 16
5. **Estimation of Saponification Value of Oils**
Anjana Anil R. A, Anamika Devi S., Anjali, Anjana A., Anupriya, Sindhu Yeshodharan 17

COMMERCE

1. **Exploring the Dynamics of Digital Disruption in Customer Experience Rendered by Banks**
 Anu P. Mathew 18
2. **An Assessment Of Household Trust In Cooperative Banking Institutions In Kerala**
 Akhil Menon 18
3. **Financial Institutions And Innovations During Covid-19 In Kerala**
 Vishuja V 19

4. Open Banking for Transformation in Banking Sector	
Shiyas I S	19
5. Third Party Administration In India: An Overview	
Biji B S	20
6. A study on the Work Life Balance of Aided College Teachers in the Covid Pandemic Scenario	
Jinu Maria Varghese	21
7. A Study on Financial Independence among Salaried People in Kerala	
Jobin Jose	22
8. Impact And Spread Of - Online Fantasy Sports Games And Gambling And Mobile Finance Application - On And Among The College Students	
Sajilal	22

ENGLISH

1. Notorious Treats And Feasts: Revealing Food As A Temptress In Children's Literature Through Study Of Four Select Books

<u>Dhaya Mukesh Dhanya</u> & Mirium Xavier*	23
---	----

SOCIAL SCIENCE

1. Historical Writing; Issues, Challenges and Prospects (Plenary Talk)	
Pratheesh. P	24
2. Indigenous Christian Resistance Against the Cultural Imperialism of the Portuguese	
Ajay T Joseph	28
3. Udaya-The Rise: The Role of Udaya Studio in the Development of Malayalam Film Industry	
Aparna M Nath	28
4. Socio-Economic Problems of Women Construction Workers in Alappuzha District: A Case Study of Cherthala South Grama Panchayath	
Arya Udayakumar	29
5. The Indian Jewish Diaspora in Israel – Migration, Discrimination and Assimilation in the State of Israel	
Suraj Rajan K	29
6. Welfare Schemes Implemented by the Government of Kerala for Internal Migrant Labourers During the Pandemic	
Sruthi P Mohanan	30
7. Sambandam: A feminist Rereading	
Anjana Menon	30
8. Protecting and Empowering Migrant Workers in Kerala by Ensuring their Human Security	
Shiraz Shanavas	31
9. Women Empowerment through Panchayat Raj Institutions in India	
Arya S Santhi	32
10. Snake Worship in Kerala: With Special Reference to Mannarsala Najaraja Temple, Alappuzha	
Devika M.S	33
11. A Study on the Survival of Mango Farmers at Muthalamada in Palakkad	
<u>Anakha .S. Menon</u> , Aiswarya .R. Nair, Denny .C. Samuel, Devika .P, Rimy Tom, Silga de Sankey, Sreeshma .S, Anju Mary George*	34
12. Alappuzha and Rajakesavadas: A Historical Enquiry into Urban planning and Townscapping	
<u>Aswathy B</u> , Jiyas N, Aparna S, Vishnu V Kumar, Manjusha S*	34
13. Protected Monuments and Heritage Sites in Alappuzha	
<u>Sandra PM</u> , Sneha P Joy, Shahina Hussain, Anagha Raju, Nirmala Mentos, Shamsiya S, Jomol John, Jesna Nazeer, Sneha Sony, Soorya CB, Sandya A.K*	35

14. Contributions of Thomas Norton in Alappuzha

Harikrishnan A M, Vishnu S Nair, Nimisha Anilkumar, Anupama Sajeev, Chithra K R, Ashokan V* 36

15. A Study on Migrant Muslim Merchants in Alappuzha

Sandra KJ, Dani Wilfred Presentation, Reshma Krishnan, Arya V Dev, Anju P, Ashokan V* 37

HOME SCIENCE

1. Research opportunities In Home Science

Dr Rashmi H Poojara

38

2. Assessment Of Food Safety Knowledge

Sreeja.S* and Dr.Leena Leon**

45

3. Study on micronutrient rich greens: Microgreens

Vineetha Antony*, Dr.R.Radha**

45

4. Prevalence Of Malnutrition Among Children Of 0-6 Years In Thiruvananthapuram District

Divya M¹, Dr. Prema L**, Dr. Bhagya D.*

46

5. An Overview on the Vitamin D Status among Women in Reproductive Years and Associated Health Risk

Urmila Vijayan.P*, Dr. Karuna.M.S.

46

6. Development of RTS Microgreen Chutney Powder, its Organoleptic, Experimental and Consumer Acceptance Evaluation and Popularization by Microgreen Recipes

Leah Anna Abraham & Kavitha Vijayan

47

7. Dietary Diversity of Young Adults with Special Reference to Fruit and Vegetable Consumption

Elizabeth Varghese Anthikkat¹ & Shilpa Jose²

48

8. Need for integrating concepts of promoting healthy diets for prevention of Non-Communicable Diseases in training curriculum of Community Health Officers (CHOs) and ASHA facilitators under Ayushman Bharat

Dr. Hemangini Gandhi* & Inderdeep Kaur Bhamra**

48

9. Food Purchase And Consumption Behaviour Of House Holds During COVID -19

Anagha Mol MA* and Dr. Leena Leon**

49

10. Study On The Consumption Pattern Of Millets In South India

Ms.Meenu Nixon^[1] and Dr.Anu Joseph^[2]

49

11. Effect of Covid 19 Lockdown on the Lifestyle and Dietary Diversity of Women Handloom Workers

Aiswarya A, Bhagya D*

50

12. Evaluating The Effectiveness Of Online Class Among Early Adolescents (10- 12 Years)

¹Athira A P, ²Dr. Sithara Balan V, ³Sivasree Bahuleyan

50

13. Social Determinants and Post Covid Effects on nutrition profile of Geriatric Patients in Coastal Areas of Alappuzha

Kripa Sabu & Bhagya D*

51

14. Formulation of Diabetic Health Drink Powder, It's Evaluation in terms of Nutritional and Organoleptic Qualities and Effect of its Supplementation in Managing Type 2 Diabetes Mellitus

Minnu Alex 51

15. Effect of Covid-19 Lockdown on the Physical Activities and Nutrition Status of Children (10-12 years)

Amritha V , Simmya Ansari.* 52

16. Assessment of Learning Style and its Awareness Among Children and Advocating Different Strategies Suitable for Different Learners

^{1*}Ashla Joseph, ²Dr. Dhanya N 52

17. A Study On Soft Drink Consumption Pattern And Ncd Risk Factors Among College Students

Agnet M J, Anju M Neeliyara* 53

18. Designing A Product For Anger Management In Adolescents

^{1*}Ajeena K R, ²Dr. Dhanya N 53

19. Composite Index Of Anthropometric Failure (Ciaf) Among Children (6-23 Months) Of Selected Villages Of Jambusar Block In Bharuch District

Dr.Hemangini Gandhi^{1*}, Dr Nandani Srivastava^{2**}, Bhumika Thakur^{3***} 54

20. Assessment of Nutritional and Mental Status of IT Workers Before and During the Pandemic Period

Niranjana C & Chithira K.R* 54

21. Assessment Of Environmental Friendly Sizing Agent From Jackfruit Seeds And Its Application On Cotton Fabric

Jasmin.,Lavanya I A,Sruthi Tomy C.,Krishnendu M U,Alisha Joy, MS. Vidhya K B* 55

22. Formulation And Organoleptic Evaluation Of Easy And Healthy Breakfast Recipes For Adolescents

Anu Mariyam John * and Dr Leena Leon** 55

23. Food Choices And Consumer Purchasing Behaviour During COVID 19 Pandemic

Fahma Mansoor, Jyothika S, Kesiya Gyan, Bhavana R R, Durga R, Meera P M, Parvathi Ajai, Shiji M, Dr.Bhagya.D* 56

MATHEMATICS

1. Data Compression Using Arithmetic Coding

Dr. K. S. Zeenath 57

2. Domination In Graphs

Neethu Mariam & Bibin K Jose 61

3. A Study On Hypergraph Theory

Athulya M Anil 61

4. Fractal Dimension

Aleena Joseph 62

5. The Punctured Plane is Isomorphic to the Unit Circle

M S Alshyma., Shabina Shafi., Fathima R A, Aroma G, Sahal Fidhu Sajeeb., Ms. Niza N 63

6. **Total Graphs and Regular Graphs**
Athul T. B.*& G. Suresh Singh 63
7. **Secure Co-independent Domination in Graphs**
Timmy Tomy Thalavayalil. 64
8. **Normal Categories of Unit Regular Semigroups**
Namitha Sara Mathew 64

PHYSICS

1. **High Harmonic Generation**
Dr Smijesh N 65
2. **Timing & Spectral Analysis of Thermonuclear X-ray Burst of LMXB 4U1636-536**
Sarath Mohan 67
3. **Study of Global Temperature and Atmospheric Carbon dioxide under Different Solar Active Periods**
Sandra Vasudevan 67
4. **Synthesis and Photoluminescence Studies of Host Sensitized Dy 3+ Doped ZnWO 4 Nanophosphor**
Kukku Thomas 68
5. **The Study on the Application of Physics in the Practice of Medical Physics**
Merline Asha .P 69
6. **Flexible And Self Standing Magnesium Ferrite/ Polyvinylidene Flouride Cast Films-Promising Candidate For High End Magnetoelectric Application**
Sumi K S 69
7. **Thermal degradation of vegetable oils studied using UV-Visible Spectroscopy**
Haritha K C 70
8. **Synthesis and Photoluminescence Studies of Dy 3+ Doped CaWO 4 Nanophosphor**
Vineeth K K 70
9. **RF Magnetron Sputtered Sno 2 Thin Film For Gas Sensing Application**
Sadika Farsana S 71
10. **Oil And Its Sunscreen Action Studied By UV-VIS Spectroscopy**
Rahul P A 72
11. **Comparison Of Two Flavour And Three Flavour Neutrino Oscillations At Various Energies-The Probability Calculations Of Neutrino Oscillation For Both Two Flavour And Three Flavour Cases And Comparing It At Various Energies.**
Anju S 73
12. **Blue Luminescent Graphene Quantum Dots from Direct Carbonization of Citric Acid for Fe 3+ detection**
Achumol Vikraman 74
13. **Gas Leakage Detection System using Arduino**
Anila S 74
14. **Formulation of Einstein's Field Equations using the Mathematics of General Relativity, Einstein-Hilbert Action and Lagrangian Formulation**
Christopher Thomas 75
15. **Arduino based Smart irrigation system for sensing soil moisture content**
Fahma Muneer Ahmed,Elsa Joseph, Shabitha B, St Joseph's College for Women Alappuzha 76

16. Radio Astronomy: Imaging the Sun at KU band using DTH Antenna

Akhil K M

77

17. Efficient Ambipolar Organic Field Effect Transistors By Utilizing Exciplex

Emission

Kavya Rajeev

77

ZOOLOGY

1. Conceptual And Technological Advancements In Modern Scientific Research

Dr E V Radhakrishnan

78

2. Study on Genetic polymorphism of Methylenetetrahydrofolate Reductase [MTHFR, C677T] as a potential risk factor for congenital heart disease (CHD) in north Indian population

Amrita Panja^{1,2†}, Abhishek Abhinay^{*3}, Antim Aakash Pakhira⁴

80

3. Risk assessment of biofilm forming bacteria on plastic debris from popular beaches around Cochin - Kerala

Soumya K*, Lakshmi E., Bini Francis and A.A. Mohamed Hatha

80

4. Retrieval of Genomics Data for the functional analysis of Tuna Species

Raisa KCP ², Nadilla Maryam ² and Rekha Govindan^{1*}

81

5. Study on the postembryonic development of Striatoppia milii Balogh, 1958 (Acari: Oribatida: Oppiidae) on Microfungi Trichoderma harzianum

K. K Praveena ¹ and T. R Sobha^{*2}

81

6. Salinity Induced Changes in Protease Activity of Halotolerant Bacteria isolated from Rhizosphere Avicennia sp.

Aleena Dennis*, Wafha KA, Baby Divya

82

7. Case Study of Corona in Chellanam with Respect To TPR

M K Sreeja* & Dr. Aneymol V S

82

8. Potent Phyto compound Leads From *Adiantum latifolium* In Combating SARS-CoV-2 And Associated Bacterial Pathogens

Simna Siddique., Dr Pradeep Kumar R*

83

9. Salivary IL6 For Detection Of Potentially Malignant Oral Disorders

Ramsheena Paymbrot*¹, Dr. Sahaya Shibu², Hiba Shiyas³, Abdul Majeed

Kummangal⁴

83

10. Diversity and Foraging Behaviour of Native Spiders From Nedumbrakkad, Cherthala, Alappuzha

Aiswarya K M*, Chithra K S, Praveen P B, Hisana S, Amala Lawrence, Narmanini S

84

11. The Effectiveness of Antimicrobial Resistance of Weaver Ant in

Present Covid Scenario

Aveline Feyona Faber, Keerthi.K.Prasad, Jeba Malar*

85

12. Evaluation Of Morphological Malformation And Hsp70 Gene Regulation Response On Carbofuran 3G Exposed Zebrafish (Danio rerio) Embryos

Sreelekshmi P

85

12. Control Methods Against Whitefly- Bemisia Tabaci	
Aiswarya S. Babu, Anju S., Athira Andrew, <u>Ayisha N.</u> , Jariya N., Sherin Francis, Remya James*	86
13. Microorganisms As a Cure to Eutrophication	
<u>Anirudh G Nair</u> , Aveline Feyona Faber, Anupama Shiji, David Jayasheelan	86
14. Molecular Evolution of Corticotropin-Releasing Hormone (Crh) Gene Family In Primates	
<u>Pavithra Prasad</u> and Ashalakshmi C N	87
15. Neuron Restrictive Silencer Factor Regulates Epstein-Barr Virus Life Cycle In EBV-Associated Cancer Cells	
<u>Vinod Soman Pillai</u> ¹ ., Gayathri Krishna ¹ ., Mohanan Valiya Veettil ^{2*}	88
16. Delineation of Potential Biodiversity Area In Outside For Available Protected Areas	
<u>Praveena Dev</u> ^{1*} , Chrips N. R. ² , Reshmi V. ¹	88
17. The Structure And Dynamics Of The Evolution Of “Diagnosis Of Fasciolosis” – A Knowledge Graph Analysis	
<u>Linshina T</u> [*] ., PA Ahammad Shareef	89

BOTANY

Invited Talk

The Possibilities And Challenges of Nanobiotechnology



Dr Anju T R

Assistant Professor & Head

Department of Biotechnology, Newman College, Thodupuzha- 685 585, Kerala, India

E mail: anju.tr@newmancollege.ac.in

The unique physiochemical and biological properties of nanomaterials made them a desirable raw material in the production of various consumer products and biomedical appliances. The nano scale dimension of these particles made them an attractive choice for various biotechnology applications; of which the use in biomedical sector, both in diagnostics and therapeutics and agriculture sector, in crop improvement and precision farming are gaining a lot of attention now a days. Along with the multitude of possibilities and advantages offered by various nanomaterials, it is essential to address the challenges and ethical concerns of nanobiotechnology. This talk will discuss the possibilities and the challenges/ethical concerns of nanobiotechnology from the perspective of its biomedical and agricultural applications in a brief manner. The rational and targeted usage along with identification of sustainable synthesis routes can help in overcoming its challenges and will ensure more effective utilization of the immense potentials of nanomaterials in biotechnology.

Micropropagation of *Syzygium myhendrae* (Bedd. ex Brandis) Gamble - An Endemic and endangered tree species of Western Ghats, India

Divya, C* and Ramasubbu, R¹

*Assistant Professor, Department of Botany, Sri Klaiswari College (Autonomous), Sivakasi, Virudhunagar.

¹Assistant Professor, Department of Biology, School of Sciences, Gandhigram Rural University, Dindigul.

*E mail: divyabotany111@gmail.com

Abstract

Syzygium myhendrae is an endemic tree species growing in the selected forest areas of the Western Ghats and included under the IUCN list as endangered. The young leaves of *Syzygium myhendrae* are highly attractive, so taxonomists suggested to introduced as ornamental and the fruits are also edible. The previous studies on a population analysis of *S. myhendrae* indicated that the population has severely fragmented due to overexploitation, pressure from exotic weeds, reproductive inefficiency, microbial infection on the leaves and further problems associated with this tree species. Hence, an alternative strategy has to be developed to enhance the population of this tree species. In this connection, a study has been attempted to develop a micropropagation protocol. The nodal explants were surface sterilized and inoculated on woody plant woody (WP) medium supplemented with various concentrations of BAP, Kn, IAA and IBA either alone or in combinations. The highest number of shoots (10.3 ± 0.97) per explants were obtained on medium supplemented with 1.0mg/l BAP along with 1.0mg/l IAA. The maximum number of roots 9.2 ± 0.23 and 13 ± 0.8 cm root length were obtained in medium supplemented with 1.0mg/l IBA. The rooted plantlets were successfully transferred into paper cups containing 1:1:1 ratio of sand, garden soil and organic manure. This protocol will provide an alternative way to conserve this little-known species from extinction. Moreover, this strategy can be used to protect other tree species which are on the verge of extinction.

Key words: *Syzygium myhendrae*, conservation, Woody plant medium, BAP+IAA, IBA

Won Second Prize

***In silico* Mutational Stability Profiling and Functional Analysis of Spike Protein in Indian SARS-CoV-2 Delta Variants**



Prisho Mariam Paul^{1,3} and Dr. Krupakar Parthasarathy²

¹Research scholar, Centre for Drug Discovery and Development, Sathyabama Institute of Science and Technology, Chennai

²Scientist D, Centre for Drug Discovery and Development, Sathyabama Institute of Science and Technology, Chennai

³Assistant Professor, Biotechnology Department, CMS College Kottayam

*E-mail: pmprisho@gmail.com

Abstract

Globally Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) is the most influential pandemic which affects the human respiratory system. The severity of the disease depends on the interaction between the viral protein and host protein. Spike protein of SARS-CoV-2 interacts with host ACE2 receptor in the presence of TMPRSS2 protease through C-Terminal Domain (CTD). In this research, we studied the effect of mutation on the S-protein stability and functional analysis based on the sequence of SARS-CoV-2 delta Indian variants by *in silico* prediction. Sequences were retrieved from the database and studied mutation and evolutionary relationships. The protein stability is analyzed by predicting intrinsic disorder and the I-Mutant v2.0 bioinformatics tool. The secondary structure was predicted by PSIPRED and the functional study of S-protein was conducted using ProtScale, ProtParam, TMHMM, and SignalP. The motif analysis with the MEME tool shows that all variants shared two motifs. This study explains the effect of mutation on spike proteins and its evolutionary relationship, which is used for the better understanding of SARS-CoV-2 variation and diversification. In the future, a complete analysis of delta variant S protein contributes to effective targeted therapeutic measures.

Key words: SARS-CoV-2, S-protein, Mutation stability, Mutation profiling, Functional Analysis

Won Excelsior Award

Evaluation of *in-vitro* Anti-Inflammatory Potential Of Ferulic Acid – A Bioactive Phenolic Compound From Pineapple Waste



Lubaina A S*

P G and Research Department of Botany, Christian College, Kattakada, Thiruvananthapuram, Kerala, India.

*E mail: lubainanizam@gmail.com

Abstract

Pineapple peels the massive waste produced by the pineapple processing industry causing environmental pollution. In this regard, the present study was an effort to tap the potential of this bio-waste as source of bioactive compounds by isolating, purifying and characterizing known as well as novel phenolic compound from it and can be used for studying its *in vitro* anti-inflammatory potential. A phenolic compound namely Ferulic acid isolated from this bio-waste and its structure has been elucidated by spectroscopic techniques and its *in-vitro* anti-inflammatory activity was evaluated using RAW and THP-1 cell lines. Inflammation a complex disease associated with various symptoms. These symptoms can be managed with non-steroidal and steroidal anti-inflammatory drugs, which lead to severe side effects on long-term use. Natural products are used as an alternative source of the discovery of new entities to be used as compounds anti-inflammatory compounds to overcome this problem. Anti-inflammatory potential of Ferulic acid was studied *in vitro* on LPS stimulated RAW and THP-1 cell lines. The levels of pro-inflammatory enzymes such as cyclooxygenase (COX), lipooxygenase (LOX), and myeloperoxidase (MPOX) activities on THP-1 cell lines and the tested compound exhibited a dose dependent anti-inflammatory activity. Ferulic acid showed remarkable activity by COX (78.47%) and LOX (78.63%) inhibition in LPS stimulated THP-1 cells at 100 µg/mL. Different concentration of Ferulic acid effectively decreased the MPOX (92.76%) level in a dose dependent manner and the results were comparable to standard drug Indomethacin. The isolated phenolic compound, ferulic acid effectively lowered the levels of inflammatory cytokines like TNF- α , IL-6 and IL-1 β along with prostaglandin E2 and leukotriene C4 and cellular nitrate levels in LPS stimulated RAW cells.

Key words: Pineapple Peel, Ferulic acid, *In-vitro* Anti-inflammatory Activity, RAW and THP-1 Cell Lines

Won Third Prize

Construction of Recombinant Bacterial Clones For the Applications In Molecular Surveillance Of Tetracycline Resistance In Microbes Of Various Ecosystems



Anusree VN¹, Mariya Sony², Sumithra TG¹, Reshma KJ¹, Amala PV¹

¹Marine Biotechnology Division; ICAR-Central Marine Fisheries Research Institute, Kochi

²Department of Plant Biotechnology, College of Agriculture, Vellayani, *E mail: sumithravet@gmail.com

Abstract

An alarmingly increasing antibiotic resistance (AR) pathogens across different ecosystems necessitate the urgent measures through extensive surveillance and containment measures. Among antibiotics, tetracycline is the most common and effective antibiotics in both humans and animals. In order to prevent the possible outbreaks of tetracycline resistant (TR) pathogens, it is essential to screen TR bacteria in various ecosystems. However, screening using conventional microbiological techniques is very laborious and tedious whereas, molecular surveillance using polymerase chain reaction (PCR) for TR genes is a fast, viable option that can be directly applied in different ecosystems. However, the possibility of producing false negatives in PCR necessitates the establishment of recombinant bacterial clones containing TR genes to be applied as positive control. Accordingly, recombinant bacterial clones carrying TR genes namely, *tetB* and *tetH* genes, the best predictors for TR in aquaculture systems, were developed. Initially, PCR conditions were optimized for the amplification of the genes from diverse bacteria, in which amplicon size of 950 bp and 650 bp respectively was targeted. The purified PCR products were cloned into a non-expression vector plasmid (pMD20-T). The recombinant plasmids were then transformed into *E. coli* DH5 α cells. The clones were then confirmed by colony PCR, plasmid PCR as well as through DNA sequencing. The sequences were submitted in NCBI GenBank under the accession numbers MW168990 and MW244841 respectively for *tetB*/*tetH* gene. Glycerol stocks were then made and stored at -80°C. Molecular surveillance in marine fish pathogens using the optimized PCR and positive control showed that *tetB* and *tetH* genes were present with a prevalence rate of 5.55% and 11.11% respectively. Further, extensive screening studies are now needed in different ecosystems, so that effective targeted control measures can be planned to control or eliminate future TR pathogen outbreaks.

Keywords: Molecular Surveillance, Tetracycline Resistance, *tetB*, *tetH*

Isolation and Molecular identification of Phosphate Solubilizing Bacteria, *Bacillus licheniformis* UBPSB-07 Capable of Enhancing Seed Germination in *Vigna radiata* L.

Smitha Thomas^{1*}, Lizzy Mathew¹ and K.S. Rishad²

¹Department of Botany, St. Teresa's College (Autonomous), Kochi, Kerala, India. 682 011.

²Unibiosys, Biotech Research Labs, Kochi, Kerala, India- 682 022.

Abstract

In the present study, the growth enhancement of phosphate-solubilizing bacteria isolated from the agricultural soils, Cochin, Kerala, India was investigated. Among seventeen bacterial strains isolated, the strain UBPSB-07 was found as the efficient producer of phosphate solubilising bacteria. The strain UBPSB-07 increased bioavailability of soil phosphorus which results in increased growth of the experimental plant, *Vigna radiata* L. The bacterium was then identified by 16S rDNA-PCR which confirmed that the bacterial strain was *Bacillus licheniformis*. The bacteria showed highest solubilization index in 72 hours on PKV agar and phosphatase activity of 0.4 U/ml/min at a temperature of 45°C and at pH 7. The production of plant growth hormone, indole acetic acid

(IAA) by the bacterial strain was also studied using TLC and colorimetric method. Growth experiments were conducted with seeds of *Vigna radiata* L. and it was found that it has a significant effect on increasing root length and overall growth of plantlets. Therefore the isolated PSB are likely to serve as an efficient biofertilizer and strong plant growth promoter to increase the overall performance of crops.

Keywords: *Vigna radiata*, Phosphate solubilizing bacteria, 16S rDNA-PCR, *Bacillus licheniformis*, bio fertilizer, Indole acetic acid (IAA)

Won Second Prize

Evaluation of *in-vitro* Antioxidant, Antimicrobial, Antitubercular and *in-vivo* Hepatoprotective Activity of Various Onion Extracts



Monika L. Jadhav^{*1}, Pratima A. Tatke²

¹Research student, Department of Pharmaceutical Chemistry, C. U. Shah College of Pharmacy, S.N.D.T. Woman's University, Juhu campus, Mumbai.

²Principal and Professor, Department of Pharmaceutical Chemistry, C. U. Shah College of Pharmacy, S.N.D.T. Woman's University, Juhu campus, Mumbai.

E mail: monikadipakmali@gmail.com

Abstract

Allium cepa (Onion), belonging to the family Liliaceae, has many folklores uses as well as recent medicinal applications for wide range of health problems. In this research project, *In-vitro* antioxidant, antimicrobial and antitubercular activity along with *in-vivo* hepatoprotective activity was evaluated of fresh bulb, skin and dried powder of two varieties (red and white) of onion and of desiccated onion. Extraction was done by the soxhlet extraction technique using four solvents. Total 28 extracts were prepared and evaluated for percentage yield, phytochemical testing, total phenolic content, total flavonoid content, *in-vitro* antioxidant activity (three methods), *in-vitro* antimicrobial activity (against 2 gram-positive, 2 gram-negative bacteria, and 2 fungi) and *in-vitro* antitubercular activity using Microplate Alamar Blue Assay (MABA). *In-vivo* hepatoprotective activity of selected extracts was performed using Paracetamol induced hepatotoxicity model of 7 days and Isoniazid-Rifampicin induced hepatotoxicity model of 30 days and evaluated for liver diagnostic enzymes like bilirubin, AST, ALT and alkaline phosphatase along with the histopathological study. Red onion extracts showed the higher phenolic and flavonoid content as compared to the white onion and desiccated onion extracts. Extracts of red onion skin and red onion dry showed better *in-vitro* antioxidant and antimicrobial activity. MABA showed that two extracts of red onion and one extract of white onion possess antitubercular activity. Hydro-alcohol extract of red onion skin and ethyl acetate extract of red onion dry showed significant *in-vivo* hepatoprotective activity. Thus, it was concluded that red onion skin extracts and dry red onion extracts have shown promising antioxidant, antimicrobial and antitubercular activity. The results obtained in *in vivo* hepatoprotective activity suggests that the red onion skin and red onion dry possesses hepatoprotective activity with enhancement of *in vivo* antioxidant activity as one of the possible mechanisms of action. These extracts can be further explored for detailed pharmacological and clinical evaluation.

Key words: *Allium cepa*, *in-vitro* Antioxidant Activity, *in-vitro* Antimicrobial Activity, *in-vitro* Antitubercular Activity, *in-vivo* Hepatoprotective Activity

Won Excelsior Award

A Clinically Competent L Asparaginase Enzyme From *Bacillus megaterium* As A Potential Nominee For Blood Cancer Treatment



Lailaja VP., Sumithra TG*, Reshma KJ., Anusree VN.

ICAR-Central Marine Fisheries Research Institute (ICAR-CMFRI), Kochi, India

E mail: lailaja@gmail.com or sumithravet@gmail.com

Abstract

L-asparaginase (ASNases) is an essential therapeutic enzyme for various blood cancers; however, certain restraints of the currently available preparations (from *Escherichia coli* and *Erwinia chrysanthemi*) limits the long-term administration in the patients. Further, lots of risks are reported with these preparations, warranting urgent research for novel resources. The concurrent activity on L-glutamine and urea, along with the required substrate (L-asparagine) is attributed as the reason for the limitations. In view of these the present study reports the characterization of an extracellular snase with clinically compatible attributes. The enzyme was produced by a bacteria isolated from the hemolymph of a mud crab (*Scylla serrata*). The rapid plate assay showed pink-discoloration with an enzyme index of >1 (average 1.45 ± 0.11) suggesting the potential to produce L-ASNase, which was then confirmed through rapid flask assay. The isolate was characterized as *Bacillus megaterium*. Quantitative estimation further confirmed the excellent production potential (132.49 IU/ml within 24 h), without any optimization. Strikingly, the pattern of L-ASNase production in the absence of glucose, low concentrations of L-asparagine, and presence of an alternative nitrogen source reflected the type II nature, the form targeted for chemotherapy. The robustness and tests for optimal conditions demonstrated the stability of the enzyme to work on a wide temperature of 25-40°C and pH 7-11. The optimum conditions for the enzyme was 35-40°C temperature, and pH 7-9 which include the physiological conditions, suggesting the ability to function normally in human body. More importantly, the isolate was found to lack glutaminase and urease activities, the most desirable properties for the clinical compatibility. The absence of these activities was further confirmed through the substrate specificity assays. Altogether, the results revealed a potential clinically competent L-ASNase that can be targeted for therapeutic applications in blood cancer.

Key words: Type II Asparaginase; *Scylla serrata*; Haemolymph, Therapeutic Enzyme, Chemotherapy

Won Third Prize

Development and Evaluation of Functionalized Iloperidone Nanoemulsions for Nasal Delivery



Niserga D. Sawant*, Namita D. Desai, Pratima A. Tatke

C. U. Shah College of Pharmacy, S.N.D.T. Women's University, Mumbai-400049, India.

*E mail: nisergasawant@gmail.com

Abstract

This research work is focused on development of Iloperidone nano emulsions functionalized with chitosan for nasal delivery wherein the nano emulsions would help in enhancing solubility and permeability of poorly water soluble; Iloperidone across nasal mucosa and presence of mucoadhesive chitosan can reduce mucociliary clearance thus, prolonging nasal residence time. Intranasal route as non-invasive approach helps in improving drug bioavailability with potential for direct brain delivery. UV spectrophotometric method for Iloperidone in Methanol AR and Simulated Nasal Fluid, pH 6.4 was developed and validated. Iloperidone nano emulsions (2% w/v) were optimized by response surface methodology using DESIGN EXPERT 13 and evaluated. The composition of optimized nano emulsions was Oleic acid (5% w/w) as oil phase, Tween 80 and Transcutol (40% w/w) as S_{mix} (1: 1) and water. The optimized nano emulsions were translucent, stable to freeze thaw cycles, showed pH 5.5 ± 0.5 and drug content $98.23 \pm 0.03\%$. Iloperidone nano emulsions could be functionalized with 0.5 % w/v Chitosan while higher concentrations led to phase separation in the nano emulsions. Optimized chitosan functionalized Iloperidone nano emulsions presented positive zeta potential (+17.2 mV) while Iloperidone nano emulsions showed negative zeta potential (-10.8 mV) which confirmed the functionalization of the dispersed droplets by the chitosan. Sustained release characteristics were seen by about 68% release of Iloperidone from chitosan functionalized nano emulsions as compared to about 91% release of Iloperidone from nano emulsions at the end of 6 hours in Simulated Nasal Fluid, pH 6.4. *In vitro* mucoadhesion studies showed that mucoadhesion of chitosan functionalized Iloperidone nano emulsions was 2.16 fold higher than Iloperidone nano emulsions. Thus, Iloperidone nano emulsions were successfully prepared by low energy emulsification method and could be functionalized with chitosan. *In vitro* release studies showed sustained release of Iloperidone from Nano emulsions after functionalization with chitosan which can be proposed to increase residence time in the nasal cavity showing potential for brain delivery.

Key words: Iloperidone, Nanoemulsions, Chitosan, Functionalization, Nasal Delivery

Bioprospecting of Mangrove Plants

Shameela Khadeeja A*, Dr. R.Raghunathan*

Department of Biotechnology, Centre for Bioscience and Nanoscience Research, Echanari, Coimbatore 21.

*E mail: shameelakhadeeja@gmail.com

Abstract

Mangroves are world's most productive ecosystems and support genetically diverse community of terrestrial and aquatic flora and fauna. They are directly or indirectly a source of livelihood to a large group of population living in or around the mangrove habitat. Mangroves have several ethnomedicinal values and provide invaluable treatment modalities, both in modern and traditional systems of medicine through its diverse source of bioactive compounds. This study highlights the medicinal potential of so

me of the beneficial mangrove plants such as *Acanthus ilicifolius*, *Bruguiera gymnorrhiza*, *Excoecaria agallocha*, etc. with a view to explore these ecosystems for its potential application in pharmaceutical industry and drug discovery. Recent studies have also shown that the medicinal value of mangroves and associated plants persist to provide invaluable treatment modalities, both in modern and traditional systems of medicine (Revathi et al., 2013). The ethno-pharmacological consequence were pointed out that the mangrove plants are traditionally used for the treatment of rheumatism, painful arthritis, inflammation, asthma, antioxidant free radical scavenging, anti inflammatory, anti diabetes and hepato-protective actions (Roome et al., 2011; Prabhakaran and Kavitha, 2012).

Key words: Bioactive Compounds, *Acanthus ilicifolius*, *Bruguiera gymnorrhiza*, *Excocaria agallocha*

Efficacy of Silicon Based Nutrients Against Sheath Blight of Rice Under Pot-Culture Experiment

Devi Shanthini V*, Jaiganesh V, Brindhadevi S

Department of Plant Pathology, TNAU, Madurai-625104, India

Department of Plant Pathology, Annamalai University, Chidambaram-608002, India

*E mail: shantinipillay1211@gmail.com_

Abstract

Rice is affected by a devastating disease. Rice Sheath Blight is one of the detrimental diseases of rice. Rice sheath blight disease caused by *Rhizoctonia solani* is a destructive disease that leads to massive yield loss and degradation of rice. Currently, the disease is being managed by fungicides. But the adverse effects of chemical fungicides causes various effects to environment. Hence, the ideas of Integrated Disease Management and ecological plant pathogen control which are broad-based. Induced resistance may provide an alternative approach to plant protection. Five silicon-based nutrients were tested in pot-culture experiment. Among them, potassium silicate at three per cent level was the most effective (22.3 %) over the other nutrients followed by potassium silicate at two per cent in reducing disease incidence (24.6%) as compared to 65.1 per cent observed in control. Sodium silicate at one per cent was the least effective. Foliar application of silicon-based nutrient (PS) application did not alter the soil micro flora and proved that this treatment could be highly adapted in the eco-friendly agriculture without distressing the environment.

Key words: Rice, *Rhizoctonia solani*, Potassium Silicate, Induced Resistance and Sodium Silicate

LAPACHOL- A Natural Inhibitor of LDH

Arya A R¹, Ritobrata Sengupta² & Mani Shankar Babu¹

¹ Department of Botany, University College, Thiruvananthapuram, Kerala, India 695 034

² Vedantu Innovations Private Limited

*E mail: manishankarbabu@gmail.com

Abstract

Lactose dehydrogenase (LDH) is an enzyme that plays an important role in cellular respiration. LDH catalyze the reversible conversion of lactate to pyruvate. LDH generates most energy for cancer cells through aerobic glycolysis. Aerobic glycolysis is essential for viral replication and plays an important role in the survival of SARS-COV 2 in host cells. Lapachol, a natural phenolic compound shows the ability to inhibit the activity of LDH. The ability of lapachol to specially target LDH activity is yet to be reported. In silico analysis is done using different crystal structures of lactate dehydrogenase as receptor and lapachol, lactate and pyruvate as ligands. Pdb files of human LDH proteins from Protein Databank and XML files of ligands from Pubchem were docked using Autodock Vina. The docked poses was brought together as a single pdb file using Accelrys Discovery studio. The protein ligand interaction was utilized for assessing non-covalent interactions. Selection of poses on the basis of minimum energy and assessment of non-covalent interactions were made. Docking studies revealed the ability of lapachol to inhibit LDH activity. Since lapachol is non-toxic to humans and it shows significant level inhibition of LDH, it can be used to target cancer cells without causing any toxic side effects to normal cells. So the present study is very relevant in the context of cancer treatment. The ability of lapachol to inhibit LDH activity and glycolysis may be used to inhibit replication of SARS- COV2 virus and lapachol may be used in the treatment of the covid-19.

Key words: Lactose Dehydrogenase, Lapachol, Lactate, Pyruvate, Cancer

Isolation of Biosurfactant Producing Bacteria from Oil Contaminated Soil and Its Applications

Brinda C.M , R.Raghunathan*

Research scholar, Centre For Bioscience and Nanoscience Research
(Affiliated for Bharathiar University)
461/3, Amman Nagar, Eachanari, Coimbatore – 641021, Tamilnadu.
E mail : rageshramesh2005@gmail.com

Abstract

Biosurfactants are microbially produced surface-active compounds. Biosurfactants are amphiphilic molecules with hydrophilic and hydrophobic regions. Biosurfactants are very less toxic molecules that are biodegradable. Biosurfactants are produced by some bacteria (*Pseudomonas* sp, *Bacillus* sp), fungi (*Nocardia* sp, *Candida* sp) and yeast. The demand of biosurfactants has been steadily increasing as they are eco friendly in nature, non toxic, biodegradable etc. Now a days, increased use of petroleum hydrocarbons and oils as many energy sources has increased the risk of leakage of these products while transportation, leading to soil and water contamination, which is not beneficial for plants, human beings and animals. Microorganisms produce several classes of biosurfactants such as lipopeptides, glycolipids, phospholipids, fatty acids, lipoproteins, polymeric surfactants and particulate biosurfactants. The objective of this study was to isolate and characterize the biosurfactants producing bacteria from oil contaminated soils. The soil samples were collected from petrol pumps and workshops of different places in Kerala & Coimbatore. The soil samples were brought to the laboratory and the bacteria were isolated using total plate count method. After basic biochemical studies, molecular identification was carried out to identify the bacteria. The gene sequences were submitted to gene bank NCBI and the accession numbers were granted as following -MN243658 – *Bacillus amyloliquifaciens*, MN 243657 – *Bacillus* sp., MN 243656 – *Bacillus thuringiensis*. Further production, purification and application are under process.

Key Words: Biosurfactants, Molecular identification, NCBI, *Bacillus* Sp.

Micropropagation of *Santalum album* L. (Santalaceae): A Valuable Vulnerable Tree Species of Southern Western Ghats, India

Divya, C*. and Gomathimala. T², Boojit. B². and Kalaikathiravan.P²

*Assistant Professor, Department of Botany, Sri Klaiswari College (Autonomous), Sivakasi, Virudhunagar.

²M. Sc, Department of Botany, Sri Klaiswari College (Autonomous), Sivakasi, Virudhunagar, Tamil Nadu.

B. Sc., Department of Botany, Sri Klaiswari College (Autonomous), Sivakasi, Virudhunagar.

*E mail: divyabotany111@gmail.com

Abstract

In vitro propagation protocol has been developed for *Santalum album* L. (Santalaceae) an important Indian medicinal plant. It is a valuable and vulnerable (IUCN 2014.3) tree species in India. Due to smuggling, illegal felling of trees and encroachment of forest land, it has become very rare. The whole plant has been used for several commercial purposes such as perfumes and cosmetics. It is used to treat various diseases such as gastric irritability, dysentery, genital- urinary disorder, skin disorders and fever. Many measures have been taken by the Forest Department to preserve and protect this rare plant species. Due to great demand for the products of this tree, *in vitro* propagation protocol has been developed to enable mass production and to maintain sustainability. The investigation aimed to carry out the shoot and callus multiplication of *S. album* by different explants such as nodal, internodal and leaf. The organogenic competence of nodal, internodal, cotyledon segments was investigated on Murashige and Skoog (MS) medium supplemented with different concentrations of BAP (0.5-2mg/l) and Kn (0.5-2mg/l) and in a combination of BAP+TDZ (0.5-2mg/l+1-4mg/l+1-4mg/l) and Kn+TDZ (0.5-2mg/l+1-4mg/l) and Kn+TDZ (0.5-2mg/l+1-4mg/l). The highest number of primary shoots with callus was obtained with MS medium containing different concentrations of BAP+TDZ (0.5+1.0mg/l). The leaf segments of *S. album* from regenerated shoots were cultured on MS medium supplemented with BAP (0.5-2mg/l) and BAP+TDZ (-.5-2mg/l). Large amounts of friable callus were obtained from BAP+TDZ (0.5+1.5mg/l) within 3 weeks. After 4 weeks, the regenerated shoots were transferred to rooting medium containing different concentrations of IAA (0.5-2.5 mg/l) and IBA (0.5-2.5 mg/l). The rooted plantlets were successfully acclimated into paper cups containing 1:1:1 ratio of sand, garden soil and organic manure under greenhouse conditions.

Key words: *Santalum album*, Endangered, Conservation, BAP+TDZ, IBA

Won Second Prize

A Bioinformatics Approach for the Assessment of Potential Lead Molecules from *Ficus religiosa* and *Sida cordifolia* for Use in the Treatment of Rheumatoid Arthritis



Lhea Blue* and Anisha S.

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

*E mail: lhea044@gmail.com

Abstract

Rheumatoid Arthritis, also abbreviated as RA, is a grave auto-immune and inflammatory disease that affects majority of the adult population. People affected by this disease experience immense pain especially at the joints of hands and legs. Because of the disease severity, it is of utmost importance to design drugs that are effective for treatment of Rheumatoid Arthritis. Currently available drugs are non-steroidal anti-inflammatory drugs, glucocorticoids, and DMARDs (disease-modifying anti-rheumatic drugs) of synthetic origin or of biological origin. Some of the conventional DMARDs are methotrexate or targeted DMARDs, such as Janus kinase [JAK]-inhibitors and those of biological origin are tumor necrosis factor [TNF]-inhibitors, B-cell depleting drugs etc. This research work is aimed to find the suitability of potential lead molecules from *Ficus religiosa* and *Sida cordifolia* for use in the treatment of Rheumatoid Arthritis. Molecular docking simulation was carried out in the present study using the software tool Molegro Virtual Docker. The drug properties of two selected compounds, one each from *Ficus religiosa* and *Sida cordifolia* were assessed and the features of the selected compounds were compared with popular chemical drugs used in the treatment of Rheumatoid Arthritis. The results of this study demonstrated that Quercetin, a prominent phytoconstituent present in *Ficus religiosa*, can be used as a potential lead compound for the treatment of Rheumatoid Arthritis.

Key words: Rheumatoid Arthritis, Molecular Docking, Molegro Virtual Docker, Quercetin

Won Excelsior Award

Molecular Characterization of Okra [*Abelmoschus esculentus* (L.) Moench] Against Yellow Vein Mosaic Virus (YVMV)



Bhalrao S. R., Puneet S. B., Rahul K., Rahul G.,

Department Plant Biotechnology, Vilasrao Deshmukh College of Agricultural Biotechnology, Latur, Maharashtra-413512, India

E mail: puneetsb350@gmail.com

Abstract

Yellow vein mosaic is the most serious disease leading to 50-95 percent yield loss in okra. In the present investigation, Field screening of fourteen okra genotypes for YVMV was done. The least YVMV incidence was observed in Parbhani Kranti (2.56%), Kashi Pragati (3.98%), and BO-2 (8.79%) at 60DAS, whereas significantly higher YVMV incidence observed in VRO-103 (68.5%), Ankur 40 (67.78%), and Arka Anamika (66.2%). Three molecular marker systems, RAPD, ISSR, and SSR, were used to identify markers associated with YVMV. A total of 30 RAPD, 10 ISSR, and 13 SSR primers were initially screened for their ability to amplify the DNA fragments. Based on the number of bands and the nature of amplification, 14 RAPD primers, 5 ISSR primers, and 5 SSR primers were selected for the study. Two RAPD primers, OPA-02 and OPW-10, and one ISSR primer, ISSR 8 produced a polymorphic amplicon that was identified only in resistant and moderately resistant genotypes and was absent in susceptible or moderately susceptible genotypes. Out of five SSR primers, MTIC 7 produced a

distinct amplicon for both resistant and susceptible genotypes, with a band size of 190bp for resistant and moderately resistant genotypes and 135bp for susceptible and moderately susceptible okra genotypes. Primer pair 1 produced an amplicon at 495bp in moderately resistant, moderately susceptible, and susceptible genotypes, but not in resistant genotypes such as Prabhani Kranti, Kashi Pragathi, and BO-2. Genetic similarity was estimated using clubbed data of RAPD, ISSR, and SSR using Jaccard's coefficient, which ranged from 0.30 (Parbhani Kranti and Ankur-40) to 0.90 (Varsha Upahar and IC-4500-0), with an average of 0.67. The outcome of the molecular analysis and evaluation of YVMV resistance provide useful information for marker assisted selection in okra breeding.

Key words: Okra, YVMV, RAPD, ISSR, SSR

Won Third Prize

Evaluation Of Variations Among Portulaca Species



¹Lakshmiraj & Sreeranjini S*

¹Department of Post Graduate and Research in Botany, Sanatana Dharma College Alappuzha, Kerala, India

*E mail: sreeranjinis80@gmail.com

Abstract

Plant Morphology is the physical appearance of plant, which help to create profile and general comparison of plant species. Variations occurs in plant populations of species under same or different genus. An investigation on variations among Portulaca species was carried out with different measures of variability. Morphological data was collected from twelve accessions and subjected to Cluster analysis using Multivariate statistical package Dendrogram plotted on the basis morphological data showed existence of two broad group of clusters. Dendrogram analysis based on quantitative and qualitative characters of stem, leaf, flower and androecium revealed that some populations show divergence. Normal colour of the stem is green but accessions having green with light pink shades, light green and light pink shades were observed. In case of leaves, all the accessions are entirely different from each other. Leaves shape are linear in double type flowers, single type flower shows variation in leaves shape - PL002 has linear shaped leaf, PL001 and PL006 has lanceolate; PL005, PL010 & PL012 have obovate shaped leaves. Not only its shape but also there is variations in its colour. In selected accessions there are 2 types of flowers mainly single and double with different size and colour. Flower size varies from small to large. Large, medium sized and flowers with small size were observed. There is single coloured, bicolored and multicoloured flowers. Light pink, white with pink shade, pure white, orange, coral with yellow shade and pink striations, dark yellow, normal yellow and light yellow were observed. In the case of stamen, single type flowers have single whorled and double type showed double whorled stamens. In single type flowers there are 5 number of petals but in case of double type flowers number of petals varies from 16-26. In double type flowers stigma fid is 2 and in single flower it range from 2-8. Cluster analysis revealed significant variations in all the characters of selected accessions and resulted in two principle clusters. The first principle cluster includes PL009, PL004, PL011, PL008, PL007, PL002 and second principle cluster includes PL006, PL005, PL003, PL012, PL010, PL001. Among them PL002 and PL003 are more diverged from others. Chromatographic studies showed significant variation in leaf and flower pigments. Pigments present in the leaf are Chlorophyll a, Chlorophyll b and Carotenoid and petals showed the presence of Xanthophyll and Anthocyanin in selected accessions. The species selected for the present study exhibit variations in their morphological characters including stem colour, leaf colour, leaf shape, leaf width, leaf length, flower type, flower colour, flower size, stamen, filament colour and number of petals and also showed variations in pigmentation.

Key words: Variations, Portulaca, Morphology, Cluster Analysis, Dendrogram, Thin Layer Chromatography

Won Excelsior Award

Assessment Of Covid-19 Gender Susceptibility And Impact Of Citrus Fruit Consumption During Pandemic



Anupa K Babu*, Elisabeth Vincent*, Elseena Thomas*, Vishnu K B*, Anju T R[#]

*Department of Botany, Newman College, Thodupuzha - 685 585, Kerala, India

[#]Department of Biotechnology, Newman College, Thodupuzha - 685 585, Kerala, India

E mail: anupakbabu25@gmail.com

Abstract

COVID-19, an ongoing pandemic, caused by a severe acute respiratory syndrome Coronavirus 2 (SARS-CoV 2) is highly transmissible and pathogenic disease. Along with age and other co-morbidities, gender also plays a role in determining the susceptibility and mortality in patients. Here, we analysed gender susceptibility to COVID 19 by a gross comparison of the reported number of sex segregated positive cases and death, globally and nationally. The analysis of the data showed that the reported percent positivity in world population follows a 50:50 pattern for male and female; whereas mortality is significantly high in males with 58% reported cases for 42% female. In Indian population, the male to female percent positivity of confirmed cases is 65% and 35% whereas the mortality rate is 2.62% and 3.07% in male and female respectively. Globally COVID-19 infection affected both sexes equally where as mortality was higher for males than females. This point that gender may determine the severity and lethality of affected individuals; but its role on susceptibility to infection cannot be concluded as the data represent only the reported cases and may not be a reflection of the total affected cases. The increased lethality in men can be related to the increased level of host receptor for viral entry due to the differential hormonal levels, especially estrogen, in both sexes. The higher mortality of females observed in Indian population is in contradiction to the reported data from many other countries and hence calls for an urgent need to check the social factors and health care modalities. A survey was conducted to check the effect of medicinal properties of citrus fruits and herbal drink against COVID-19 which showed that 96.7% of people who consumed citrus fruits were not tested positive. This provides a strong evidence for the benefits of citrus fruits against COVID-19.

Key words: COVID-19, Gender Susceptibility, Global Population, Indian Population, Citrus Fruit

Won Second Prize

Exploration of prodigiosin producing rhizosphere bacteria, *Serratia marcescens* isolated from the paddy fields of Kuttanadu for natural and organic agricultural practices



Jaseena T, Anagha U, Anupama Shiji, Neeraja M, Safna A, Dr.Roshmi Thomas*

Department of Microbiology, S.D College, Alappuzha, Kerala, India

*E mail: roshnnirosethomas@gmail.com

Abstract

Nowadays agriculture is deeply dependent on the chemical fertilizers and pesticides. The intense application of these chemicals has led to severe environmental pollution with harmful effects including health hazards, interruption of natural ecological nutrient cycling and destruction of biological communities. This indicates the significance of sustainable and organic methods which are economical and have healthier outcome when

compared to chemicals. The rhizosphere microbes exhibit several antagonistic properties as well as a wide variety of ecological niche and a high diversity of soil microorganisms. Plant growth – promoting rhizobacteria or rPGPR strains act as an inhibitory factor for various pathogenic microorganisms through the production of some metabolites which stops the further growth of the particular pathogen. The present study involved the isolation of rhizosphere bacteria, molecular identification and screening of their antagonistic properties and phosphate solubilization potential. The antimicrobial potential of selected isolate (RRB) against fungal pathogen *Fusarium* sp. was screened by dual culture technique. It was come to found that the selected pigmented bacteria have some antagonistic properties, which completely inhibited the further growth of the test pathogen. In addition, the pigmented isolate was found to be potent phosphate solubilizer showing clear halo zone around its colony on Pikovskaya's agar medium. The selected pigmented rhizosphere bacterial isolate with the potential against plant pathogen and phosphate solubilisation capacity was further subjected to molecular identification. For this, genomic DNA was isolated followed by PCR amplification and sequence analysis of 16 S rDNA. The sequence were further be subjected to BLAST analysis. BLAST result of the selected isolate RRB showed 100% similarity with the available database sequence of *Serratia marcescens*. Therefore the antifungal activity and phosphate solubilization potential of the prodigiosin producing rhizosphere bacteria *Serratia marcescens* isolated in the current work indicates its potential to be exploited as a natural environment friendly biocontrol agent.

Key Words: Rhizosphere, Phytopathogen, Pigmented Bacteria, Antifungal Activity, Phosphate Solubilization

Won Third Prize

FTIR studies of selected *Ficus* L. species from Alappuzha district Kerala, India



Pinkie Cherian*, Athulya Praveen, Sangeetha K & Lina Varghese

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

*E mail linavarghese2018@gmail.com

Abstract

FTIR (Fourier Transform Infrared Spectrophotometer), act as powerful tool for identification and determination of phytochemical compounds. The phytochemical detection was possible through FTIR and based on this understanding, chemical profiling of *Ficus* plants was carried out. Several phytochemicals based drug formulations are also used for the prevention and treatment of complex diseases Therefore, in this study, we aimed to identify and classify the selected *Ficus* L. plant (*Ficus benghalensis*, *Ficus hispida*, *Ficus microcarpa*,) using FTIR analysis. A similar peak was observed for *F. benghalensis*, *F. hispida*, *F. microcarpa*, *F. racemosa* and *F. religiosa* at 3257 cm⁻¹, 3258 cm⁻¹, 3283 cm⁻¹, 3257 cm⁻¹, 3228 cm⁻¹ absorption. A uniform peak was exhibited for *F. hispida*, *F. microcarpa* 2926 cm⁻¹, 2925 cm⁻¹ absorption. They show C-H stretching bond which has functional group alkanes. On comparing *F. hispida* and *F. benghalensis*, nitro-compounds, Alcohols and Alkyl halides are the similar compound class observed from the absorption bands in FTIR graph. There were great similarities between the functional groups among this five *Ficus* species. The study provided strong evidence for the use of bark of *Ficus* species for making new formulations for health care.

Key words: *Ficus*, Spectrophotometer, Diseases, Streching

Won Third Prize

GC-MS Analysis of Bioactive Compounds from Leaf Essential Oil of *Eugenia rottleriana* Wt. & Arn. and It's Antimicrobial and Antimalarial Activity



S. Shanmugarevathi and G. Manikandan*

Department of Botany, Sri Kaliswari College (Autonomous), Sivakasi, Tamil Nadu, India

*E mail: rgmani.19@gmail.com

Abstract

Eugenia rottleriana Wight et Arn. belongs to the family Myrtaceae. It is a small tree with leaves linear to oblong lanceolate, long acuminate at apex, endemic to South Western Ghats and found in evergreen forests at low altitude. In this present study, Essential oil of the leaves of *Eugenia rottleriana* by GC-MS analysis clearly showed the presence of 32 compounds. In GC-MS analysis, *Eugenia rottleriana* showed 06 major and 26 minor compounds. In addition, the antimicrobial activities of the essential oil were evaluated by disk diffusion method against selected human pathogenic organisms. The results showed a strong antimicrobial activity against all the tested microorganisms. The leaf essential oil of *E. rottleriana* was found to be more potent and showed 100% mortality at all the concentration against *An. stephensi*. The results indicated that the leaf essential oil might be utilized as natural drug for the treatment of several infectious diseases by microorganisms and larvicidal activity.

Key words: GC-MS Analysis, Essential Oil, Antimicrobial, Disk Diffusion, Larvicidal Activity

CHEMISTRY

Won Excelsior Award

Unraveling the Electro chemical Behavior of Plant Material Containing Biologically Active Components as an Electrolyte for Safer All-Solid-State Lithium-ion Batteries



Vengadesh Krishna M¹, Malaichamy Ilanchelian^{1*}, Selvasekarapandian S.^{2,3}, Nandhini K¹

¹Department of Chemistry, Bharathiar University, Coimbatore, Tamilnadu-641046, India.

²Department of Physics, Bharathiar University, Coimbatore, Tamilnadu-641046, India.

³ Materials Research Center, Coimbatore, Tamilnadu-641045, India.

* E mail: chelian73@yahoo.com

Abstract

So far, plants containing various biologically active components have been particularly utilized for medicinal applications majorly. Their electrochemical behavior studies of such materials can unravel the door for next generation, eco-friendly, cheaper and safer electro chemical device technology. Hydrocotyle, locally known as Vallarai contains various biologically active constituents like terpenoid saponins including asiaticoside, centelloside, madecassoside and asiatic acid. In addition, hydrocotyle contains other components including

volatile oils, flavonoids, tannins, phytosterols, amino acids and sugars. In this present work, lithium-ion conducting polymer membrane based on standardized poly vinyl alcohol/hydrocotyle incorporated with different composition of lithium chloride were prepared by solution casting technique. X-ray diffraction analysis confirms the increase in amorphous nature with the addition of lithium chloride and high degree of amorphous property is exhibited by the 1g PVA+400 mg hydrocotyle+ 0.8 wt %lithium chloride. The prepared polymer membrane has exhibited maximum ionic conductivity of $2.75 \pm 0.04 \times 10^{-3} \text{ S cm}^{-1}$ at 303 K. Rechargeable lithium ion CR2032 coin cell has been constructed with the cell configuration graphite|1 g PVA + 400 mg hydrocotyle + 0.8 wt % lithium chloride|LiFePO₄. The constructed coin cell has shown open circuit voltage of 3.37 V and present good cycle performance, suggesting that the polymer membrane can be a promising alternative electrolyte material for safer all solid-state lithium-ion batteries.

Key words: Biologically Active, Hydrocotyle, Polymer Membrane, Ionic Conductivity And Battery

Won Third Prize

Extraction of Cellulose Nanofibers from Agricultural Waste as Future Nanomaterials



Arsha M. R., Parvathy D. S., Shilpa R. A., Surya R. B., Vrisanka J., Poornima Vijayan P*

Department of Chemistry, Sree Narayana College for Women, Kollam, Kerala, India 691001

*E mail: poornimavijayan2007@gmail.com

Abstract

Natural materials are experiencing a renaissance of sorts, as people around the world seek safe, environmentally friendly and renewable alternatives to plastics and other oil-based products. The use of eco-friendly and bio-based materials is a green concept in material science research. Nanocellulose is the most promising sustainable solution for several future challenges in modern society. Toxic nanofillers would effectively be replaced with nanocellulose and this extends their application in biomedical area. Cellulose nanofiber (CNF), which can be derived from plant, is one of the most abundant green resources on Earth. Several plant parts are used to extract cellulose nanofibers. Herein, we have adopted an eco-friendly method to extract cellulose nanofibers by making use of wealth from waste concept. In the current research, cellulose nanofibers were successfully extracted from onion skin and garlic straw, which are popular agricultural waste from food processing industry via a simple and economic method. The extracted cellulose nanofibers are characterized using Scanning Electron Microscopy (SEM), Dynamic light scattering (DLS) and ¹³C NMR spectroscopy techniques. The prepared nanofibers are of high purity, nanoscale dimension and high aspect ratio, which would have potential application in a variety of fields using a variety of fields including filter material, high gas barrier packaging material, electronic devices, foods, medicine, cosmetics and health care. Due to the renewable and sustainable nature of cellulose, nanofibers, it creates low environmental impact in its production and disposal.

Key words: Cellulose nanofibers, Eco-Friendly Methods, Sustainability

Won Excelsior Award

In Silico Docking Studies Done on Fluorinated Derivatives of Chrysin -Potent Healing Agent against Breast Cancer



Shilpa A.S, Arya G.S, Arya Krishnan A.S, Muhammad Thanseer S., Lucky M.V.*

Department of Chemistry, Mother Theresa College, Nellikad, Thiruvananthapuram-695571, Kerala, India

* E mail: luckyvishnuvs@gmail.com

Abstract

Chrysin, a naturally occurring polyphenol, appears to possess many pharmacological activities such as anticarcinogenic, pro-apoptotic, antiangiogenic, antimetastatic, immunomodulatory and antioxidant properties. Taking this into account a series of fluorinated and non-fluorinated derivatives of chrysin labelled C1 to C6 were designed and made to dock with the protein 2IOG, a protein associated with breast cancer in women. The aim of this work was to find out how the fluorination of substituents would vary the docking scores. iGEMDOCK software was used to perform the docking procedure. The higher negative value of the docking scores is directly related to better binding of the ligand molecule with the target protein. The variation of docking scores of the derivatives upon change in the nature of substituents was investigated in silico analysis and found that the best result was obtained when the 8th position of the A ring of chrysin was substituted with -CF₃. This may be attributed to the stronger hydrogen bonding interaction of the two -OH groups with the amino acid residues. CF₃ being a better electron withdrawing group makes the adjacent phenoxide ions more electronegative. Better lipophilicity of the fluorinated derivatives along with the enhanced docking scores with 2IOG makes them potent hit molecules for ADMET studies. On further research it may be developed as a novel and efficient drug for the treatment of breast cancer.

Key words: Chrysin, iGEMDOCK, docking, ADMET, fluorinated, lipophilicity, 2IOG

Solvent Extraction of Mango Seed Kernel Oil

Varsha Chandran, Anet P Kurian, Megha T Thomas, Josna Jose, Reni Mary Varghese, Anu James*

Department of Chemistry, Assumption College Autonomous, Changancherry, Kottayam, Kerala, India

* E mail: anujames21@gmail.com

Abstract

The extensive application of mango seed kernel oil in various industrial products has led to the development of oil extraction methodologies from mango seed kernel. Mango Seed kernel is a biological waste after consumption of mango pulp that can be effectively used to extract oil which is useful to take various products. Purpose of the present study is to extract oil and to characterize by finding its acid value, saponification value, ester value and techniques including FT-IR. The aim of the work is to extract oil from mango seed and to characterize by finding its acid value and techniques including FT-IR to identify binding groups. Mango is an edible fruit native to South-East Asia. Mango, mangifera indica is a member of the family Anacardiaceae. It is a drupe or a stone fruit which embeds a shell within its hardened endocarp. The fruit have a single inedible, flat, hairy and fibrous seed. The edible pulp of this fruit is eaten as such or processed into many products. The annual production of mango is about 50 million tons and India produce over 40% of the total every year and to be disposed in a proper manner. This waste can be put to use by extraction of mango seed oil from the seeds and then vermi-composting the remains in a proper manner thus, obtaining a useful product and addressing a solid waste. Conclusion in study of the effect of extraction solvent and physiochemical properties of mango oil carried out in this work. Mango seed kernel oil, an important by-product of mango and a rich source of phenolic and vitamin E is a bio active compound. The procedure was evaluated in terms of oil extraction yield. The minimum yield of 2.5 ml of mango seed kernel oil can be extracted with about 90 ml of n-Hexane solvent and kernel is sun dried condition. Residual solids are then properly disposed, thus tackling the solid waste issues while being able to extract valuable product from the same waste. The result of this study can be applied to obtain the optimum conditions of Mango seed kernel oil extraction, can be applied in food industry. The result suggest mango seed kernel has the potential as raw material for food products oil-based and as a natural antioxidant of functional food and use in food processing.

Keywords: Saponification Value, Ester Value, Acid Value

Won Second Prize**Estimation of Saponification Value of Oils**

**Anjana Anil R. A., Anamika Devi S., Anjali, Anjana A., Anupriya, Sindhu
Yeshodharan***

Department of Chemistry, All Saints College, Thiruvananthapuram
E mail: sindhu.che@allsaints.ac.in

Abstract

The saponification value is a common parameter in the specifications of oils. The purpose of this work was to determine the saponification value of commonly used oils. In the present study we estimated the saponification values of various oils like coconut oil, olive oil, sunflower oil, palm oil, castor oil and rice bran oil by refluxing a weighed amount (2g) of each oil with known excess of standard alcoholic potash solution and back titrating the excess alkali with acid. The saponification value of these oils increases in the order as given below:

Castor oil < Rice bran oil < Coconut oil < Sunflower oil < Olive oil < Palm oil

By analysing the saponification value of these oils, we get an idea about their molecular weight. Smaller the saponification value, higher will be the molecular weight. Hence among the six different oils molecular weight is least for palm oil (847.3 g / mol) and high for castor oil (927 g / mol.) Oils with lower saponification value is capable of producing soft soaps with good cleansing action while oils with high saponification value produces hard soap with fair cleaning action. So it is clear from this study that rice bran oil and castor oil can be used for making soft soaps and palm oil, coconut oil, sunflower oil can be used for making hard soaps. An increase in saponification value enhances the quality of oil because it shows the presence of lower molecular weight components in 1g of oil which will yield more energy on combustion. Hence based on the saponification value of oils we have found out that highest quality is for palm oil and least for castor oil. The quality of other oils, that is, olive oil, sun flower oil, coconut oil and rice bran oil are found to decrease with decrease in saponification value. From this study, it is clear that by determining the saponification value one can easily get to know about the chemical composition, amount of fat content, structure of fatty acids, soap making ability, molecular weight and quality of oils.

Key words: Saponification Value, Oils, Molecular Weight Of Oils

COMMERCE

Won Excelsior Award

Exploring the Dynamics of Digital Disruption in Customer Experience Rendered by Banks



Anu P. Mathew*

Assistant Professor, Department of Commerce, Deva Matha College, Kuravilangad, Kottayam, Kerala-686633, India.

*E mail: anu.mathew@devamatha.ac.in

Abstract

Digitalization has been a developmental mantra for empowering Indian Economy for quite some time. The penetration of technology and digital disruption has touched upon varied domains and banking is no exception to it. It has been propagated as a significant strategy to establish financial inclusion at its best. Moreover, the key motive of banks is to be customer centric in their performance and the question is whether they succeed in offering superior Customer Experience. This research paper attempts to focus on customers' view on the reality of a customer centered approach and also whether digitalization in banking domain has influenced improving better Customer Experience. The study followed a descriptive and analytical research design, conducted among ninety three bank customers in Kerala. Findings showed that nature of the bank is not a significant criteria in forming a favourable opinion regarding customer centric approach of banks. The more customer centered the banks are, the more will be the customer experience enjoyed by customers. Perception about customer centricity and feeling of exciting customer experience are positively correlated. The outcome of customer experience pertaining to digital disruption is predictable by factors of the 7 C's framework.

Key words: Digital Disruption, Customer Experience, 7 C's Framework

Won Excelsior Award

An Assessment Of Household Trust In Cooperative Banking Institutions In Kerala



Akhil Menon

Research Scholar, Department of Commerce, Institute of Management in Government, University of Kerala

*E mail: menonakhil95@gmail.com

Abstract

In contemporary times, some of the cooperative banking institutions in the state of Kerala, witnessed cases of massive loan frauds committed by many of the staff and also the board members. Since then, the level of trust in these institutions among the public is sceptic. Even the levels of trust in general on banking institutions among the households is doubtful. This paper thus attempts to measure the level of trust among the households, and since a lower trust may result in significant reduction in engagement

with banking institutions, it can dampen the financial inclusion efforts, thus the study becomes more significant.

Key words: Trust; financial institutions; Banks; Cooperative banks, Households

Won Second Prize

Financial Institutions And Innovations During Covid-19 In Kerala



Vishuja V

Research Scholar, IMG Thiruvananthapuram, University of Kerala, Department of Commerce

Abstract

Kerala is one of the leading states in terms of inclusive banking system. As on March 2020, banking sector in Kerala comprised 6584 branches, which includes commercial banks, RRBs and small financial banks with ₹ 544371.82 core of deposits and ₹ 359273.74 core of advances. Besides there are 992 co-operative banks are also in the state. Co-operative banks in Kerala have been playing a central role in providing rural credit to agriculture and other informal sector activities. The present study describes the level of loan disbursal by banks is an important indication of economic activity. The study is based on secondary data sources of financial institutions and planning board of Kerala. Kerala is yet to reach to all sections of borrowers like small entrepreneurs, unemployed youth and return emigrants. Credit delivery assumes to be a greater significance in times of crisis.

Key words - Deposits and Advances, CDR, DRI, Co-operative Banks, Kerala Bank, KSFE, NBFES, KFC, Annual credit growth

Won Third Prize

Open Banking for Transformation in Banking Sector



Shiyas I.S

Research Scholar, Institute of Management In Government, Thiruvananthapuram

Abstract

Open banking, often known as open bank data, is a banking practice in which third-party financial service providers use APIs to gain access to consumer banking, transaction, and other data from banks and NBFCs. Application programming interface (API) is a connection between computers or between computer programs. It is a type of software interface, offering a service to other pieces of software. Open banking allows consumers, financial institutions, and third-party service providers to use the network of accounts and data across institutions. Customers must agree to share their data by checking a box next to the 'terms of service' screen on the app. APIs of third-party providers can get the access to the customer data. Instead of centralization, the concept of open

banking makes large, established banks to be more competitive with small and new banks. Large banks will have to put effort to adopt new technologies to provide better customer service at lower costs. Open Banking is an innovative model for the financial industry not only from competition perspective but also from customer engagement perspective.

Key words: Open Banking, API, Centralization, Innovation, Financial Service Provider

Won Third Prize

Third Party Administration In India: An Overview



Biji B S

Research Scholar, Institute of Management in Government (IMG)
Thiruvananthapuram, Kerala, India
E mail : bs.biji1994@gmail.com

Abstract

In this modern era, proliferation of various diseases and escalating medical costs put together marked the importance of health insurance. Health insurance is inevitable and a viable solution which is imperative to tackle the out of pocket costs. Without insuring health, an ordinary man finds it very difficult to conquer the accelerating medical costs and drains out his personal income to a great extent. The fast growing insurance sector had paved the way for the emergence of huge number of insurance companies having wide variety of health insurance schemes. The rapid developments in the health insurance market and stiff competitions among the insurance companies started in exploiting the customers. Consequently, Insurance Regulatory and Development Authority introduced the establishment of Third Party Administrators, ensuring higher efficiency, standardisation, providing cashless claims, and for increasing the penetration of health insurance in India. The present paper tries to explain the third party administration in health insurance sector and how it works according to the regulator. This paper is based on secondary data collected from various journals, articles, and publications of IRDA, various insurance companies and from websites of TPAs in India. Third Party Administrators are intermediaries between insurance companies, policy holders and healthcare providers for facilitating cashless services at the hospital, administers and settles claims and provides administrative support to insurance companies.

Key words : Health insurance, IRDA, TPA, Healthcare provider

Won Excelsior Award

A study on the Work Life Balance of Aided College Teachers in the Covid Pandemic Scenario



Jinu Maria Varghese

M.Com Student, Department of Commerce, St Stephen's College Uzhavoor, Kottayam, Kerala- 686634

*E-mail: ottaplackalginumaria@gmail.com

Abstract

Work life balance is about finding a right balance between work and life and feeling comfortable with both work and family commitments. Work Life balance does not mean an equal balance between work life and personal life. It is the happy medium between the minimum and maximum. The dimensions of Work Life Balance have changed drastically with the current pandemic. With the outbreak of covid 19 the teaching profession has become much more challenging as the pandemic compelled the transition from traditional offline teaching to online teaching that was entirely new to the teaching community. Balancing both work life and family life during covid 19 was not an easy task for the teaching community as they were using online mode of teaching and also compelled to work from home. Therefore, the present study tries to know the level of work life balance, the factors influencing the work life balance and the major work life issues of college teachers during the covid pandemic scenario and to suggest some ways and means to improve the work life balance of the teaching community. The study was conducted among 203 respondents. Based on the study, it is understood that both work and family life are equally important to the college teachers. During the covid 19, 34% of the college teachers have not get the opportunity to comfortably work from home. The covid 19 has brought unfavorable impact on the work life balance of college teachers and as a result of covid 19 college teachers were able to maintain only a medium level of work life balance only. The level of institutional support received by the college teachers during the covid 19 is only medium. With the outbreak of covid 19 the working hours of the college teachers has also been increased and also the college teachers got sincere support from the family members to balance their work and family life. The study point outs that 40.9% of the college teachers were not getting sufficient time to spend with their family members. The major factors that influence the work life balance of college teachers were the technical know-how to carry out online classes and the attitude of the family members. College teachers also find it difficult to balance their work and family life during the covid 19 and the major work life issue faced by the college teachers is the increased level of physical and mental fatigue. In order to improve the work life balance of aided college teachers during the covid pandemic earnest efforts from the part of higher education department, university, government and institutional level is required and also to maintain a balanced work and family life college teachers should take measures by themselves. For all that, results of the present study would definitely help them.

Key words: Work Life Balance, Covid 19, College Teachers

Won Second Prize

A Study on Financial Independence among Salaried People in Kerala



Jobin Jose*

M.Com Student, Department of Commerce, Deva Matha College, Kuravilangad, Kottayam, Kerala-686633, India

*E mail : jobin100813@gmail.com

Abstract

You don't work for money, the money itself work for you, it is called financial independence. This paper is a study of financial independence among the salaried people in Kerala. It is an exploratory and analytical study which evaluates the journey of salaried peoples to financial independence. This study encompasses evaluation of people's performance in pre-condition stages to financial independence, analyzing the ability of mind mapping of people in financial independence and evaluating stages of financial independence experienced by the salaried people. Multi-stage sampling technique was employed for data collection. Using well-structured questionnaire 250 samples were collected from respondents. The study found that majority of the respondents are not having full emergency fund mix and not following the standard level of emergency fund mix; people are not salary independent. Salaried people are successfully tracking their loans and majority of them are well aware of investments. They consider stable income as the most favorable investment objective. Among the respondents under study, 12.80% have basic independence, 8.80% of them have comfort independence and 2.80% have luxury independence.

Key words: Financial Independence, Pre- condition stages, Mind Mapping, Emergence Fund Mix, Passive income

Impact And Spread Of - Online Fantasy Sports Games And Gambling And Mobile Finance Application - On And Among The College Students

Sajilal

Department of Commerce, UIT, Aroor

Abstract

This project is about a study of a few harmful trends developing in our society – gambling and use of mobile applications for quick finance. These two form the subject matter of our project, and the study focus on college students, especially, those in and around Aroor. The aim of the study was to identify the impact and consequences of mobile fantasy games and gambling and mobile finance apps on those students. The study mainly revolves around primary data, and we decided to use sampling methods for which random and convenient samplings were used. A total of 100 respondents were selected and they participated in a survey containing more than 60-tailor made questions. The survey was conducted via Google Forms, and we have the entire set of documents as proof. The survey reveals that an overwhelming majority, more than 81% have either heard of or are interested in such games while exactly two in three have participated in such games with 56% of them doing so during or because of the corona virus pandemic. It might come as a relief that only a comparatively low proportion - one third - played with money. It can be understood from the study that many students from the region has an interest in online fantasy sports and mobile finance apps. Even though the harmful effects of these trends are very minimal and not many students fall victim to these, it is important for authorities to take note so that this does not spread to other students and wider community. It is also important to help those who have fallen prey to these, and it is expected that remedial measures are taken and preventive actions will be put in place.

Key words: Mobile Finance, Gaming, College Students, Online Games

Ideal International E- Publication
www.isca.co.in

ENGLISH

Notorious Treats And Feasts: Revealing Food As A Temptress In Children's Literature Through Study Of Four Select Books



Dhaya Mukesh Dhanya, Mirium Xavier*

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

E mail : dhayamukesh1907@gmail.com, mirium85@gmail.com

Abstract

“Food is a mirror of society and a statement of the zeitgeist” [1]

This is the perfect answer to the ever-haunting questions as to why people from different parts of the world consume different type of food and why certain foods or culinary traditions are considered so important to one's culture. But again, there is more to food than a mere way of survival or how it links our culture. Food is a plethora of symbolic meanings. It is a mirror of society and culture. It is portrayed in literature as a metaphor for religion, sex and gender, family, social hierarchy, identity etc. and as a means of reward or punishment. This research project will be an attempt at trying to prove how an inevitable aspect of everyone's daily life, food, has been used and portrayed in children's literature as a temptation for the child protagonists. The food in question will mostly be fantastical and visually appealing, which will ignite in the children, a deep longing to taste it. Their willingness to do anything to acquire the treats, guides them through the manipulating scheme of the evil force who lures these children into doing misdeeds and mischiefs. This analysis will be taken forward by following the breadcrumb trail of food portrayals in children's fiction and tracing the meanings they acquire and the impressions they leave in the minds of the children, thus helping to understand how food is shown as the weapon of the cliched antagonists like stepmother, witch etc. Since a child starts its learning process right from the beginning, the things portrayed in these children's books form the foundation in a child's mind. It is always this foundation and experiences of one's childhood that sprouts the deepest emotional exposure to imagination. The food-as-temptation stories, thus become an inevitable part of children's literature, owing to their ability to connect with the young readers and give them a hint of the enormous space the real world has to offer, be it good or evil, and show them the consequences of every decision they make.

Key words: Food as Culture, Temptation, Children's Fiction, Imagination, Reflection of Society

Note:[1] statement by Inés Lauber, a food and experience designer.

HISTORY

PLENARY TALK

Historical Writing; Issues, Challenges and Prospects



Mr. Pratheesh. P,

Assistant Professor, Department of History, St. Michael's College, Cherthala
E mail: pppadath@gmail.com

One of the most critical tasks facing today's historians is the re-examination of basic theoretical and methodological problems. History may be the past but the reflections on that past and the different mediums that inform and shape us about the past must be examined for their veracity and usefulness. All of us are surrounded by history, whether we study it or not. History is found in our social traditions, our holidays and ceremonies, our education, our religious beliefs and practices, our political and legal systems, even in our popular culture (Alpha History). "No other discipline has its portals so wide open to the general public", says Johan Huizinga. But there is a significant disadvantage. There is substantial gap between historical understanding in the public domain and the history written by historians. It would therefore seem obvious that historical research methods, whose primary concern is the role of time, would be at the forefront of the analysis (Peter J. Buckley, 2016). Looking from a historical point, reflection on the role of methods and theories in history is in a sense an indicator of crisis. History is an integrated narrative of past events, representing a critical search for the whole truth, with a field of inquiry as broad as human past and life itself (Carter. V. Good, 1942). Thus, the purpose of this article is to provide an overall account of the challenges that confront the historian in the onerous task of reconstructing the past, as well as the prospects of surmounting them.

THE NATURE OF HISTORY

The word history has become an omnipresent word conceptualized in different ways by various scholars. For example, the conventional conception of history epitomized by historians like Herodotus (Father of History), his great successor Thucydides, Livy and Tacitus, the greatest of the Roman historians, viewed history as any written narrative of events (Osokoya, 1996). This definition is inadequate as the definition did not admit the development of history ultimately and the conception of history as mere narration of events is now outmoded because history has metamorphosed from mere account of events into critical and analytical interpretation of events. Much more than did 'conventional' history writing, it assimilated both ideas and methodologies from other disciplines (Eric J. Evans, 2008). Later, Arthur Marwick provided a tripartite definition of history as "the entire human past as it actually happened", "man's attempt to describe and interpret the past" and, as "a systematic study of the past" (Marwick 1970). However, in present-day, history as a field of knowledge encompasses not only past events but also their consequences. Moreover, vital historical events with consequences are generally preferred by the historians than more events in the past.

For the historians, it is necessary to look at the facts behind the facts. It is in this context Walsh defines history as "a reconstruction of the past which is both intelligent and intelligible" (Walsh, 1967). The historian must certainly avail himself of insight and retrospection but must not allow himself to become victims of these. In a similar hint, Geoffrey Barraclough defines history as "the attempt to discover on the basis of fragmentary evidence the significant things about the past", noting that "the history we read, though based on facts, is strictly speaking not factual at all, but a series of accepted judgments" (Barraclough, 1955). The historian was resilient in warning that the value of facts depends on who wields them. Keeping this in mind, Edward Hallett Carr defines history as "a

continuous and unending interaction between the present and the past”, affirming that, interpretation is the lifeblood of history (E. H. Carr, 1961). The historian must recognize that there are no absolutes in doing history apart from the certainty that all is relative. For Carr, the writing of history is a process that involves instantaneous reading and writing, the latter being the aspect that expands a historian’s intellectual horizon (Kenneth Andres, 2016).

The position in all these is that there is yet to be unanimity regarding the exact meaning of history. However, it is possible and popular to identify certain features which may be described as defining characteristics of history. After all, history is the product of historical research, and therefore the nature of history and of historical research is symbiotic. According to modern concept, history is not confined to one period or country or nation. It also deals with all aspects of human life-political, social, economic, religious, literary, aesthetic and physical, giving a clear sense of world unity and world citizenship. One of the basic characteristics of history is in its humanistic nature (Ajetunmobi, 2005). Availability of evidence, its reliability and consistency, available time and the objectives of the study shape his selection and utilization of sources and evidence. History has assumed the role of a human science since it deepens our understanding of the potentialities and limitations of the present. It has thus become a future-oriented study related to contemporary problems. Finally, history is an outcome of industrious research. History is vital in the selection, interpretation and analysis of on hand data. It is these features of history that have made it look science. Though historians use scientific techniques, experiment is impossible since history deals with events that have already happened and cannot be repeated. These aspects of history imply that what is presented as history is a product of honest inquiry and not that of the historian’s sensibilities or imagination.

HISTORY Vs STORY

One of the biggest challenges before the people who work with history is the boundary between literature and objective representation. There is no room for including too much or too little story (Subjective or fictional or mythical) in your writings. A categorically analytical speculation without imagination is an essential prerequisite. The prime criticism against political narratives is that they relay much on imaginations and elaborate descriptions which are basically subjective. A catch reader presentation of history should not be the aim of the historian; too little, and it won't immerse the reader in the period. If you present the truth like a story, it will definitely remain only as story and not history. If you are trying to explain the historical events and truths, the background of your epistemological arguments must be a representation of objective facts divorced of combination of narrative exposition, dialogue, and internal thought to convey it. Apart from presentation of facts, justification is not at all the responsibility of the historians because the historical facts have to be and they justify.

THE PROBLEM OF GENERALISATION

A significant problem when thinking about history is our habit of thinking in general terms (Alpha History). The human mind (Cognition) has a tendency to make assumptions (Abstraction) about the whole based on just some of its parts (Inductive Thinking). People in general, are prone to make universal conclusions from just a few events or pieces of evidence. A generalization may be a linkage of disparate or unrelated facts, in time or space, with each other. Consequently, when studying macro groups such as a nation, society or community, this abstraction may happen. Human beings are creation of diversity; contain enormous economic, ethnic and cultural diversity. Hence, any judgment about an entire population based on few instances or evidence is likely to be flawed.

So, it is certain that the grand generalization in history is predominantly problematic. Then raise the question, what kinds of generalizations are possible in history? If we fail to answer this question constructively, then historical research loses much of its interest and purpose. If historical knowledge were limited to statements about specific actors in concrete local circumstances, it would have roughly the interest of a police report. The historians should aggregate their understanding of the available evidence into statements about large agglomerations: villages, cities, crowds, classes, riots, and movements. These are made when historians reach out to the largest possible, significant connections or threads that tie a society together. There can be many sources to such as previous writings, theories of history, society, culture and even politics such as those of Marx, Weber and Freud are major source of generalization, careful collection of data and interpretations are the essential prerequisites. The possibility is that the micro-study is somehow "representative" of larger social realities at the time. Another possibility is diachronic generalization.

THE CHALLENGES IN WRITING

At first glance, writing about history can seem like an overwhelming task. Carr has said “no document can tell us more than the author of document thought”. There are no facts of history that are absolute what sources tell us about past depends on a great deal on our understanding of subject matter, biases, prejudices, and upon the questions that we ask (Pratha Chatterjee, 2002) . History’s subject matter is immense, encompassing all of human affairs in the recorded past. At the same time, history’s subject matter is partially irretrievable. Barring the invention of time travel, no scholar can experience the past firsthand or recreate its conditions in a laboratory setting. Hence the students of history must rely on the scrappy records that are survived, which automatically reveal just part of the story. Thus, it is said that, ‘no one person can possibly consult all of these records, no work of history can ever pretend to be comprehensive’. Then the guiding principles for historical writing must be thoughtful selection of topics and responsible interpretation of sources in order to construct meaningful arguments.

In literature, one can start and end anywhere, but historical narrative has to be woven around a concrete set of verifiable source materials. The historian could always be questioned about the verifiability and the resource base for any assertion that he makes in his work. A high-quality historical reconstruction not only the evidence, but also the interpretive outline and the codes governing it should be critically examined. Impersonal and inter-subjective method is valued than traditional claims of impartiality, truth, and trustworthiness of historians. In short, history writing is impersonal and objective understanding and interpretation of sources.

In the task of reconstructing the past, the question of source is a grim task to the historian. The essence of the work is checked by the approach in which sources are collected, treated and used. Sources are fundamental in historical writing and they are diverse and countless. The importance of recovery, examination and preservation lies in the fact that they provide a basis for the assessment and interpretation of sources in order to achieve the objective of historical research (Osarhieme, 1993). While sources must be reliable and valid, it is important to strive at understanding the origins of the sources. The basic questions to be asked are,

- Who – Who made the source - did they have an opinion or bias? Were they involved?
- What – What information does the source give? Is it the full story? Is it accurate?
- Why – Why was the source made? Was it made to persuade people of a particular opinion?
- When – Was it made at the time? or years later? Was the person there?
- Where – Where was the source made? Were they involved in the event? Did they have an opinion?

It is followed the questions for interpretation. They are:

- a) **Identify the source.** Is it primary or secondary? Who wrote it? When was it written? What kind of document is it? Where was it published? How widely was it circulated? What is it about?
- b) **Put it in its context.** What events had happened or were happening when this was written? Specifically, what was happening where this was written? Who was the intended audience and what bias might they have had?
- c) **Consider the author and their purpose.** Who was the author? Consider their race, gender, religion, nationality, heritage, party affiliation, socio-economic class, and their job. Is there bias? Is the author trying to persuade, incite, enlighten, explain or deceive their audience? Why was it written and for whom? Was the author paid to write this? Or bribed or threatened? Where did it first appear: a newspaper, a diary, a letter or a propaganda flyer?
- d) **Evaluate the information.** Read the information, summarize it, and identify keywords, examples of bias and intention. Are there footnotes or citations? Does it reference other documents or events? What is the document about and how does that help you understand the period? What is the overall theme? How similar is it to other documents from the same period? How does the author claim to have their information? What assumptions does the author make? Is the author expecting any resulting action, sentiment or opinion from the audience?

Again, weakness of human memory makes it hard to chronicle events in specific detail for more than four generations. Alteration is yet an extra limitation of oral tradition as well as with written sources. Alteration in oral tradition may either due to alteration of traditions or adaptation to provide the basis for the elevation of a

particular society above another. The historian encounters this problem when two societies give an account of the same events, thus the given evidence might conflict, or even contradict at many points (Osarhieme, 1993).

One must be aware that the "phenomenon of history" is not something that lies in a past that can be distinguished from the historian of the present. Each sentence, by being pronounced, is already history. This insight is fundamental to the whole process of reconstructing the past, because it does not exist without the reference to those people who try to reconstruct it. This is done by selecting thoughts about the past to be described in our consciousness. And this process takes place in a way that George H. Mead has stated in his social theory: By trying to grasp the past - parts of it - we also look ahead to our own (moral) judgment (not as a consequence of the representation at the end). And we look ahead - especially in conflicts and controversial historical contexts - to the judgment of the expert audience.

References

1. Ajetunmobi, R.O. (2005). *Historiography and the Nature of History*. Ikeja: OACE.
2. Barraclough, G. (1975). *History in the Changing World*. Oxford: Basil Blackwell.
3. Carter. V. Good (1942): 'Some Problems of Historical Criticism and Historical Writing', *The Journal of Negro Education* Vol. 11, No. 2, Apr., 1942.
4. Carr, E. H. (1988). *What is History?* London: Penguin Books.
5. Ernst Opgenoorth (1987): 'Historians and Written Sources: General Problems', Frobenius Institute, <https://www.jstor.org/stable/41409909>
6. Marwick, A. (1970). *The Nature of History*, Macmillan Press, London.
7. Osokoya, I.O (1996). *Writing and Teaching History: A Guide to Advanced Study*. Ibadan: Laurel Educational Pub. Ltd
8. Pratha Chatterjee., Anjan Ghosh (2002). *History and the Present*, Orient Blackswan Pvt.Ltd, New Delhi.
9. Walsh. W.H. (1967). *An Introduction to Philosophy of Education*, Hutchinson & Co. Pub. Ltd, London

Won Excelsior Award

Indigenous Christian Resistance Against the Cultural Imperialism of the Portuguese



Ajay T Joseph

Guest Lecturer, Department of History, St. Thomas College, Arunapuram Palai-686574

E mail: ajaytjoseph@gmail.com

Abstract

Although when we hear about the National Movement or the Freedom Struggle a skirmish and a bloodshed between two schools of Christian thought may not come into the picture. But in the coastal shores of Kerala it had happened all throughout late 16th and 17th centuries. In this paper I wish to address the same and to widen the dimensions of the readers and also to look into the socio-cultural and economic dimensions of it. A group of people were forced to adhere to the dikats of the Pope in the Rome mainly to satisfy the imperial economic designs of the Portuguese. They were the St. Thomas Syrian Christians of Kerala. Their cultures, rituals and beliefs which were in tune with the local Hindus as a result of centuries of syncretisation were mocked, their saints were disrespected and their religious canons burned. Nevertheless, they revolted and successfully guarded their beliefs and culture and still continues to do. In this paper I also make an attempt to address the issues of the impact of a cultural imperialism and how it plagues the psyche of the people even in the present day. And how the St. Thomas Syrian Christians of Kerala and their culture were Indianized as a result of centuries of close contact and how it contributed to secular fabric of Kerala. In a nutshell this paper looks to address the problem of cultural imperialism and how it can disrupt the social fabric. Readers will also have a better understanding of religious conflicts in tribal areas due to missionary activities at present after going through this paper.

Keywords: St. Thomas Christians, Synod of Diamper, Coonan Cross Oath, Pepper Trade, Liberation Theology

Won Second Prize

Udaya-The Rise: The Role of Udaya Studio in the Development of Malayalam Film Industry



Aparna M Nath

Guest Lecturer, Department of History, St Joseph's College for Women, Alappuzha

E mail: aparna.maninath@gmail.com

Abstract

In the era of ongoing historical debate of class consciousness of social formation of Kerala, the Malayalam speaking areas of South India, trade is found to have facilitated in fusing the diverse cultures into the unique identity of a Keralite. If the Brahmin settlements can claim the credit of social formation in Kerala, the landed gentry turned to capitalist class can also. The Venice of East which, born on 1957 August 17, entered into brisk business as a world-renowned commercial port also launched many industrial initiatives ranging from coir factories to oil mills. This is also the case in the establishment of an indigenous film industry for Kerala, though the State had not been formed yet, witnessed the first well established film studio of Kerala in Alappuzha- Udaya. The pioneer behind the establishment of Mollywood has given the Malayalam film industry an independent identity from the contemporary Tamil films by setting up the first film studio in Kerala, at Alappuzha. Thus, the Malayalam commercial film industry got a strong foothold in Kerala and began to flourish from Alappuzha. From

the late 1890s onwards and even more so from the late 1930s, Cochin became the focal point of overseas shipments as it assumed a position of port hegemony on the Malabar coast at the expense of Alleppey and many other minor ports in the region. Alleppey's coir sector was drastically reduced and largely transformed from making end-products into the supply of raw materials or semi-finished products for final manufacturing in Cochin or elsewhere. The prestige of the industries of Alappuzha is on the wane. The various industrial establishments of the land have lost the past glory. Many such industrial initiatives suffer a serious setback. In this context, the past glory and the early demise of Udaya Studio is taken into consideration.

Keywords: Mollywood, Alleppey, Studio

Won Third Prize

Socio-Economic Problems of Women Construction Workers in Alappuzha District: A Case Study of Cherthala South Grama Panchayath



Arya Udayakumar

Guest Lecturer in Economics, Dept. of History, St. Joseph's College for Women, Alappuzha

E mail: aryaudayakumar3@gmail.com

Abstract

Construction sector is the backbone of a country as it creates the infrastructure necessary for social, economic and industrial growth. In India, the construction sector is the largest employer of unorganized labours. The term unorganized labour can be defined as those labours who have not been able to organize themselves in pursuit of their common interest due to certain constraints like seasonal nature of employment, ignorance, illiteracy and scattered work sites etc. In the construction industry women are employed mostly as the helper or unskilled labours. The women construction workers are facing many problems like low wages, gender discrimination, sexual harassment, lack of social security etc. This study aims to find out socio – economic problems of women construction workers in Alappuzha district and to suggest recommendations for their upliftment.

Keywords: Women, Labour, Alappuzha, Social, Economic

Won Excelsior Award

The Indian Jewish Diaspora in Israel – Migration, Discrimination and Assimilation in the State of Israel



Suraj Rajan K.

Research Scholar, Jindal School of International Affairs, O.P. Jindal Global University, New Delhi

E mail: surajrajan33@gmail.com

Abstract

The formation of the state of Israel in 1948 was a wakeup call for the Jewish communities around the world to make *Aliyah* (return) back to the 'Holy land'. The Zionist idea of creating this 'new state' appealed to the Indian Jewish communities mainly to the Cochin and Bene Israeli Jews, who settled in Cochin and along the areas of Konkan coast. This research work initially focuses on understanding the reasons that motivated the migration of both these groups to Israel. The study further delves to explain how the assimilation within the society was challenging for the Indian Jews, as discrimination based on skin colour, Asian lineage etc. were used by the Israeli government to segregate them from the White Ashkenazi Jews thus pushing them geographically towards the peripheries of the state. The paper concludes by explaining how the Indian Jewish community tried to retain their Indianness along with the newly constructed Israeli identity, thus finding a right balance between the concept of

“Mother India and Father Israel”. For the purpose of this paper, migrations between the years 1949 to 1973 were studied as, 1949 marks the first wave of Cochin Jewish immigration to Israel. This paper follows a mixture of both ethnographic and historical analysis methodology to understand the various aspect of discrimination. In depth interviews of the Indian Jews in Israel were conducted to collect data for this research work.

Keywords – Diaspora, Israel, Indian Jews, Discrimination, Skin colour

Welfare Schemes Implemented by the Government of Kerala for Internal Migrant Labourers During the Pandemic



Sruthi P Mohanan

PhD Research Scholar, Department of Political Science, Maharajas college Ernakulam

E mail: sruthipmohanan93@gmail.com

Abstract

Migrant workers are holding a vital role in every spheres of our day-to-day life and they are working in every sectors such as agricultural and construction etc. Like all others, they have too suffered lot of vulnerabilities from lock down following covid 19. They have lossed their employment as well as income. And it has compelled them to displace to their native places through very terrible ways and modes. Central government has formulated certain policies like Atma Nirbhar Bharat Abhiyan for protecting their life. Like this, Kerala has also formulated such welfare schemes for their wellbeing during the pandemic. Because, their role is very vital in the development of state and also Kerala is one of the chief destinations of migrant workers from other states. In this regard the paper is going to discuss about various vulnerabilities faced by them during that situation and major welfare schemes taken by the state government and its implementation.

Keywords : Internal Migrant Workers, their sufferings during Covid -19, Welfare schemes by Government of Kerala

Won Third Prize

Sambandam: A Feminist Rereading



Anjana Menon

PhD Research Scholar, Department of History, Maharaja's College, Ernakulam, Kerala-682011, India.

E mail: anjanaabhinavmenon@gmail.com

Abstract

The system of Sambandam that prevailed among the Nair communities till the twentieth century is a subject that was given much thought and discussed not only in the academic realms but in socio-political circles too. Since this unequal system of matrimonial alliance that prevailed in this land was very much alive till recent past, the memories of the same continue to enrich the public through literature, theatre or movies. This paper is an attempt to analyse this system through a feminist lens. Historians have highlighted that the moral and sexual worries of the British and that of the aspiring indigenous classes, had not only strengthened the colonial grasp over India but also updated the patriarchal framework for the nation, which was in the making. This study shall underline the nature of such cultural investments that Britain had imposed upon India by focusing on the practice of Sambandam which was deemed as a social ‘ill’ by the new ethos of the society and shall examine the ‘new dignity’ that was conferred upon on women as a result of the social “cleansing” process which in turn was wedded to colonial modernity.

Key words: Feminist critique, Sambandam, Colonial modernity, Kerala

Won Second Prize**Protecting and Empowering Migrant Workers in Kerala by Ensuring their Human Security****Shiraz Shanavas**

PhD Research Scholar, School of International Relations and Politics, MG University Kottayam

E mail: shirazshanavas24@gmail.com

Abstract

The concept of human security is a complex concept which focuses primarily on security through non-traditional security measures. This theory became a central point in international arena when it was introduced in the United Nations development programme (1994). In human security the focal point is always individual human beings. The migrant working community in Kerala faces many social threats like wage theft, poverty, political insecurity, very high health risk and lack of proper shelter. These communities in Kerala have been subjected to various human right violations both from the society as well as from the government institutions. The major problem is that majority of these workers don't even know about their basic human rights which are ensured by the Indian constitution. The migrant working communities need to be legally organized to ensure their human security. Which is a complicated process but an effective deterrent against widespread oppressions against them. There are gaps in government policies which are intended for the welfare of migrant working communities. We can see the marginalization of migrants in Kerala by observing the day-to-day issues they are facing. Which ranges from terrorizing them to policing them with a notion of seeing them as public menace or enemy. The prejudices reserved for migrant communities are harming the social harmony within the state. Various data which were collected for analysing the attitude of local population towards migrant working communities are validating this argument. The state should be able to ensure economic security, food security, health security, environmental security, personal security and political security of the migrant workers. This paper focuses on highlighting the issues faced by migrant working communities. It will address all the possible aspects to ensure the human security of these communities.

Keywords: Migrant workers, Human Security, Kerala, Empowerment

Certificate for Appreciation

Women Empowerment through Panchayat Raj Institutions in India



Arya S Santhi

Post Graduate Diploma in Rural Development, IGNOU

E mail:aryassanthi@gmail.com

Abstract

Suppression of women's political rights is only another manifestation of the patriarchal mindset which seeks to smother women from birth till death and contends that a woman's identity always derives from a man be it her father or husband. A Panchayat, in the traditional sense, is a body of 5 elders of the village who help resolve conflict amongst the villagers. Yet, women and lower castes were not allowed membership of this body. In pre-independence India, legal provisions made it difficult for women to participate actively in politics. For instance, the Bombay Village Panchayat Act, 1920 stipulated that no female could become an elected member. The Constitution of Independent India only spoke of local self-governing bodies in Part IV, the Directive Principles of State Policy, and did not make any provisions for specific reservation for women in Panchayati Raj Institutions (PRIs). In the light of these historical circumstances, one can quite categorically say that the 73rd Amendment Act, 1992, mandating reservation in at least 1/3rd of the seats of all Panchayat Councils and 1/3rd of the Pradhan (head of the Panchayat) positions for women, was a landmark for women's political empowerment. This was followed by the 74th Amendment Act, 1992, which established similar reservations in Nagar Palikas (Municipalities). In addition, Bihar became the 1st state to reserve 50% of seats for women with Madhya Pradesh, Chhattisgarh, Rajasthan and Himachal Pradesh following suit. Today, 54% of elected representatives of PRIs in Bihar are women. Numerically, today India can actually boast that there are more elected women representatives (EWRs) in India than the rest of the world put together. Present study intends to focus upon various aspects of women's functioning in the Gram Panchayats and its effects on overall development of women. Investigation into these institutions throws light on the actual role played by the women especially at the third strata of governance in solving local problems.

Keywords: Panchayath Raj, Political Rights, Governance

Certificate for Appreciation

Snake Worship in Kerala: With Special Reference to Mannarsala Najaraja Temple, Alappuzha



Devika M S

MA History, Karyavattam Campus, University of Kerala

E mail: devikampm452221@gmail.com

Abstract

Our Universe is home to a diverse range of flora and wildlife. Its origin and how it became a habitat for such a diverse range of animals remain a mystery. It is thought that about eighty crores of years ago, the species began to evolve. biotic character of marine leads to the evolution of various reptiles like lizards and tortoises, snakes and scorpions and gradually through the process of evolution the Human creature (Homo sapiens) came into existence. Thus, snakes seem to form an integral part of this universe which indirectly paves way for the Evolution of Modern Man. Snakes are found almost all over the world. Hundreds and thousands of species of snakes are there all over the world and among them about one-third are familiar to India. Snakes are animals that fascinate many people while frightening others. Generally, snakes are supposedly venomous and even some are human eaters too. Only a few snakes are poisonous in general. As we know Religion emerged to our arena from the character of fear in the minds of man, thus from that frightening nature of snakes it became the part of religion. Worshipping snakes began to be viewed in the coming years throughout the world especially in India. Egyptians, Africans, Japanese, Chinese, Koreans, Romans, Greeks, etc worshipped snakes, they considered it as the embodiment of God, embodiment of Spirit, embodiment of genius etc. They even believed that worshipping the snakes (Nagas) gave protection to their empire. Snake Worship is a part of Hindu religion and plays an important role in the cultural as well as in ritual aspect in India. Snakes are animals that fascinate many people while frightening others. The rituals devoted to the propitiation and supplication of the *Sarpa*. as the common snake is called in Sanskrit. God, *Naga* has taken a prominent place in various forms of literature, traditional paintings, art, sculpture, folklore, architecture and so on. Snake worship in India is typical. It is believed to exist all through the life of man right from the prenatal stage. Even the sperm which is the smallest cell looks similar to that of a hooded-cobra and also our spinal cord also looks similar to that of a cobra. The beauty and strength of the serpents, its strange look, practice of wearing away its skin out, its supernatural powers and all compelled the man to admire and to adore it from times immemorial. The popularity of snake worship all over the world made man to think of it as one of the most ancient and important deities. The serpent has been a source of reverence for Hindus since ancient times. no orthodox person would dare to kill or injure a snake, especially a cobra, because it is a sacred animal. It is widely held the belief that anyone who kills a cobra, whether by mistake or on purpose, will be punished, in this life and the next, the person will be punished. Snake worship is still practiced in South India. For the infertile and barren to appease the snake deity by performing the Nagapratishtha or the consecration of a Naga or stone idol, is a Hindu ritual. A Serpent Kavu or an abode of snakes is an indispensable adjunct to every Nayar house, minor divinities such as Nagathans, Nagarajas, Yakshis, Gandharvas and Sastas also find place in these Kavus. Some are of great age and repute, are richly endowed. Snake worship had existed in Kerala from the ancient times itself, as in other parts of the world. It is known as Pambu Thullal. The ritual is conducted by Pulluvar. In the background of music and song regarding the origin of snakes, copulated form of snakes is drawn in the Kalam. This Kalam was rubbed during the ceremony of Pambu Thullal.

Key words :Deity, Snake, Hindus, Alappuzha

Won Third Prize

A Study on the Survival of Mango Farmers at Muthalamada in Palakkad



Anakha .S. Menon, Aiswarya .R. Nair, Denny .C. Samuel, Devika .P, Rimy Tom, Silga de Sankey , Sreeshma .S, Anju Mary George*

BA Economics, Mar Ivanios College (Autonomous), Thiruvananthapuram- 695015, Kerala, India

E mail: anakhathanal@gmail.com

Abstract

This project is based on the study of the survival crisis faced by Mango farmers at Muthalamada panchayat in Palakkad district (Kerala). The work aimed at analysing the socio- economic hurdles encountered by these farmers and comprehend practical measures to resolve them. The primary data was collected from 80 farmers from the destination through telephonic survey and secondary data from Horticulture department websites of the government and other prominent works on the subject. The responses revealed that the farmers were facing a severe survival crisis in their traditional mango farming especially in recent years. The study proved that farmers' profits were largely minimized and farmers were forced to search for alternative employment opportunities. Findings reveals lack of supply chain management, climate change, lack of scientific farming methods as the main hurdles faced by the farmers. The work concluded with suggestions, like introducing new and sustainable pest control measures, undertaking production of processed food from mango produces, fair supply chain management measures and others, to help the farmers in continuing their mango farming profitably and effectively.

Keywords: Mango farmers, Horticulture, employment, hurdles

Alappuzha and Raja Kesavadas: A Historical Enquiry into Urban planning and Townscapping

Aswathy B, Jiyas N, Aparna s and Vishnu V Kumar, Manjusha S*

BA History, SD College, Alappuzha

E mail: aswathybaburaj435@gmail.com

Abstract

The Project titled Alappuzha and Rajakesavadas: A historical enquiry into urban planning and townscapping is an analyse on the historical importance of Alappuzha and the contribution made by Rajakesavadas for making Alleppey as a commercial centre of Travancore. Alappuzha is a place which contributed much to the development of Travancore. It has a great historical value. Alappuzha was the commercial metropolis of the erstwhile kingdom of Travancore. It was by construction of the Alappuzha port that it gained a coveted place in the international trade map. The port was built by Rajakesavads who was the Diwan of the erstwhile kingdom of Travancore. His achievements have made him one of the greatest Dewans of the State. The period of Dewanship was the most critical one for Travancore. He made internal reforms of the country. For this purpose, he opened two new ports, one at Alleppey and other at the Vizhinjam. The Alleppey port was opened in the year of 1762. It was a dream project of him. To turn Alleppey into a major port, Rajakesavadas selected the present Alleppey town, he started infrastructure development with meticulous planning. Two parallel canals were built for the transportation of goods to the port. Roads were laid on the both sides of canals and roads. He was well aware that good traders are unavoidable for the prosperity of any port. So, he brought the traders from Kutch, Saurashtra, Maratha, Udupi, Tamil Nadu, to start their business at Alleppey, extending them all possible facilities to settle down to do business without any hindrance and with full support of administration. The Leading industrialists like Navaroji khawazji, Vallabha Das Kanchi and other found Alappuzha as their second native place. For improving foreign trade Raja

Kesavadas invited shipping companies like Syandhya steamship navigation to start Travancore centres here. The native people administrators showed a remarkable tolerance towards the outsiders. Though the port is more attractive due to many reasons, the go-downs, the warehouses, the port and the pier stand today as a symbol of glorious past. For the expansion of water transport Rajakesavadas invited 42 Gujarati families into here. They involved in various of commerce in this area, the spice come from the western countries was the most common. Gradually Alleppey became the one of the most important trading and commercial centre. The network of canals and roads inside the city presented Alleppey another name *venice of the east*. Alappuzha became the centre of trade for coir, copra, ginger, cardamon, rubber and tea. The Alappuzha light house was built in 1862. To identify them from a distance in the sea, they are built in different shapes and when identical towers are built in the same area, different colours and colour bands are given to them for easy identification. After standing tall for a long time in a port, it will become a part of that port city and people start identifying the city by the sight of the lighthouse. Monopoly in the coir market was just one of the feathers in the crown of this port town of those glorious days. The rise and fall of Alappuzha is closely linked to the history of the port. Port was the main factor which propelled the region to dizzying heights and later to the depth of stagnation and backwardness with its downfall. The intensity of trade exchanges at the port of Alappuzha saw a drastic decline after the rise of port. The development of port of Kochi was a major factor which contributed to decline of the port of Alappuzha. The decentralization of coir industry was another reason led to the decline of Alappuzha port. Thus, the historical background of Alleppey which is very significant it had definite position in Kerala as well as in the Indian history. It had attributed a lot to the economy and heritage as well. Thus, Alleppey was a place in Travancore, which cannot be avoid in the scenario of foretelling history.

Keywords: Townscapping, Alappuzha, Reforms, Coir Market

Won Second Prize

Protected Monuments and Heritage Sites in Alappuzha



Sandra PM, Sneha P Joy, Shahina Hussain, Anagha Raju, Nirmala Menten, Shamsiya S, Jomol John, Jesna Nazeer, Sneha Sony , Soorya CB, Sandya A K*

BA History, St Joseph's College for Women, Alappuzha

E mail: sandrapmtp@gmail.com

Abstract

This project titles 'Protected monuments and Heritage Sites in Alappuzha' is an attempt to highlight the importance of preserving the cultural heritage of Alappuzha, the coastal district of Kerala. In all ways, Alappuzha is rich in its cultural heritage and a number of heritage monuments are located in the region which needs to be protected for the future generations. Hence this study focuses on some of the important monuments and sites of historical, cultural and archaeological significance.

Key words: - Archaeology, Heritage Monuments, Cultural

Won Excelsior Award

Contributions of Thomas Norton in Alappuzha



Harikrishnan A M, Vishnu S Nair, Nimisha Anilkumar, Anupama Sajeev, Chithra K R, Ashokan V*

BA History, Sanatana Dharma College, Sanathanapuram P O Alappuzha, Kerala 688003
E mail: harikrishnansivapriya@gmail.com

Abstract

In this project we are trying to analyse the social, religious and educational contributions of Rev: Thomas Norton in Alappuzha. Thomas Norton was the first missionary to be sent out by the Church Mission Society (C.M.S) to take the Church Gospel of South India. Norton's missionary and social works was valuable services in Alleppey as well as in Travancore. The objectives of this study is to discuss the arrival of Rev Thomas Norton to Travancore, to analyse the activities of Thomas Norton among the common people in Alleppey, To understand and highlight the contribution of Rev. Thomas Norton in Travancore especially in Alleppey and to highlight the contribution of Thomas Norton in the field of education. The main reason to select this topic was the activities of Thomas Norton remains unsung in the history of missionary activities. He had made significant contributions in missionary activities as well as in educational reforms. This study aims to highlight the importance of Thomas Norton in framing a society in Alappuzha. The study goes through four chapters. The first chapter is the introductory framework to the project. The second chapter titled "The Church Mission society of Travancore" discusses the arrival and activities of Church Mission Society in Travancore. The third chapter titled "The Missionary Activities of Rev: Thomas Norton in Alappuzha" explains the arrival and contributions of Thomas Norton in Alleppey. The fourth chapter concludes with the findings in the study about the activities of Thomas Norton which is titled as "conclusion". The first Anglican Missionary to arrive in Travancore was the Rev. Thomas Norton who settled at Alappuzha in 1816 at the suggestion of Col. Munro. Norton was happy to be at Alappuzha, outside the Syrian sphere, so that he might concentrate his evangelistic efforts on the medley of races and religions in that commercial town. Norton worked among the poor people and he tried to encourage their life. Norton, organized the poor fund for the benefit of the people and he took free Bible class and educational class for the poor. Norton powerfully worked against the cast Restrictions and inequality of the upper caste. So he give importance for the improvement of the low caste people. The major contribution of Thomas Norton was the education field. He started many schools and other institutions in various part of Alleppey. In 1816 Norton established first English medium school in the mission compound with 44 pupils in addition to an orphanage with 22 inmates supported. It was the first school in Alleppey as well as Travancore. He started Hindu girl's schools, vernacular schools at Paravoor and established four boy schools and two girl's schools at Punnappa and Kakazham. Norton also gave the primary education for fishermen and other low caste working people. He established 2 seminary and a Preparate at Alleppey. Norton and his wife gave primary education for poor women in Alleppey and started the village schools at Nirkunnam, Great Bazar and Kommadi. But the work of Thomas Norton did not develop with the work of Kottayam mission. The major reason for it, was the unfavourable attitude of the catholic christens in Alleppey. They also watched the activities of Norton, with hostility. For instance, when Norton started a school at great bazar, the catholic group popularized that (especially the Varapuzha Bishop) Norton tried to convert their children to Protestantism, and he taught the religious texts. It was a failure to some of his activities. But he could not move back word and his works were intended for the benefit of the common people.

Keywords: Social, Religious, Primary Education, Cast Restrictions

A Study on Migrant Muslim Merchants in Alappuzha



**Sandra KJ, Dani Wilfred Presentation, Reshma Krishnan, Arya V Dev, Anju P,
Ashokan V***

BA History, SD College Alappuzha
E mail: sandrakjkunnel@gmail.com

Abstract

In this project we are trying to analyze the social, historical and cultural contribution of Muslim merchants in Alappuzha. The reason behind the selection of this topic is the contribution by Muslim merchants of Alappuzha to the history of Alappuzha. Raja Kesavadas was the real builder of Alleppey port. For the development of Alleppey port he invited many merchant groups. The merchant Muslim community played a major role in development of Alleppey. The early period of sangam age Kuttanad will known as the Rice bowl of Kerala. Sangam works gave reference about early trading relations. History says that Alappuzha had commercial link with ancient Greece and Rome in BC and in middle age. This chapter also explained the Buddhist influence and Portugese influence in Alappuzha, Dutch relations in Alappuzha and the emergence of English power. It also says about hinterland trade routes. The trade of Alleppey was mainly based on commodities that came from the hinterlands. Hinterland reached Alleppey port for easy traffic several new means that is roads and water channels were constructed. Most of the commodities that reached Alleppey was from hinterlands. Especially from eastern parts of the Travancore. The Muslim merchants community played a major role in development of Alleppey port, sea bridge, light house, canal connected transportation etc. encouraged the trading in Alappuzha. Many merchant groups came to India and established their trade relations some groups are settled different parts of India. Alappuzha port was established in Raja Kesavadas and a network of land and water routes was setup to the link the distant production centers with the newly established port. Alappuzha attained progress and become the financial nerve centre Travancore. During the time Gujaratis, Marathies, patsies, kuatch Muslims, Rawathers ,konkinees, pattanies etc. many of merchant groups came to Alappuzha and settled. We can see only four Muslim merchants in Alappuzha. They are, cutch memon ,Rawathers, bohra and nora groups. These four believed in Islam and come for trading purpose.Memon community is traditionally a business community having its origin from the old and famous I ohana community of sind. A few cutchi memon families from cutch and Bombay came to Alleppey in the early 19th century. They were invited by a illustrious and famous Dewan of the Travancore state. They earned a good fortune and flourished in business theirs helping the public and at the same time earning good revenue for the state. As the Cutchi memon community has always done charitable and philanthropic deeds elsewhere, the cutchi memon in Alleppey also utilized their surplus funds in the constructions of Mosque establishment of charitable trusts and such other institutions. The second migrant Muslim community is Rawather. It is a Muslim community from the South Indian states of Tamil Nadu and Kerala. Rawathers follow the Hanati School of fiqh. In 1742 the Travancore force of marthanda varma were able to defeated Kayamkulam army with the help of Rowthers cavalry men brought in from Thirunelveli. When Alappuzha port was founded by Kesavadas ,he invited the rich Rowther traders to settledown at Alappuzha and Changanacherry. Kakkazham Bava Ahammad Moideen Haji and their family were leading group of these communities. The third community is Bhora. It is said that three things are dear to a Bhora man, his topi ,his bayiro and his vayopur. The Dawoodi Bhora community traces its spiritual heritage from Prophet Muhammad and his VasiAmirul Mumineen Moulana Ali son in law of the Prophet and continuing through their successors, the Imams who functioning first from Medina, spread over the North Africa and Egypt in the succeeding centuries in 18th century sone Bhora family migrated to Alappuzha. Their migration based on trading activities. They traded on hill products and mechanical item through Alleppey port in this present time only few families existed in Alappuzha about 10 families. Another Muslim merchant community known as Dakhini Muslim or pattani Muslim. The development of Alleppey port many Muslim merchant groups arrived and settled for trading purpose. Dakhini or pattani Muslim also arrived in Alappuzha and settled for commercial benefits. Many of pattani families existing in Alappuzha. They were followed their traditional customs and culture.

Key words: Migrant, Muslim merchants, Alleppey, Customs, Culture

HOME SCIENCE

Invited Talk

Research Opportunities in Home Science



Dr. Rashmi H. Poojara

Assistant Professor (Food Science and Nutrition)
St. Teresa's College (Autonomous)
Ernakulam

Introduction-Research refers to a studious inquiry or examination, especially; investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or law in the light of new facts, or practical application of such new or revised theories of law. According to Kothari (2006), Research is a pursuit of trust with the help of study, observation, comparison, and experiment, the search for knowledge through an objective and systematic method of finding solutions to a problem. The steps involved in the conduct of any research are indicated in Figure 1.

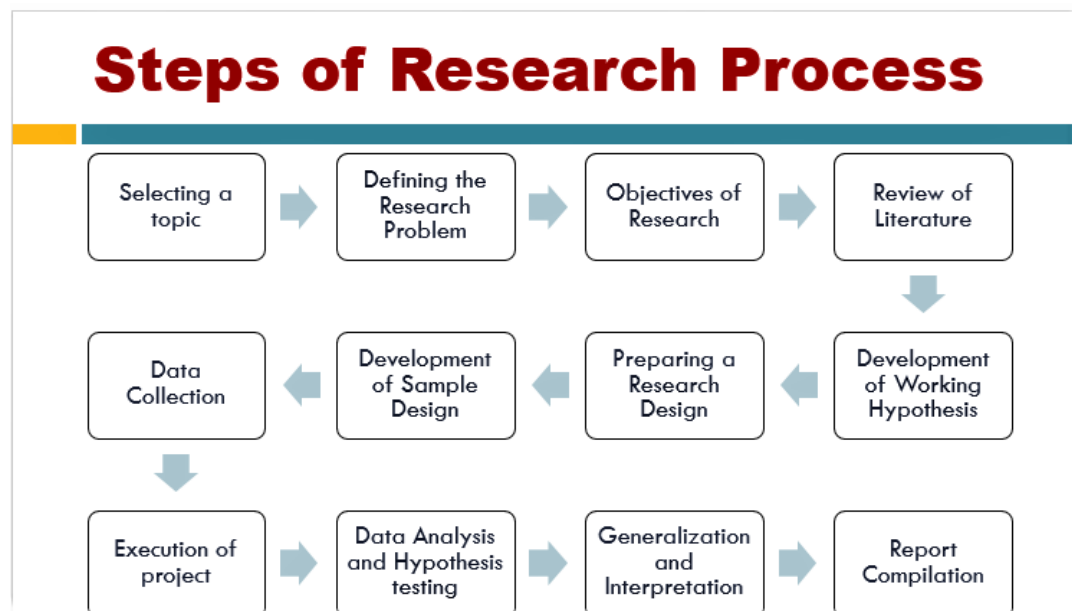


Fig 1: Steps involved in the research process

Realms of Home Science Academia-Home Science is a science-oriented, multidisciplinary subject encompassing multifarious aspects of activities that occur in families, households, and communities. Gradually, the discipline has evolved and expanded to include activities and services of relevance, both to micro contexts of the family and community, and the macro context of society. Home Science is both multidisciplinary and interdisciplinary in its context encompassing the five major disciplines of Family Resource Management(FRM), Foods and Nutrition, Clothing and Textiles, Human Development and Family Studies(HDFS)/Child Development(CD), and Extension Education and Communication(Figure 2). Each discipline has one or more specific areas of specialization.



Figure 2: Realms of Home Science Academia

Human Development and Family Studies (HDFS)/Child Development (CD)- Human Development and Family Studies is a discipline of study integrating knowledge and interdisciplinary understanding of family relationships and individual development. There is knowledge enhancement concerning key developmental tasks during each stage of life, with particular emphasis on the family as a context for human development. Few focal areas of research include-Research in mental health, children with special needs, child rearing practices, child rights and protection and rehabilitation of senior citizens

Child-rearing practices, child rights, and protection-Research concerning child-rearing practices in villages/communities/tribal population. Planning, implementation, and evaluation of intervention programs for infants, young, and school-going children. Evaluation of the role of media and community in the improvement of child-rearing practices, promoting rural child health care practices through community participation, and the study of alternative childcare systems and their impact.

Research in Mental Health- Human ecology system and mental health of adolescents, urban/rural family environment as affecting child's development, working women and their problems, family conflicts and crisis, juvenile delinquents, socially maladjusted developmental assessment of early childhood years, school age, assessment of adolescent's aptitudes, interests, personality are the focal areas of research.

Children with Special Needs-Behaviour analysis and study of children with special needs/exceptional children,

problems faced by parents of exceptional children, learning disability, and early childhood education. Curriculum and pedagogy of early childhood education.

Rehabilitation of senior citizens- Life satisfaction of elderly, assessment of abilities and problems of senior citizens- planning, implementation, and evaluation of remedial programs. The study of rehabilitation services offered by institutions for senior citizens.

Research Institutes in Child Development-

- ❖ Centre for Early childhood Development and Research, Jamia Millia Islamia, Delhi
- ❖ National Institute of Physical Medicine and Rehabilitation(NIPMER), Irinjalakuda, Kerala
- ❖ National Institute of Speech and Hearing, Thiruvananthapuram
- ❖ National Child Development Council, New Delhi
- ❖ Child Development Centre (CDC), Medical College, Thiruvananthapuram
- ❖ National Institute of Public Cooperation and Child Development-Guwahati, Bangalore, Lucknow, and Indore.

FOOD SCIENCE AND NUTRITION: Nutritional Science has its roots in life sciences, and encompasses biological as well as social sciences. Nutrition plays a significant role in impacting the quality of life through improved physical growth, immune competence, and enhanced productivity with improved health. Optimal nutrition can prevent the onset of Non-Communicable or lifestyle diseases. Food Science and Nutrition deals with the processing and preservation of food as well as the planning/popularisation of balanced diets by individuals and communities at large. Social, economic, and cultural factors influence food consumption patterns and further influence the nutritional status of an individual. The changes in nutrient composition during food processing and storage are crucial. There are upcoming areas of interest like Nutrigenomics, Gut Microbiome, Precision Nutrition, and Chrononutrition. Research in these areas of food, nutrition, and health has been gaining immense importance. The broad areas of research in Food and Nutrition include Public Health Nutrition(PHN), New Product Development, Dietetics, Nutrition and Ageing, and Food Toxicology and Safety respectively.

Public Health Nutrition-Assess prevalence of various diet and nutrition-related problems prevalent in communities, evolve methods to prevent and control nutrition problems, operational research for the planning and implementation of nutrition-related policies and programs, Nutrition Health Education(NHE) through community and media-based approaches for effective behavioral change in the community, Development and popularisation of culture/region-specific weaning/supplementary mixture for infants and preschool children. Food Anthropology –comprehend the role that food plays in communities and society at large.

Dietetics-Development of recipes suitable for disease conditions and vulnerable groups, formulation of functional foods to combat various disease conditions, evaluation of individual and composite foods for Glycemic Index(GI) and Glycemic Load(GL), Human metabolic studies/metabolics, nutritional concerns of the public through diet counseling, nutrigenomics, Precision Nutrition(PN) and Chrononutrition. Planning, Implementation, and Evaluation of Nutrition Care Process(NCP) in hospital settings- Eg.-Critical Care Nutrition, Burns Management, Oncology, and Neuronutrition.

Nutrition and Immunity-Nutrition deficiencies and associated morbidity, the relationship between undernutrition and immunity, individual nutrients and their influence on immune function, prebiotics, probiotics, and the gut microbiome. The COVID-19 pandemic has opened new vistas of research concerning nutrition and immunity.

New Product development-Development and nutritional evaluation of nutrient-rich products using underutilized/shelf-life studies, Development and nutritional evaluation of value added products using medicinal plants-Efficacy testing for hypoglycemic/hypolipidemic effect. Nutritional evaluation of under-utilized foods and incorporation in traditional diets to improve the nutritional quality of diets consumed. Microbes-Fermented Foods and human health is emerging area of research.

Food Toxicology and Safety- To investigate foodborne disease outbreaks and toxicological evaluation of foods. Identify naturally occurring food toxins, pesticide residues, food additives, toxic metals, mycotoxins, heavy metals, and pesticide residues in water and food. Environmental monitoring and biomonitoring to study human exposures to carcinogens/toxins/toxic elements in the environment and their biological impact. Risk assessment, detection, and capacity building programs, for making regulatory risk management decisions.

Research Institutes in Food Science and Nutrition-

- ❖ National Institute of Nutrition(ICMR),Hyderabad
- ❖ Central Food Technological Research Institute(CFTRI),Mysore
- ❖ St. John's Research Institute(SJRI), Bangalore
- ❖ Public Health Foundation of India, New Delhi
- ❖ Nutrition Foundation of India, New Delhi
- ❖ International Food Policy Research Institute (IFPRI),India
- ❖ National Institute of Food Technology Entrepreneurship and Management(NIFTEM)
- ❖ Defence Food Research Laboratories(DFRL), Mysore, India
- ❖ Food Safety and Standards Authority of India (FSSAI),New Delhi

COMMUNITY/FAMILY RESOURCE MANAGEMENT- Resources refer to anything we use to achieve our goals. In other words, they are the materials and human attributes which satisfy our needs/wants. Management is a process involving activities, through which action is initiated and resources are used for achieving a goal. To facilitate the attainment of desired goals it becomes essential to plan, organize, coordinate and control all activities, such that the resources are not wasted. The planned use of resources provides direction towards the achievement of desired ends. This involves the weighing of values and the making of a series of decisions. The broad areas of study include Human and Material Resource Management, Family Housing, Interior Designing, Consumer Buyer Studies, Ergonomics, Entrepreneurship Management respectively.

HOUSING AND INTERIOR DESIGNING-Housing needs/house plans of various income or socio-economic categories and life cycle stages- future projections, Ergonomic requirements in houses, Household furniture - functional designing, the material used and evaluation techniques, Household equipment - functional design and evaluation, Ergonomically viable Furniture, and simple tools for various tasks and Latest trends in House Lighting, wiring and sanitary fittings. Slums and squatters – Living conditions, Issues, and solutions. Recommendations for comfortable furniture according to household activities, Space-saving / Multi-use furniture design and evaluation.

ENVIRONMENT MANAGEMENT- Impact of environment on family / personal life, Role of government and non-government sectors in environment management. Developing strategies to overcome environmental pollution. Energy crisis and conservation of energy for future use. Identification and measurement of various environmental pollutants, preparation, and implementation of projects for creating environmental awareness in the community.

ERGONOMICS AND BODY MECHANICS-Significance and scope of ergonomics-Man, Machine and Environment systems interactions, Anthropometric dimensions of workers with space requirements for selected activities, Functional design and arrangement of workplaces for different activities, Product testing, and evaluation and quality control and standardization for food, textiles. Effect of heat, noise, and illumination on the workers' performance, Influence of physical and chemical agents in the work environment on the efficiency of human performance, Functional design and arrangement of workplaces for different activities, and Ergonomic factors in design and selection of household goods.

WORK ANALYSIS AND OCCUPATIONAL STRESS MANAGEMENT-Human cost of work concerning affective, cognitive, temporal, and physical components. Procedure for designing work through time and motion study techniques, Ergonomic designing of workspaces. Correlating anthropometric measurements of workers concerning household work. Occupational stress- causes, sources and assessment, Identification of general, specific, and task-related stressors in family and occupational setup, Developing stress inventories and stress measuring tools and developing and analyzing coping strategies.

CONSUMER EDUCATION-Rights and responsibilities of consumer, Consumer Issues and problems, Consumer movements in a locality, consumer cooperatives. awareness of consumerism, identifying the level of consumer responsibility, consumer organizations, role of media in consumer information, awareness regarding consumer legislation, consumer protection and its reach to public, Product design Vs consumer demand, Computer-aided product designing and modification, Advertising as a mode of consumer communication- Pros and Cons, Advertising trends, management, legislation, Developing information packages on specific consumer issues, Critical analysis of the impact of different advertisements on consumers and Developing consumer-friendly advertisements.

ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT -Importance and scope of entrepreneurship, entrepreneurship ventures suitable for women, case study on women entrepreneurs, financial and developmental institutions assisting small entrepreneurial ventures, management practices for small scale enterprises, critical analysis and reporting on financial management practices of selected enterprises

HOSPITALITY MANAGEMENT-Trends in hospitality and tourism in selected study locale, Development of training packages in housekeeping and front office, Influences on tourism and hospitality, Case studies of unique hospitality ventures, Computer-assisted management tools in hospitality, Evaluation of sanitation and safety procedures, Interior and Exterior Design trends in hospitality spaces, Use and effectiveness of floral decorations, Accessories for hospitality interiors, Influence of medical tourism and other traditional healing techniques on hospitality and tourism and factors influencing local tourism.

CLOTHING AND TEXTILE SCIENCE-Textile science is a unique combination of design with art. Design skills can be used to create original garments that reflect an understanding of art, culture, tradition in the contemporary context of modernism and sustainability. The textile and apparel design science emphasizes aesthetics and creativity, design technologies, the historical and cultural aspects of dress and textiles, sustainable design, and the role of apparel and textiles in the local and global context. The broad areas of research in textile science include-

- Novel Fibres and quality improvement of under-utilized protein and cellulosic fibres by enzyme treatments.

- Effect of enzymatic treatment/mordants on vegetable/natural/herbal dyes.
- Analysis of properties of fabrics dyed with dyes extracted from medicinal plants Eg. Indigo.
- Blending of under-utilized fibres with major fibres for quality analysis.
- Designing protective and functional clothing for farm and industrial workers
- Diversification of utilization of banana,jute and similar such underutilized fibres
- Semiotic studies of Indian Costumes like the saree and the dhoti
- Adaptive/Friendly clothing alternatives for vulnerable groups –Disabled/Elderly
- Product diversification using minor fibers and traditional designs
- Evaluation of the drape characteristics of textiles
- Vernacular textile fabrics/embroidery/surface ornamentations/finishes.
Eg. Bhujodi, chickankari, ikkat, kantha, phulkari, Zardosi etc.
- Documentation of rare textile artifacts
- Geotextiles, Nano textiles, and Techno textiles
- Design intervention, Design thinking, E-Commerce in clothing and customer purchase behavior
- Sustainable textiles/ fashion, possibilities of Khadi/handloom fabrics

Research Institutes in Clothing and Textile Science-

- ❖ National Institute of Fashion Technology (NIFT)
- ❖ South Indian Textile Research Association (SITRA), Coimbatore
- ❖ North Indian Textile Research Association (NITRA), Ghaziabad
- ❖ National Institute of Design (NID)
- ❖ Ahmedabad Textile Industry Research Association (ATIRA), Ahmadabad
- ❖ Bombay Textile Research Association (BTRA), Mumbai
- ❖ Synthetic and Art Silk Mill Research Association (SASMIRA)
- ❖ Man-Made Textile Research Association (MANTRA), Surat

EXTENSION EDUCATION AND COMMUNICATION MANAGEMENT- The objectives of extension education and communication management in Home Science can be indicated as-Assisting people to discover and analyze their problems, their felt and unfelt needs, developing leadership among people, and helping them in organizing groups to solve their problems, dissemination of information based on research and practical experience, implementation of a ‘Lab to Land Approach’ and to update researchers informed of grass root level problems so that solutions can be offered based on research. Broad areas of research include-

- Women empowerment, Gender perspectives, Women in agriculture
- Socio-economic analysis of Communities, concept of community development
- Perspectives and approaches to community development
- Technology assessment, refinement, and transfer
- Media development, standardization, and effectiveness
- Communication and media studies, health communication strategies
- Impact assessment concerning relocation/displacement associated with development projects
- Social marketing, advertising, and public relation
- Information and Communication Technology (ICT) in higher education

- Project planning, planning, Implementation, and Evaluation, management and techniques
- Programs for rural and urban development
- Training for development- types and techniques, programs for rural and urban development

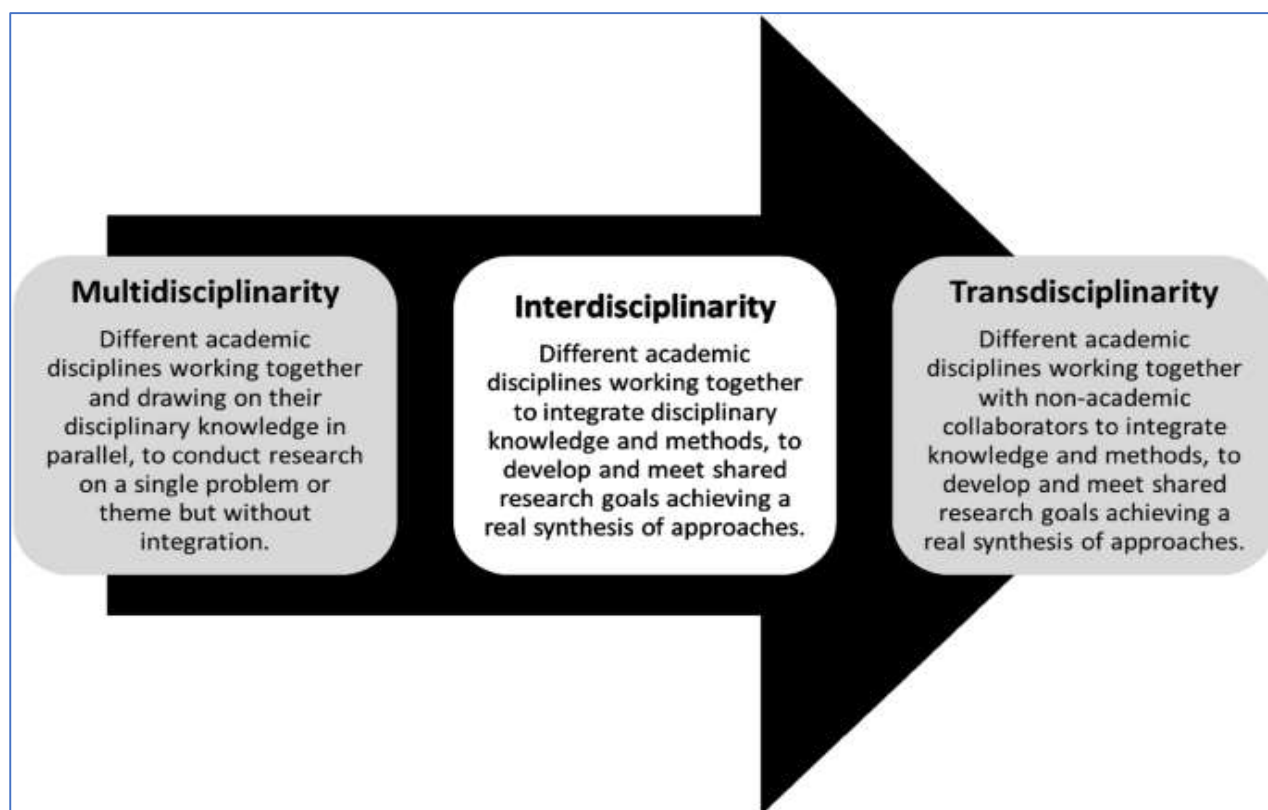


Figure 3: Defining the concepts of multi disciplinarity, inter disciplinarity and trans disciplinarity. Adapted from Stember (1991, p. 5) and Tress et al. (2006, p. 17)

Multidisciplinary, Interdisciplinary and Transdisciplinary research are essential and the need of the hour to meet the ever increasing global socio-ecological challenges. The overview of these research types are indicated in Figure 3. Home Science is a unique discipline of study that facilitates research that is interdisciplinary, multidisciplinary and transdisciplinary.

REFERENCES-

1. Kothari, C.R. (2006). Research methodology: methods & techniques. (2nd ed.). New Delhi: New Age International (P) Limited Publishers
2. Kelly, R., Mackay, M., Nash, K.L. et al. (2019) Ten tips for developing interdisciplinary socio-ecological researchers. *Socio Ecol Pract Res* 1, 149–161 . <https://doi.org/10.1007/s42532-019-00018-2>

Won Third Prize

Assessment Of Food Safety Knowledge



Sreeja.S* and Dr. Leena Leon**

*Research Scholar, Department of Home Science, St. Teresa's College, Ernakulam

**Assistant Professor, Department of Home Science, St. Teresa's College, Ernakulam

E mail: sreejamanan@gmail.com, **leenaleon@gmail.com

Abstract

Eating a safe food continues to be one of the major concerns of the societies. An important factor for a successful food control is to create awareness for food safety and quality information, education and communication. According to FSSAI, Food Safety Officers conduct inspection of the food establishments, and they must have adequate knowledge in food safety to perform their duties and responsibilities. This study is carried out with the purpose of investigating the relationship between the educational qualification and knowledge on food safety of the food safety officers. The investigator also aimed to check the association between knowledge and practice of the respondents. The study involved 50 Food Safety Officers from four districts of Kerala. The food safety knowledge and practices were assessed using a questionnaire. The total knowledge score of the respondents lies in between 4 and 9. The mean score of knowledge is 6.2, with a standard deviation of 1.20. 50% of the respondents had a moderate knowledge in food safety. Only 20% of the respondents were included in the required group of high knowledge category. Karl Pearson correlation coefficient between knowledge score and practice score is .361($P < 0.05$) shown that the strength of the association between knowledge and practice is medium. The chi square test shows that the level of knowledge is significantly associated with their educational qualification. The proportion of medium/high level of knowledge is more among post graduates in Food Science. The findings shown a need to update the qualifications required for a Food Safety Officer.

Key words : Food safety, Food Control, Food Safety Knowledge, FSSAI, Food Safety Officers

Won Excelsior Award

Study on micronutrient rich greens: Microgreens



Vineetha Antony*, Dr. R. Radha**

* Research Scholar , Department of Food service management and dietetics,
Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore

** Assistant Professor, Department of Food service management and Dietetics ,
Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore

E mail: vineethaantony93@gmail.com

Abstract

Microgreens are defined as the small salad greens grown for their fully developed and non- senescent cotyledons which often encompasses one to two true leaves in development. Microgreens became popular in the last two or three decades as culinary additions to enhance texture, color, taste, aroma, and visual appeal of a number of food dishes and more recently have been promoted as healthy additions to the diet. Many species in the Brassicaceae, the Amaranthaceae, and other vegetables and herbs have been tested for microgreen production. Microgreens are tiny versions of leafy vegetables and herbs, have been described as healthier than full sized greens. Microgreens (seedlings of green vegetables and herbs) are gaining in popularity as a new culinary ingredient, providing intense flavors, vivid colors, and crisp texture when added to salads and other food preparations. While their nutrient contents vary slightly, most varieties tend to be rich in potassium, iron, zinc, magnesium and copper. Microgreens are also a great source of beneficial plant compounds like antioxidants. Microgreens require slightly less warm and humid conditions than sprouts do, and only the leaf and stem, rather than the root and seed, are consumed. To

adapt to the new innovative food modifications the advent of microgreens are added advantage to shift the nutritional and culinary profile of the foods. Although microgreens would inherently be regarded as a healthy addition to the diet, no information is available on their nutritional content. The proposed study intended to highlight the environmental conditions and the best microgreen seeds that suits the climate of south India.

Keywords : Microgreens, Confetti, Phytonutrients, Micronutrient, Profile

Won Third Prize

Prevalence Of Malnutrition Among Children Of 0-6 Years In Thiruvananthapuram District



Divya M¹, Dr. Prema L^{}, Dr. Bhagya D.***

^{**}Former Professor, College of Agriculture, Kerala Agriculture University

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

E mail: divyamadhavam1985@gmail.com, *bhagyasjcw@gmail.com

Abstract

Children between 1 and 6 years of age in India constitute 15% of the total population. According to WHO report, nearly two of three preschool children in India are malnourished which is the main underlying cause of up to 50% under five deaths. Kerala which tops the list in most of the health indicators in India is no exception to wide prevalence of malnutrition in children. The study focusses on comparison of height and weight of the children in the age group 0 to 6 years with WHO standards. The samples were collected by stratified random sampling from the growth monitoring records maintained by Anganwadis situated in rural area of Thiruvananthapuram district. Out of 1000 children 469 were males and 531 were females. Growth indicators such as weight for age, height for age and weight for height were studied. About 86.55% fall under normal category, 7.50% was under weight, 2.10% were severely underweight and about 3.9% had growth problems. Even though majority of the study population falls under normal category; obesity (4.6%) was also identified along with stunting, wasting and growth problems. The growth potential of a child is determined at the time of conception itself, but under nutrition, repeated infections and unscientific dietary habits have a long a term implication on the growth potential and nutritional status of the child which needs to be curbed.

Key words : Growth indicators, Stunting, Wasting, Obesity, WHO standards, Under Five Children

Won Second Prize

An Overview on the Vitamin D Status among Women in Reproductive Years and Associated Health Risks



Urmila Vijayan.P^{*}, Dr. Karuna.M.S.

Department of Home Science, Vimala College (Autonomous), Thrissur-680009, India

*E mail: urmila_vijayan7@yahoo.co.in

Abstract

Ample literature supports the intrinsic contribution of Vitamin D in several aspects concerning women health. Deficiency of vitamin D is related to morbidities like ovarian cancer, breast cancer, depression, osteoporosis, cardiovascular diseases, and gynaecological concerns like endometriosis, uterine leiomyoma, fertility issues etc.

The study was focused on the health risks associated with vitamin D status among women in reproductive years. Purposive sampling techniques were employed to select 200 subjects in the age group of 25 to 45 years from Thrissur and Calicut district. A structured questionnaire was formulated to elicit the demographic details, medical history, clinical assessment, menstrual details and dietary pattern of the selected subjects. Biochemical analysis of serum 1,25 –dihydroxy vitamin D and estimation of body fat percentage was performed in a micro sample. The results indicated that the serum vitamin D values of the subjects were found to be below standard values (< 30 ng/ml). The subjects showed the presence of obesity, diabetes, hypothyroidism, PCOS and increased abdominal fat. Dietary pattern analysis showed that cereals, fats & oils, non-vegetarian foods and milk and milk products were the most frequently consumed. Statistical tests of significance were applied to analyze the results.

Key words: Vitamin D, Women Health, Health Risks, Dietary Pattern, Gynaecological Issues

Development of RTS Microgreen Chutney Powder, its Organoleptic, Experimental and Consumer Acceptance Evaluation and Popularization by Microgreen Recipes **Leah Anna Abraham & Kavitha Vijayan**

M.Sc., Dietetics and Food Service Management, Department of Family and Community Science, CMS College Kottayam (Autonomous), College Junction, CMS College Road, Kottayam, Kerala, 686001
E mail: leahabraham1928@gmail.com, kv.kavithavijayan@gmail.com

Abstract

This research work is focused on development of RTS microgreen chutney powder with an intention of preserving microgreens for longer duration and to get increased shelf-life. For the preparation of RTS microgreen chutney powder, microgreens were dried in a low temperature of 50° C for 3-4 hours and powdered. The antioxidant level has been retained at 3664 mg/100g and is rich in calcium which is 350 mg/100g. Organoleptic evaluation was also conducted for developed microgreen chutney powder and microgreens recipes and it was found to be acceptable. As part of popularization of microgreens and microgreen chutney powder, trial pack of developed microgreen chutney powder was distributed and nutrition education was conducted in local language. Also a recipe book with 10 variety of dishes and a brochure of microgreens which has details on growing methods, harvesting periods, nutrient and health benefits, method of making dishes, etc. were distributed to encourage people to grow and prepare microgreen dishes at home. Finally, the impact of nutrition education was assessed, hence the average difference between before and after scores is -5.24 and the corresponding SD is 2.759. $t(49) = -13.427$ with P-Value is $0.0001 < 0.05$. Due to the means of the two scores and the direction of t-value, it was concluded that there was a statistically significant improvement in knowledge about the microgreens and its nutritional benefits following Nutrition Education Programme.

Key Words: Microgreens, RTS Chutney Powder, Popularization, Microgreen Dishes, NEP

Won Third Prize

Dietary Diversity of Young Adults with Special Reference to Fruit and Vegetable Consumption



Elizabeth Varghese Anthikkat¹ & Shilpa Jose²

Department of Home Science and Centre for Research,
St. Teresa's College (Autonomous), Ernakulam, Kerala

E mail: ¹ elizabethvargheseanthikkat@gmail.com, ² shilpajose2017@gmail.com

Abstract

Healthy lifestyle with proper balance of right food and physical activity is crucial for fitness and longevity. Fast, unprecedented changes in life largely influence eating behaviour of people. The United Nations has declared 2021 as International Year of Fruits and Vegetables, to raise awareness on significance of fruits and vegetables in human nutrition, food security and health as they are dense sources of various micronutrients. Hidden hunger is a matter of global concern attributed to lack of diversity in daily diet. Right eating habits in adulthood is indispensable to prevent complications in later life. The global and national trends of fruit and vegetable consumption show consistent low intakes. The present study aims to contribute to the existing data on the dietary diversity of young adults in Kerala. The data from 500 college going young adults from the urban and rural area of Kerala, belonging to the age group 18-25 years was collected using survey method. The study revealed that majority of subjects consumed lower than WHO recommended intake of fruits and vegetables. Fruit and vegetable frequency survey revealed that energy dense fruits and vegetables were consumed in greater frequency. KAP study revealed that majority of young adults were unaware of the actual recommendation of fruit and vegetable intake given by WHO which shows the dire need for spreading awareness about the same, however higher intakes were found to be associated with higher physical activity level and involvement in kitchen gardening practices.

Key words: Dietary Diversity, Fruits And Vegetable Intake, Young Adults, Dietary Consumption Pattern

Won Excelsior Award

Need for integrating concepts of promoting healthy diets for prevention of Non-Communicable Diseases in training curriculum of Community Health Officers (CHOs) and ASHA facilitators under Ayushman Bharat



Dr. Hemangini Gandhi* & Inderdeep Kaur Bhamra**

Department of Foods and Nutrition

Faculty of Family and Community Sciences

The Maharaja Sayajirao University of Baroda, Vadodara

E mail: inderdeepk17@gmail.com, hgandhi1950@gmail.com

Abstract

Dietary risks rank 2nd in disease burden profile of Gujarat highlighting the need of promoting healthy diets in the community. CHOs play a pro-active role in all the activities at community level. One of the major skills that this cadre of functionary should possess is knowledge and aptitude for promoting healthy diets at community level

Ideal International E- Publication

www.isca.co.in

under eat right India campaign. The present study was planned with objective of assessing the knowledge of CHOs and ASHA facilitators on concepts of healthy diets for NCD prevention under Ayushman Bharat. All the community health officers (CHOs) and ASHA facilitators from 8 blocks of Vadodara district who were available for the study were enrolled (n=69 and n=58 respectively). The data on their knowledge regarding healthy diets in preventing non communicable diseases was assessed using pre-tested semi-structured questionnaire. The result revealed that 73.91% CHOs had a degree in nursing (56.52% had a diploma and 17.39% had a bachelor's degree) and 26.09% had a degree in ayurveda (BAMS). Majority of the CHOs were aware of the concepts like nutrition, food groups, balanced diets, calorie restricted diet, NCDs, 'Aaj se thoda kam' and glycemic index. Majority of the ASHA facilitators were aware of the concepts like nutrition, food groups, balanced diets, calorie restricted diet, NCDs and use of millets. There was a need to strengthen their knowledge on concepts like FANTA classification, for dietary diversity, RDA, food pyramid, My Plate, eat right campaign, functional foods, use of millets and indigenous foods and recommended daily intakes of foods like fruits and vegetables, fats, sugar and salt. There is a need to integrate concept of healthy diets for effective delivery and utilization of services related to non-communicable disease prevention at community level to facilitate SDG goal 3.

Key words: Ayushman Bharat, Community Health Officers, ASHA Facilitators, Healthy Diets, Eat right India

Food Purchase And Consumption Behaviour Of House Holds During COVID -19

Anagha Mol MA* and Dr. Leena Leon**

*PG Student, Department of Home Science, St. Teresa's College, Ernakulam

**Assistant Professor, Department of Home Science, St. Teresa's College, Ernakulam

E mail: leenaleon@gmail.com, anaghamol2016@gmail.com

Abstract

One of the basic needs of the human being is food. It is vital for the normal functioning of the body parts and for a healthy growth. Consumer interest in ready-to-eat (RTE) and ready-to-serve (RTS) food is mounting due to their convenience, value, attractive appearance, taste and texture. The Covid-19 pandemic has inevitably taken a heavy toll on food consumption and purchase behaviour of people. This paper is envisioned about the food purchasing and consumption behaviour households during Covid-19. The method adopted was survey and the data was collected from the subjects using google forms. The pandemic crisis brought very noticeable changes in food purchase and consumption behaviour of people. The selected area was Kottayam district. Majority participated in the survey was non vegetarians and had snacking habits. Most of the subjects revealed their interest in online purchasing and majority suggested Zomato as their favourite food purchasing app. Another important change has occurred and observed was participants dependence online mode of purchase of items for food preparation considering the covid protocols. Study found that food delivery apps have grown increasingly popular and exciting customers who are, in turn, paying more attention to the available options. The shift in customers' food purchasing behavior has spurred the growth of the food delivery business. The study emphasized the importance creating awareness on healthy food choices- eating tight is a needed investment for a healthy future.

Key words : Pandemic, Food Preference, Food Practices, Food Consumption

Study On The Consumption Pattern Of Millets In South India

Ms.Meenu Nixon ^[1] and Dr.Anu Joseph ^[2]

^[1] Postgraduate in Food Science & Nutrition, ^[2] Associate Professor,

Department of Home Science, St. Teresa's College, Kerala, India

E mail:^[1] meenunixon123@gmail.com, ^[2] anujosephstc@gmail.com

Abstract

Millets are considered as an ideal food because of their high nutritive value. Compared to cereals, millets contain high levels of proteins, minerals, vitamins and antioxidants. The present study was carried out with the objective of determining the current trend in the consumption pattern of millets in different regions in South India. The study also assessed the factors influencing purchase and consumption of millets, consumer acceptability and awareness on the availability and health benefits of millets. A total of 250 adults from South India, comprising 100 subjects (male and female) from the five states namely Kerala, Tamil Nadu, Telangana, Andhra Pradesh Karnataka were selected through quota sampling method. The tool selected for conducting the present study was a questionnaire. Considering the present pandemic situation, the questionnaire was circulated as a Google form. The data collected was analysed and interpreted. More than half were found to be regular consumers of millets,

the highest proportion of regular consumers were from Telangana followed by Tamil Nadu while least were from Kerala. Majority of the respondents were aware of at least one form of millet. Most popular was Finger Millet. Among the total subjects, majority were aware of the benefits of millets. Consumers in Andhra Pradesh were found to have the highest awareness. Reasons for the unpopularity of millet was limited knowledge on methods of preparation, unacceptable taste, and lack of availability. In Kerala, the major reason attributed to low consumption of the millet was less availability.

Key words: Awareness; Consumption, Frequency, Households, Millets

Effect of Covid 19 Lockdown on the Lifestyle and Dietary Diversity of Women Handloom Workers

Aiswarya A& Bhagya D*

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

E mail: aiswaryadinesha12@gmail.com, bhagyasjcw@gmail.com

Abstract

Covid-19 lockdown has influenced the lifestyle of handloom women as weaving is the only mean of earnings for them. The nutrition profile of working women is a vital part of their general health as they have more chances of dietary deficiencies; in addition they face various safety related problems at workplace. Working conditions and household responsibilities complicate role conflict leading to stress that in turn affect nutrition and health status. Purposive sampling method was used to collect data from 100 samples of women handloom workers between the ages of 30-60 years from Kanhirode Weaver's Co-operative Society, Kannur, Kerala, India. Personal interview method was used for data collection. The interview schedule included occupational health profile, anthropometric, physical activity and food frequency assessment. Dietary diversity questionnaire was used to assess the levels and adequacy of dietary diversity. Depression Anxiety Stress Scale (DASS) was used to assess psychological well-being among the samples. COVID-19 lockdown downgraded the life style of majority (90.7%) of women workers. Majority of samples were with mean age 46.74 ± 5.73 years and height of 1.52 ± 0.10 m respectively. Out of 100, 63 samples noticed a weight change from which majority (71.4%) noticed an increase in their body weight. The mean weight before lockdown was 54.100 ± 7.603 Kg and after lockdown 55.020 ± 8.013 Kg. The mean BMI before lockdown was 23.232 ± 2.866 and after lockdown BMI slightly increased to 23.572 ± 2.928 . Lockdown introduced a significant reduction in percentage of consumption of pulses (3.7 ± 1.2 g), fish (4.1 ± 0.5 g), chicken (2.0 ± 0.6 g), meat (1.4 ± 0.6 g) and milk products (4.6 ± 1.05 ml). Most of the subsamples were not meeting the calories (2063.3 ± 166.9 Kcal), fat (20.6 ± 4.3 g) and micronutrients such as vitamin A (761.3 ± 180.3 mg), vitamin C (61.2 ± 15.9 mg) and calcium (963.3 ± 183.9 mg) requirements which indicate the incomplete dietary diversity. The nutrition profile of women handloom workers was negatively influenced by the COVID-19 pandemic.

Key Words: COVID 19, Dietary Diversity, Handloom, Nutrition Profile, Women

Evaluating The Effectiveness Of Online Class Among Early Adolescents (10- 12 Years)

¹Athira A P, ²Dr. Sithara Balan V, ³Sivasree Bahuleyan

¹PG Scholar, Government College for Women, Thiruvananthapuram, Kerala

²Assistant Professor, Department of Home Science, Government College for Women, Thiruvananthapuram, Kerala

³Research Scholar, Government College for Women, Thiruvananthapuram

E mail: athirarohini17@gmail.com

Abstract

Online learning is an emerging teaching pedagogy where the learning takes place between the teacher and the learner at the distance. Online learning gained more attention and became popular especially during the time of this COVID- 19 pandemic. Therefore it becomes necessary to understand whether this concept of online learning among children is efficient enough to make up our traditional teaching strategy. The main objective of the study was to check the effectiveness of online class. The present study was carried out in schools of Thiruvananthapuram district due to the easy approachability and accessibility. The sample size of the study was 100 comprised of early adolescents of age group 10-12 years of age. The study used a Questionnaire and Attitude Scale as the standard tools for data collection. The data was collected through direct face to face survey, online mode and through telephonic survey. A pilot study was carried out among 15 students in order to check the feasibility of the tools

developed. Both primary and secondary data were collected for supporting the study. The collected data was analysed and interpreted using graphs, diagrams and figures. The study could able to find that majority of the respondents have the opinion that online classes are more effective than traditional class. Even though majority of the respondents feel more comfortable in online class, but most of them prefer classroom learning to online classes and they also feel classroom learning is friendlier than online classes.

Keywords: Online class, Early adolescents, Effectiveness, Classroom learning

Social Determinants and Post Covid Effects on nutrition profile of Geriatric Patients in Coastal Areas of Alappuzha

Kripa Sabu & Bhagya D*

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

E mail: kripasabu96561998@gmail.com, bhagyasjcw@gmail.com

Abstract

The global COVID-19 pandemic has wreaked havoc on people all over the world. The social distancing protocols enacted to slow the spread of COVID-19 are more likely to have negative consequences for older people, who already have higher rates of social alienation and loneliness. 100 samples of old age people from Cherthala thaluk (Kadakkarapally grama panchayath) were taken, out of which 50 were females and 50 were males. This study reveals that the majority of the people (80%) were from the low-income category and socio-economic factors may contribute to the incidence of coronavirus infection among elders. It was evident that majority of the respondents have clinical symptoms such as fever, loss of smell and taste, tiredness, dry cough, headache, and gastrointestinal symptoms. Very few samples were found to have symptoms like difficulty in breathing, chest pain, and loss of speech or movement associated with COVID 19. Post COVID-19 health issues among elders are palpitation, fatigue, joint pain. Comorbidities increase the severity of COVID-19 among the geriatric population. The study found that females have more health issues after post COVID-19 infection. The change in lifestyle and nutritional profile during COVID-19 influence the quality of life of the geriatric population. Their socio-economic status negatively affected and limited their health care facilities. Nutritional status and health profile of elders were worsened during the pandemic, and physiological distress developed after COVID-19 infection.

Key words: COVID-19, Comorbidities, Geriatrics, Quality of Life, Nutritional status

Formulation of Diabetic Health Drink Powder, It's Evaluation in terms of Nutritional and Organoleptic Qualities and Effect of its Supplementation in Managing Type 2 Diabetes Mellitus

Minnu Alex

Department of Dietetics and Food Service Management, CMS College, Kottayam, Kerala-686001, India

E mail: minnamariyam98@gmail.com

Abstract

The prevalence of type 2 diabetes mellitus, a chronic metabolic disorder has been increasing steadily all over the world. It is increasing in such a rapid rate that the number of people affected are expected to double in the coming decade. Various medicines and health supplement powders are available in the market, but natural, cost-effective and equally consumable products by all ages are few. So, the purpose of the study was to formulate a health drink powder and assess the effect of its supplementation in managing type-2 DM. Natural ingredients comprising of flaxseeds, fenugreek seed, oats which have low glycemic index, high fiber content and antidiabetic effects were selected for the preparation. Sensory evaluation by implementing a composite score card was done by a group of panel members to select the best flavor out of the different flavored samples. The selected powder was then subjected to nutritional quality analysis and shelf-life analysis. By means of google forms, a group of type 2 diabetic people, non-insulin dependent and without any medication were chosen. Being supplemented with this health drink powder for two weeks, and each week, their FBS and RBS values were evaluated. Results of the study indicated that this helps in stabilizing the health condition of a type-2 diabetic patients by helping to maintain a stable blood glucose sugar level. Thereby, it improves the health of these people by providing this extra supplementation. In conclusion, the study also provides ample scope and opportunities for further researches to be conducted on this topic.

Key words: Type 2 DM, Diabetes Management, Health Supplement

Effect of Covid-19 Lockdown on the Physical Activities and Nutrition Status of Children (10-12 years)

Amritha V, Simmya Ansari.*

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

E mail: amrithav00@gmail.com

Abstract

The COVID 19 lockdown has influence the physical activity of school going children due to closure of school. During the shutdown, there may be shifted towards unfavourable dietary habits, such as increased calorie intake, more frequent snacks, decreased fresh fruit, and vegetable consumption, and weight gain. A total of 100 samples of school going children between the ages of 10-12 years were selected by purposive sampling from Kannur. The data regarding general profile and socio-economic status of the samples was collected. The nutritional profile of the samples was assessed by anthropometry and dietary methods using a structured Google form. To assess sleeping quality of school going children, Pittsburgh Sleep Quality Index (PSQI) was used. Majority (82%) of samples has noticed significant change in their body weight; out of 82 samples, majority (98%) noticed an increase in their body weight. The mean weight before lockdown was 34.14 ± 12.03 kg and after lockdown 36.58 ± 12.31 . The mean BMI before lockdown was 16.71 ± 5.53 and after lockdown it increased to 17.38 ± 5.3 . Majority of subsamples were not meeting the calorie requirement. In girls, there is a significant difference in mean fat intake and RDA value. The micronutrients such as calcium and iron deficiency seen to be high in girls compare to boys while vitamin A and vitamin C deficiency found to be high in boys than girls. Lockdown introducing a significant change in physical activity, during the lockdown majority of sample 58 are not doing any physical activity. Majority (99%) samples have good quality of sleep during lockdown. Physical activity of children negatively influenced by COVID 19 lockdown and improved their nutritional status during lockdown.

Key Words: COVID 19, Physical Activity, Sleep Quality

Won Second Prize

Assessment of Learning Style and its Awareness Among Children and Advocating Different Strategies Suitable for Different Learners



^{1*}Ashla Joseph, ²Dr. Dhanya N

^{1*}Post Graduate Student, St. Teresa's College (Autonomous), Ernakulam

²Assistant Professor, Department of Home Science, St. Teresa's College (Autonomous), Ernakulam- Park Avenue Road, 682011, Kerala, India

*E mail: ashlaajoseph98@gmail.com

Abstract

This research work is focused with the aim of assessing the learning style of children from 4-10 years, give awareness on the concept of learning style and suitable strategies and to provide activities for various concept and skill building. Due to the pandemic, the study was carried completely through online platforms. 100 students from various parts of India belonging to 4-10 years were selected through purposive sampling method. The tools used were the VAK learning styles self-assessment questionnaire, video development and webinar. The information was collected from the respondents by developing and distributing a questionnaire for general information which include age, gender, class, academic details etc and the VAK questionnaire with 30 questions each with 3 options through a Google form. In the next phase of the study, 9 short videos were prepared by the investigator involving activities for concept building such as counting, addition and subtraction, greater than less than, time and shape concept and skill building activities like fine motor skills, eye- hand coordination, pre- writing and life skills were included. A two day webinar was conducted on "learning style and suitable strategies" by Mrs. Harini Mohan, head of academics, Madras Dyslexia Association for the participants. The prepared videos were presented at the

end of the webinar for evaluation. The collected data was sorted, analyzed and interpreted in terms of percentage. It was found that the selected boys tend to learn using their kinesthetic modality whereas girls tend to learn using visual and auditory modality. The study also threw light through the webinar regarding the concept of learning style and its importance in education and academic achievement among the participants. The developed video was helpful and beneficial for the participants as it contains simple activities suitable for all learning style.

Key words: Learning Style, Strategies, Visual Modality, Auditory Modality and Kinesthetic Modality

A Study On Soft Drink Consumption Pattern And Ncd Risk Factors Among College Students

Agnet M J, Anju M Neeliyara*

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

E mail: agnetmj112@gmail.com, anjuneeliyara@gmail.com

Abstract

Young people are the precious resources of a country, and their health is in a vulnerable phase, often influenced by intrinsic and extrinsic factors. India experienced the highest loss in potentially productive years; NCDs approximately contributing 235 million DALYs. Regular consumption of soft drinks leads to weight gain, and adverse cardio metabolic health. An online survey was carried out among 120 college students in the age group of 18-22 years. A comprehensive structured questionnaire was developed to collect data on socio-economic status and anthropometric parameters. Data on soft drink consumption pattern, morbidities and bio-chemical parameters were collected and used to assess the impact of soft drinks on health. Frequent consumption of soft drinks affected the health of youth. Soft drinks were consumed on a weekly basis by 42 percent of the students, while 41 percent had a history of soft drink consumption over a long period and majority (64%) consumed soft drinks in the company of friends. Though 52 percent had a normal BMI, 25 percent had a BMI above normal and 23 percent samples were underweight. The waist-hip-ratio of 33 percent samples were found to be in the moderate to high-risk category. Statistical analysis showed that there was no significant difference in BMI and waist-hip-ratio among regular and non-regular consumers of soft drinks. Majority of the consumers noticed that they had health problems like vomiting, headache, stomach ache and dental problems. Hypertension was found among 8 percent of the respondents, while 40 percent were found to be pre-hypertensive. It was reported that 17 percent had borderline sugar levels. It was also noted that 26 percent of the respondents had cholesterol level above normal. The degree of association of hypertension, cholesterol level and blood sugar with soft drink consumption pattern was found to be statistically non-significant.

Keywords: Soft drinks, Youth, Peer Groups, (NCDs) Non-Communicable Diseases, Risk Factors

Designing A Product For Anger Management In Adolescents

^{1*}Ajeena K R, ²Dr. Dhanya N

Post Graduate Student, St. Teresa's College (Autonomous), Ernakulam, India

Assistant Professor, Department of Home Science, St. Teresa's College (Autonomous), Ernakulam- Park

Avenue Road, 682011, Kerala, India

*Email: ajeena6029@gmail.com

Abstract

The study on "Designing a product for anger management in adolescents" was taken up by the investigator with the aim to understand modes adopted by the subjects to express their anger and to design a product for anger management in adolescents. The sample consisted of 100 adolescents from different parts of Kerala. A standardized questionnaire "Anger Expression Scale for Children" (AESC) was used in the present study to identify the level of anger expression among adolescents. The questionnaire consisted of 26 questions which were modified and a total of 24 questions were prepared for the analysis. A relieving cap was also developed by the investigator as a means to help teenagers to manage their anger more efficiently. Ten subjects were selected and introduced to self-designed product to help them manage their anger more efficiently and a checklist was provided for assessing its effectiveness. From the evaluation of the product "relieving cap", 80 percent of the respondents ranked the product as excellent for the creativity and Sixty percent of the participant's claimed that the originality of the product was "very good". Thus the product can be used to enhance anger management.

Keywords: Anger, Adolescent, Anger Management, Relieving Cap

Composite Index Of Anthropometric Failure (Ciaf) Among Children (6-23 Months) Of Selected Villages Of Jambusar Block In Bharuch District

Dr.Hemangini Gandhi^{1*}, Dr Nandani Srivastava^{2}, Bhumika Thakur^{3***}**

^{1 and 3}Department of Foods and Nutrition
Faculty of Family and Community Sciences
The Maharaja Sayajirao University of Baroda,

²Aatapi Seva Foundation

E mail: hgandhi1950@gmail.com , bhumikathakur68214@gmail.com

Abstract

Undernutrition is considered as a serious public health problem in most developing countries. Globally anthropometric measures are widely used to estimate the magnitude of undernutrition among children. The Composite Index of Anthropometric Failure (CIAF) provides the overall magnitude of undernutrition as an aggregate single measure over the conventional anthropometric indices and helps in identification of single or double or multiple anthropometric failures among children. It was a University-NGO collaborative study so the study was conducted in the villages which come under the working of Aatapi seva foundation in Jambusar block. In this study Jambusar block was purposely selected and the study was conducted in anganwadi centers of 5 villages where Aatapi seva foundation is currently working. Total 232 children were enrolled in the study and data on Socio- economic status (HHs), Anthropometric measurements of Weight and Height were measured using standard procedures. Age-sex specific z-score value of wasting, underweight and stunting were calculated by using WHO-Anthro, v. 3.2.2. A child having Z-score <-2 Standard deviation of any anthropometric indices was considered to be undernourished and the standard CIAF classification was used to calculate the prevalence of undernutrition. The results of the study showed the prevalence of stunting was 69%, underweight was 37%, and wasting was 13% (-2SD). The sex-specific prevalence of all the three categories of malnutrition was seen higher among boys as compared to girls. The overall prevalence of multiple burden of malnutrition, that is, the presence of wasting, stunting and underweight was 14%. It can be concluded that high prevalence of undernutrition among 6-23 months children of selected villages of Jambusar block is a cause of concern. Breast feeding practices and complementary feeding practices need to be strengthened among young mothers. It is very important to have nutrition specific interventions to improve maternal nutrition and early identification of nutritionally high risk mother's.

Key words: Composite Index of Anthropometric Failure (CIAF), Anthropometric Indices

Assessment of Nutritional and Mental Status of IT Workers Before and During the Pandemic Period

Niranjana C & Chithira K.R*

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

E mail: niranjanaashokniru@gmail.com

Abstract

COVID-19 has resulted in enormous disruption on work and workers life style. Employees in the Information Technology (IT) industry are often overwhelmed at work and are at risk of developing health issues as a result of their professions. The main purpose of the study was to assess the nutritional and mental status among the IT workers. Hence the study entitled "Assessment of nutritional and mental status of it workers before and during the pandemic period" was done. By purposive sampling method, 100 samples of IT professionals were selected for the study. Data collection was done by means of Google form questionnaire method. Nutritional status assessment was done by anthropometric measurements and food frequency data both before and during the lockdown. Physiological status of workers was done using standard DASS tool, which assessment three emotions mainly depression, anxiety and stress. An increased nutritional intake and decreased physical activity was seen among the workers during the pandemic. A majority (54%) of the samples were males with mean age 25 years. Variation in the body weight was seen in 90% of total samples during the pandemic than before. Thus BMI both before and during lockdown were 21.5 ± 3.54 and 22.4 ± 3.59 respectively. The physical activity status reveals that majority (61%) of samples were physically less active during lockdown. The physiological status revealed that a moderate level of three emotions was common among the workers. Both the nutritional and mental status of the IT workers was affected during the pandemic period.

Key Words: COVID 19, IT Workers, Nutritional Profile, DASS

Won Excelsior Award

Assessment Of Environmental Friendly Sizing Agent From Jackfruit Seeds And Its Application On Cotton Fabric



Jasmin.,Lavanya I A,Sruthi Tomy C.,Krishnendu M U,Alisha Joy, MS. Vidhya K B*

Department of Home Science, Vimala College (Autonomous), Thrissur, Kerala-680009, India.

*Assistant professor, Dept. Of Home Science, Vimala College, Thrissur

E-mail: zjasmin111@gmail.com, *kbvidyasinu@gmail.com

Abstract

This research work is focused on the investigation of extracting starch from Jackfruit seed kernel and to utilize jackfruit kernel starch as a stiffening agent on cotton fabric. A Jackfruit weighing 7.5 kg was collected from home and peeled manually to collect seeds. The embryos were washed and cleaned and directly subject to starch extraction. 300gm embryo cut into small pieces and grinded in a domestic mixer. The grounded slurry was mixed with 2.5 L of water and kept aside for 24 hours at room temperature for sedimentation. The sedimented starch layer of residue dried under sunlight and starch is obtained. Then desized muslin cloth were applied with Jackfruit kernel starch at 2% and 5% and the effects are recorded. The results indicate that developed starch powder showed better results when tested on fabric durability. Physical properties like fabric stiffness were improved when treated with Jackfruit seed starch. Jackfruit seed starch can be recommended as an eco-friendly and user-friendly sizing agent.

Key words: Stiffening Agent, Starch Extraction, Sedimentation, Desizing, Sizing Agent

Won Second Prize

Formulation And Organoleptic Evaluation Of Easy And Healthy Breakfast Recipes For Adolescents



Anu Mariyam John * and Dr Leena Leon**

*UG Student, Department of Home Science, St. Teresa's College, Ernakulam

**Assistant Professor, Department of Home Science, St. Teresa's College, Ernakulam

E mail: anumariyam1999@gmail.com, **leenaleon@gmail.com

Abstract

The prevalence of unhealthy eating behaviors bad food habits is prevalent among adolescents. As adolescent snack more, skip more meals and seem more interested in foreign foods, they deviating from a healthy body concept. Millets are nutritionally superior because their grains contain high amount of proteins, essential amino acids, minerals, and vitamins. The present study entitled "Formulation and organoleptic evaluation of easy and healthy

breakfast recipes for adolescents” was carried out with the objective of formulation of few healthy yet easy breakfast recipes for the challenging adolescent group with special emphasis given to their nutritional requirements. The methodology adopted for the study included 4 phases namely 1: Formulation of easy breakfast recipes for adolescents, 2: Sensory evaluation of the developed recipes, 3: Nutritional evaluation of the developed recipes, 4: Documentation of developed recipes to educate adolescents. The five recipes are Choco ragi pancake, pink chicken Momo, Falafel bread with hummus, Green jowar crepe and Kodo rainbow uthappam. The panelist members were adolescent school students selected upon their interest in participation and free from any oral ailments that may alter the result was taken as the subject. Garrett’s test has been used to analyze the overall general acceptance of the five recipes incorporated with millet by the panelists and then Garrett value is calculated from the Henry Garrett’s table. Score card was used for hedonic rating test for developed recipes from different millets. A recipe with highest Garrett score is considered to be first in preference among the five recipes- chocolate Ragi pancake stands first in the ranking preference with a highest Garrett average score (64.23) and then pink Momo (63.4) stands second and falafel bread and beet meat hummus (62.3) third respectively. Among the recipes chocolate Ragi pancake is considered to be tastier. The color and texture of chocolate Ragi pancake is more appealing than other recipes. The study emphasized the need of popularizing having a healthy breakfast culture that is acceptable and innovative to the requirements of adolescents.

Key words: Formulation, Organoleptic, Healthy breakfast, Recipes, Adolescents

Won Third Prize

Food Choices And Consumer Purchasing Behaviour During COVID 19 Pandemic



Fahma Mansoor, Jyothika S, Kesiya Gyan, Bhavana R R, Durga R, Meera P M, Parvathi Ajai, Shiji M, Dr.Bhagya.D*

Department of Home Science, St. Joseph’s College for Women, Alappuzha, Kerala-688001, India
E mail: fahmamanz@gmail.com, bhagyasjcw@gmail.com*

Abstract

The imminent threat of COVID 19 that overwhelmed cities and neighbourhoods encouraged panic shopping behaviours that resulted in stock-out and purchasing limits on many food items. The purpose of the study is to highlight consumer food shopping and consumption pattern that were catalysed by COVID 19. In addition, the effects of COVID 19 on food choices and purchasing patterns of consumers, the influence of socio-economic status on saving patterns, buying behaviour in consumers pre and post COVID 19 and the factors influencing the buying behaviour of consumers in Alappuzha were studied. The survey was carried out using google forms on 100 samples of Alappuzha dwellers using simple random sampling. The consumers food choice behaviour, consumer profile, changes of food choices during COVID, buying behaviour, influence of PDS (Public Distribution System) in food security, panic buying during COVID 19 and effect of safety measures while purchasing were collected. Nuclear families were least affected by the sudden outbreak of COVID 19 compared to joint and extended families together. After the pandemic struck 92% of people started to buy ration, in which 5% were new beneficiaries. 13% of people tend to change from traditional to online buying. 65% of total money was spent on food items. 32% of people had used their savings to cope with the situation and 41% of them reduced their expenses. Many of them had to face a decrease in income(76%), loss of job (9%) and salary reduction (15%). People opted for non-perishable goods rather than perishable ones. People also possessed a habit of hoarding food (34%) and panic buying (32%). People also were concerned about their health which made them choose organic and homemade meals (96%) , to practice kitchen gardening (81%) and shop local (42%). People had to face a lot of struggle during this period of pandemic which made them adopt different measures and techniques to cope with the situation as reflected by changes in buying pattern and food choices. They also possessed behavioural changes such as food hoarding and panic buying which certainly needs to be addressed.

Key Words: COVID 19, Buying Behaviour, Food Hoarding, Food Choices, Food Safety, Kitchen Gardening

MATHEMATICS

Invited Talk



Dr. K. S. Zeenath

Professor (Rtd.), Department of Mathematics, School of Distance Education, University of Kerala

E mail: zeenath.ajmal@gmail.com

Introduction

Data compression is the art or science of representing information in a compact form. Due to the explosive growth of data that needs to be transmitted and stored we use data compression. An early example of data compression is Morse code, developed by Samuel Morse in the mid 19th century. Letters sent by telegraph are encoded with dots and dashes. Morse noticed that certain letters occurred more often than others. In order to reduce the average time required to send a message, he assigned shorter sequences to the letters that occur more frequently, such as e (.) and a(. -) and longer sequences to letters that occurs less frequently such as q (- - . -) and j (. - - -). This idea of using shorter codes for more frequently occurring characters is used in Huffman coding.

There is another code called Braille code, which was also developed in the mid 19th century, uses the frequency of occurrence of words to provide compression. In Braille coding 2x3 arrays of dots are used to represent text. Different letters can be represented depending on whether the dots are raised or flat. In Grade I Braille, each array of six dots represents a single character. However, a given six dots with two positions, for each dot, we can obtain 2^6 or 64 different combinations. If we use 26 of these for the different letters, we have 38 combinations left. In Grade 2 Braille, some of these left over combinations are used to represent words that occur frequently, such as 'and' and 'for'. One of the combinations is used as a special symbol indicating that the symbol that flows is a word and not a character, thus allowing a large number of words to be represented by two arrays of dots.

Compression techniques: There are two algorithms. There is the compression algorithm and reconstruction algorithm.

1. Compression algorithm takes an input X and generate a representation X_c , that requires fewer bits.
2. Reconstruction algorithm which operates on the compressed data X_c and reconstruct Y .

Based on the requirement of reconstruction, the data compression schemes can be divided into two broad classes, lossless and lossy.

Definition 1.1. If the original data can be recovered exactly from the compressed data, we say that the compression is lossless.

Definition 1.2. If the original cannot be recovered or reconstructed exactly from the compressed data, the

compression is called lossy.

Example 1.1. Text compression is an example of lossless compression, but compression of speech and video is lossy.

1.2. Modeling and coding: The development of data compression algorithms for a variety of data can be divided into two phases 1. Modelling and 2. Coding

Definition 1.2.1 Modeling is the process of extracting the information about any redundancy.

Definition 1.2.2: Coding is the process of describing the data using binary alphabets.

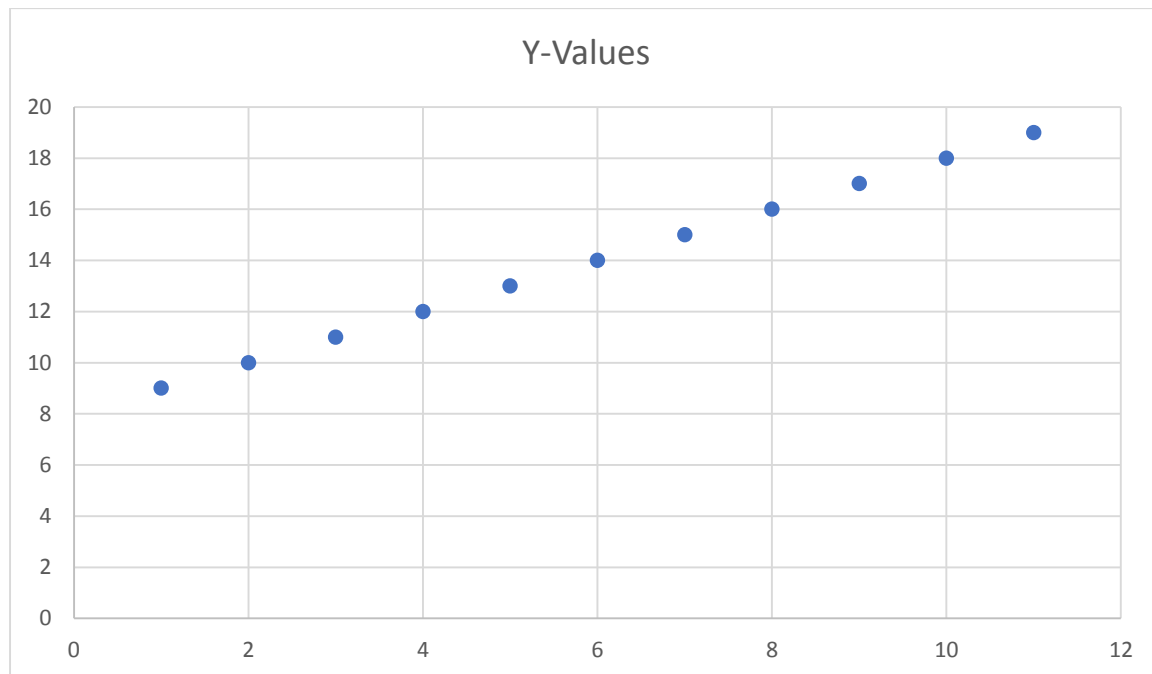
While the process of modelling and coding incurs residual.

Definition 1.2.3.: The difference between the data and the model is called residual.

Example 1.1 Consider the following example

x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}	x_{12}
9	11	11	11	14	13	15	17	16	17	20	21

Plot the data as follows; $x_n = n + 8$



Modeling 1.2.3: We see that the points are cluster around a straight line $x_n = n + 8$. Then in place of the second value we send the difference between it and previous value. The sequence transmitted values are as follows

x_n	27	28	29	28	26	27	29	28	30	32	34	36	38
$\bar{x}_n$	27	1	1	-1	-2	1	2	-1	2	2	2	2	2

Hence the number of distinct values are reduced. Only 5 distinct values we have to represent. Fewer bits are required to represent each number and compression is achieved. The decoder adds each received value to the previous decoded value to obtain the reconstruction corresponding to the received value.

Let us discuss some mathematical preliminaries for lossless compression. For that we have to define results on Statistics.

Definition 1.2.3 The quantity of measure of information is called self information and is devoted by $i(A)$.

$i(A) = \log_b \frac{1}{P(A)}$, where $P(A)$ is the residuals, $l_n = X_n - \bar{X}_n$; so we have the following table.

x_n	9	11	11	11	14	13	15	17	16	17	20	21
$\bar{x}_n$	9	10	11	12	13	14	15	16	17	18	19	20
l_n	0	1	0	-1	1	-1	0	1	-1	-1	1	1

From this table we see that the residual sequence consists of the numbers $\{-1,0,1\}$.

Coding: We see that the residual sequence consists of only three numbers $\{-1,0,1\}$. So assign the code 00 to -1, 10 to 0 and 11 to 1. Thus we see that we require only two bits to represent each element of residual sequence.

Example 2: Consider the following sequence of numbers 27, 28, 29, 28, 26, 27, 29, 28, 30, 32, 34, 36, 38. Plotting the values in scatter diagram we see that there is no simple relation as above example 1. But each value is closer to previous value. Suppose we send the first value. Probability that A will occur; The units of information depends on the base of log. If we use log base 2, the units is bits; if we use log base e, the units is nats, and if we use log base 10, the unit is harleys.

Example 3: Find the self information, for H and T be the outcome of flipping of a coin.

Solution: We know $P(H) = P(T) = 1/2$, then $i(H) = \log_2 \frac{1}{P(H)} = \log_2 2 = 1 = i(T) = 1 \text{ bits}$

Example If the coin is unfair say $P(H) = 1/8$ and $P(T) = \frac{7}{8}$; find $i(H)$ and $i(T)$

Solution: $P(H) = \frac{1}{8}$

$$i(H) = \log_2 \frac{1}{P(H)} = \log_2 8 = 3 \text{ bits}$$

$$i(T) = \log_2 \frac{8}{7} = 0.193 \text{ bits}$$

Definition: The average of self information is called entropy and is given by

$$H = \sum P(A_i) i(A_i)$$

Example: Find the entropy of the following sequence 1, 2, 3, 2, 3, 4, 5, 4, 5, 6, 7, 8, 9, 8, 9, 10

Solution: $P(1) = P(6) = P(7) = P(10) = \frac{1}{16}$

$$P(2) = P(3) = P(4) = P(5) = P(8) = P(9) = \frac{2}{16}$$

Hence $iP(1) = 4; i(P(2)) = 3,$

Concludes that entropy $H = 4 \times \frac{1}{16} \times 4 + 6 \times \frac{2}{16} \times 3 = 3.25 \text{ bits}.$

1.3 Generating of a binary code

Definition 1.3.1 The set of binary sequence is called a code.

Definition 1.3.2 Individual numbers of the set are called letters.

Definition 1.3.3 A set of symbols A is called alphabet for the source and the symbols are referred to as letters.

Definition 1.3.4. Tag: $\tilde{T}(x) = \sum_{k=1}^{i-1} P(x = k) + \frac{1}{2}P(x = i) = F_x(i - 1) + \frac{1}{2}P(x = i)$

where $F_x(i) = \sum_{k=1}^i P(x = k).$

Definition Length of the binary code is truncated by $l(x) = \log \left[\frac{1}{P(x)} \right] + 1 \text{ bits}.$

Example 4 Consider a source A that generates letters from an alphabet of size four $A = \{a_1, a_2, a_3, a_4\}$ with probabilities $P(a_1) = \frac{1}{2}, P(a_2) = \frac{1}{4}, P(a_3) = \frac{1}{8}, P(a_4) = \frac{1}{8}$

Solution: For the symbol a_1 , $F_{x_n}(a_1) = \frac{1}{2} \tilde{T}_x(a_1) = 0 + \frac{1}{2}(0.5) = 0.25$

In binary form, $0.25 \times 2 = 0.5 \rightarrow 0$

$$0.5 \times 2 = 1.0 \rightarrow 1$$

Hence binary form of $a_1 = 0.01$

Length of the code is $\log\left(\frac{1}{P(A)}\right) + 1 = \log_2 2 + 1 = 2$

For the symbol a_2 , $F_x(a_2) = 0.5 + 0.25 = 0.75$.

$$\tilde{T}_x(a_2) = \frac{1}{2} + \frac{1}{2} \times \frac{1}{4} = 0.5 + 0.125 = 0.625$$

In binary form,

$$0.625 \times 2 = 1.25 \rightarrow 1$$

$$1.25 \times 2 = 2.50 \rightarrow 0$$

$$2.5 \times 2 = 5 \rightarrow 1$$

Binary form of $a_2 = 0.101$.

Length of $a_2 = \lceil \log \frac{1}{P(A)} \rceil + 1 = 3$

For the symbol a_3 , $F_x(a_3) = 0.75 + 0.125 = 0.875$

$$\tilde{T}_x(a_3) = 0.75 + \frac{1}{2}(0.125) = 0.8125$$

In binary form of $a_3 = 0.1101$

Length of $a_3 = 4$

Similarly $F_x(a_4) = 1$, $\tilde{T}_x(a_4) = 0.9375$

Binary form of a_4 is 0.1111

Length of $a_4 = 4$

We can tabularize the result as follows

Symbol	F_x	$\tilde{T}_x$	Binary Form	Length	Code
a_1	0.5	0.25	0.01	2	01
a_2	0.75	0.625	0.101	3	101
a_3	0.875	0.8125	0.1101	4	1101
a_4	1	0.9375	0.1111	4	1111

Conclusion: Thus we can convert any data which is repeated frequently to code using arithmetic tag, which can be obtained directly from the probability model.

Reference: Khalid Sayood: Introduction to Data Compression, Morgan Kaufmann Publications-2006

Won Excelsior Award

Domination In Graphs



Neethu Mariam Sebastian & Bibin K Jose*

PG Department of Mathematics, SD College Alappuzha

Assistant Professor, PG Department of Mathematics, SD College, Alappuzha

E mail:neethumariam99@gmail.com, bibinkjose2002@gmail.com

Abstract

The purpose of this project is to provide a comprehensive treatment of domination in graphs. The project is constructed as follows : The project begin with the preliminary section followed by the basic definitions for the detailed understanding of the topic. We take a look into the origin of domination and introduce the concept of dominating sets, domination number and its bounds in the second chapter. In the subsequent chapter we turn our attention to domination chain, discussing the relationship which exists among dominating sets, independent sets and irredundant sets in graphs. The detailed discussion on changing and unchanging domination is done in the fourth chapter. The project is concluded by discussing the conditions on the dominating sets. Total dominating sets, connected dominating sets, dominating cliques and dominating cycle is discussed here. Domination is a rapidly developing area of research in graph theory, and its various applications in system analysis, operation research, computer applications, economics and social networks partly explain the increased interest. As a first course reference guide on domination in graphs, this project will be a valuable tool to researchers and advanced students and can be used to familiarize themselves with the subject and research techniques in the field.

Keywords: Domination, Dominating Sets, Domination Number, Irredundant Set, Dominating Cliques

Won Second Prize

A Study On Hypergraph Theory



Athulya M Anil

Department of Mathematics St. George college Aruvithura, Kerala Pin : 686122

E mail : athulyaanil50@gmail.com

Abstract

This research work is focused on the study of hypergraph theory. This is the branch of mathematics has developed very rapidly during the latter part of 20th century, influenced by the advanced computer science. It was only in the 1860s hypergraph become an independent theory. hence, hypergraph theory is an recent theory. It was mostly developed in Hungary and France under the leadership of mathematicians like Paul Eros, Laszlo Lovasz, Paul

turan, It is generalization of graph theory. The basic idea consists in considering sets as generalized edges and then in calling the hypergraph the family of these edges. Hypergraph model more general types of relation than graphs do. The theory of hypergraphs has proved to be a major interest in applications to real world problem. These mathematical tools can be used to model network, data structure, biology network. This projects includes the introduction to basic definitions in the graphs, introduction to basic definitions of hypergraph, some properties of hypergraph, classical notations of coloring, some applications of hypergraphs.

Key words: basic definitions hypergraph, properties of hypergraph classical notations of coloring, applications of hypergraphs

Won Excelsior Award

Fractal Dimension



Aleena Joseph

Department of Mathematics, St Stephen's College Uzhavoor

E mail: aleenajoseph3001@gmail.com

Abstract

A fractal **dimension** is an index for characterizing fractal patterns or sets by quantifying their complexity as a ratio of the change in detail to the change in scale. Several types of fractal dimension can be measured theoretically and empirically. Fractal dimensions are used to characterize a broad spectrum of objects ranging from the abstract to practical phenomena, including turbulence, river networks, urban growth, human physiology, medicine, and market trends. The essential idea of *fractional* or *fractal* dimensions has a long history in mathematics that can be traced back to the 1600s, but the terms *fractal* and *fractal dimension* were coined by mathematician Benoit Mandelbrot in 1975.

Keywords: Fractal, Fractal Dimension, Spectrum

Certificate of Appreciation

The Punctured Plane is Isomorphic to the Unit Circle



M S Alshyma., Shabina Shafi., Fathima R A, Aroma G, Sahal Fidhu Sajeed., Ms. Niza N*

Department of Mathematics, TKM College of Arts and Science, Kollam-5

E mail: alshymams2000@gmail.com, *nizamehar@gmail.com

Abstract

In the dissertation titled 'The Punctured Plane is isomorphic to the Unit Circle', we dealt with the study of isomorphism between various groups and their proper subgroups and finally leading to an astonishing fact that the punctured plane is isomorphic to the unit circle. Our study took its strong base with the study of various properties of groups and taking ideas from linear algebra which leads to the successful completion of our dissertation. Similar but quite different way has followed to establish isomorphism between various groups and their proper subgroups. The paper also discussed about the $\mathbb{Q}$ -linearly isomorphic relation between two vector spaces over a field. Finally the dissertation came to its successful ending by showing $\mathbb{C}^*$, the multiplicative group of complex numbers (The Punctured plane) is isomorphic to its proper subgroup T , multiplicative group of complex numbers of modulus 1 (The Unit Circle).

Key words: Groups, Isomorphism, Vector Space, Punctured Plane

Won Excelsior Award

Total Graphs and Regular Graphs



Athul T. B.* & G. Suresh Singh

Assistant Professor, Department of Mathematics, Sree Narayana College, Punalur, Kollam, Kerala, India.

Professor, Department of Mathematics, University of Kerala, Trivandrum, Kerala

*E mail: athultbacl@gmail.com

Abstract

Let G be a graph with vertex set $V(G)$ and edge set $E(G)$, the total graph $T(G)$ of G has vertex set $V(G) \cup E(G)$ and two vertices in $T(G)$ are adjacent if and only if they are adjacent or incident in G . In this paper we characterize the total graph of regular graphs and complete graphs. We prove that there doesn't exist a complete graph K_n , whose total graph is also complete for $n > 2$. Also we prove that there doesn't exist a graph whose total graph is a complete bipartite graph.

Key words: Complete Bipartite Graph, Complete Graph, Regular Graph, Total Graph

Ideal International E- Publication
www.isca.co.in

Won Second Prize

Secure Co-independent Domination in Graphs



Timmy Tomy Thalavayalil*

Department of Mathematics, St. George's College Aruvithura, Kerala, India.

*E mail: timmytomy@gmail.com

Abstract

In this article we introduce a new parameter related to secure domination called secure co-independent domination. Let G be a connected simple graph. A dominating set S of a graph G is called a secure dominating set if for each v in $V-S$ there exists a vertex u in S such that $S - u \cup \{v\}$ is a dominating set. The minimum cardinality among all secure dominating sets of G is called secure domination number. A secure dominating set S of a graph G is called a secure co-independent dominating set if $\langle V-S \rangle$ has no edges. The minimum cardinality of a secure co-independent dominating set is called secure co-independent domination number. In this article, we study the bounds of secure co-independent domination number in different graph classes and bounds are presented.

Key words: Domination, Secure Domination, Independent Domination

Normal Categories of Unit Regular Semigroups

Namitha Sara Mathew

Assistant Professor, Department of Mathematics, St. Joseph's College for Women, Alappuzha

E mail: namithamodoor@gmail.com

Abstract: In this paper we introduce categories associated with unit regular semigroups and R -strongly unit regular semigroups. A semigroup S is said to be unit regular if for every element x in S there exist a unit u in S such that $x = xux$. We characterize the normal category associated with a unit regular semigroup as a weak UR-category and that associated with an R -strongly unit regular semigroup as a UR-category.

Key words: Unit Regular Semigroups, R -strongly Unit Regular Semigroup, UR-Category, Normal Cones

PHYSICS

Plenary Talk



Dr. Smijesh N.

Assistant Professor
School of Pure and Applied Physics
Mahatma Gandhi University, Kottayam
Adjunct fellow, Centre for Quantum Dynamics
Griffith University, Australia

High Harmonic Generation

Experimental strong-field physics is a fast-growing area of nonlinear optics owing to the development and application of isolated attosecond pulses (IAP)/ attosecond pulse trains (APT) generated through high harmonic generation (HHG). HHG is a highly nonlinear optical phenomenon where an intense ultra-short laser pulse ionizes an atom/molecule through the process of tunnel ionization. The electron tunnels through a modified electric potential barrier under the electric field of the laser pulse. The electron follows the electric field variation and produces a photon upon re-collision with the parent ion leading to the generation of a HHG spectrum. A spectrum consisting of frequency combs is obtained, along with a continuum, due to the interference of many such processes happening in a short space and in a short span, depending on the nature of the HHG driving pulse. For driving lasers with several optical cycles, a train of ultra-short pulses with pulse duration less than that of the femtosecond (fs) driving pulse are formed during the HHG process: namely the APT. Essentially this can be considered as a pump-probe technique where the free electron wave function probes the bound part after some time delay. Using this technique, the science of bond breaking which usually occurs in fs timescales, can be investigated with a temporal resolution of the order of attoseconds.

Coherent Extreme UltraViolet (EUV) sources based on HHG have become popular during the last two decades since EUV wavelength regime is beyond the operational range of conventional lasers. The EUV radiations generated by such phenomena are found to exhibit exceptional laser-like properties which are promising for the investigation of a variety of ultra-fast

processes at the atomic level. Besides the research on improving the source efficiency, the EUVs generated via HHG is nowadays employed as a tool to investigate various processes in the atomic, molecular and optical physics, lensless imaging, high precision frequency metrology, probing ultra-fast processes, attosecond pulse train generation, relativistic attosecond physics etc. to name a few. It is expected that attosecond science could revisit many physical systems with a better spatio-temporal resolution for a better understanding in the near future.

Timing & Spectral Analysis of Thermonuclear X-ray Burst of LMXB 4U1636-536

Sarath Mohan, Susmitha Bose*

Department of Physics, St. Thomas College, Ranni, Kerala-689673, India.

*E mail: sarathmohanvb@gmail.com , susmithabose9@gmail.com

Abstract

One of the main properties of low mass X-ray binary is Thermonuclear X-ray bursts. We investigated the timing and spectral properties of the atoll source 4U 1636-536 using Astrosat/LAXPC data. The source was observed in the year 2017 and the analysis shows 12 type-I bursts. Among the 12 burst-like events, two bursts were with least count rates of ~ 480 c/s and ~ 900 c/s respectively; whereas other bursts showed a maximum of intensity of ~ 12750 c/s. The burst duration varied from ~ 5 seconds to ~ 23 seconds. The energy dependence of these bursts was found upto 25 keV except in the case of two smaller bursts. The low mass X-ray binary source 4U 1636-536 showed rapid bursts. We also carried out the spectral analysis in which the time averaged and time resolved analysis were done by using a double component model. The analysis suggests the variation of spectral parameters as burst evolves. The evolution of flux, blackbody norm and spectral data counts were studied.

Key words: Astrophysics, Thermonuclear Burst, Timing & Spectral Analysis, Burst

Study of Global Temperature and Atmospheric Carbon dioxide under Different Solar Active Periods

¹Sandra Vasudevan ²Dr.RemyaRemanan

¹Department of Physics, St. Joseph's College for Women, Alappuzha, Kerala-688001, India ²Department of Physics, Sree Narayana College, Cherthala, Kerala-688582, India

E mail: ¹sandravasudevan7@gmail.com ²drremyaremanan@gmail.com

Abstract

This work reveals the role of anthropogenic actions on current warming scenario. The effect of carbon dioxide as a green house gas has been found undoubtedly from the warming trend. It is found that the warming trend was irrespective of the variation of the activity of the sun. Thus it can be inferred that apart from the natural greenhouse effect, anthropogenic contributions have a major role in the overwhelmed heating. Temperature anomaly over 1880-2020 was analysed. It proves the phenomenon of global warming with an average increase of 0.45 degree Celsius per decade. The global temperature anomaly during 2020 was found to be 1.2 degree Celsius when the concentration of carbon dioxide was 414 ppm in the atmosphere. From the analysis of Carbon dioxide over 1960-2020, it can be summarized that the increase in warming is mainly due to the increase in Carbon dioxide that serves as a greenhouse gas. The analysis of solar flux over different solar cycles since 1940 shows that the solar activity has no relationship with the increased global warming. The correlation studies also strengthen these arguments. It is evident from these facts that human activities are the major driving force behind the warming expedition.

Key words: Global Warming, Global Temperature, Solar Activity, Anthropogenic Action

Won Second Prize**Synthesis and Photoluminescence Studies of Host Sensitized Dy³⁺ Doped ZnWO₄ Nanophosphor**

Kukku Thomas, Athira Saji, Linju Ann Jacob*

Department of Physics, Baselius College Kottayam, Kerala-686001, India

*E mail: linjusaju@gmail.com

Abstract

Synthesis and photoluminescence studies of host sensitized Dy³⁺ doped ZnWO₄ nanophosphor is reported here. Rare earth doped inorganic materials have a significant amount of attention due to their potential applications in the field of display devices. A phosphor is a substance which exhibits luminescent properties; consisting of a host material and a dopant like rare earth ions or transition metal ions. The Dy³⁺ doped ZnWO₄ nanophosphor was synthesized by chemical co-precipitation method. The structure and optical properties of the prepared nanophosphor were studied by using the X-Ray diffraction analysis (XRD) and photoluminescence excitation and emission spectroscopy respectively. From the XRD pattern the crystallite size of the pure zinc tungstate were determined using Debye-Scherrer equation and the phase of zinc tungstate were identified. Photoluminescence characterization of both pure zinc tungstate and dysprosium doped zinc tungstate were taken. The emission spectrum of pure zinc tungstate involves a broad band consisting of blue, green and yellow regions, whereas the emission spectra of Dy³⁺ doped zinc tungstate consists of sharp lines which corresponds to blue, yellow and red emissions in which yellow is the most intense one on host excitation. This confirms the existence of an efficient energy transfer from the host to dysprosium ions. Some of the energy levels of the host match with the dysprosium and thus trigger characteristic sharp emission of Dy³⁺ ions. From CIE Chromaticity analysis, CIE co-ordinates were calculated which corresponds to white emission. The results indicate that the prepared phosphor is a potential candidate for UV excitable phosphor converted WLED applications.

Key words: Photoluminescence, Phosphor, Energy Transfer Mechanism

The Study on the Application of Physics in the Practice of Medical Physics

Merline Asha.P, Roselin Jeyaseeli. J

Department of Physics, Holy Cross College, Tiruchirappalli, Tamil Nadu – 620002

E mail: jrjeyaseeli@gmail.com

Abstract

The study was performed in sound and pressure by Ultrasonography, Echocardiography and Sphygmomanometer to find the normality and abnormality functions in the human body. First the study was made in ultrasonogram. Ultrasonogram is used for imaging the internal body structures. The data analysis was made for three people X, Y and Z for uterus and ovaries and results are shown as Normal and Nulliparous (Never can give birth). Normal size of the uterus is 86.6mm×49.6mm×40.6mm for Nulliparous is 72.8mm×42.8mm×32.4mm. Secondly the measurements performed on right and left kidney for two men V and W by ultrasonogram and the results are shown as Normal. The normal size of the right and left kidney is 110mm length, 50mm breadth and 25mm thickness. Under the sound the third study was performed on Echocardiogram. Echocardiogram uses sound waves to produce images in the heart. The data recorded for five people A,B,C,D,E and Ejection Fraction (EF) is calculated. The Ejection Fraction determines the abnormality of ventricles. The data results shown for EF are A is 77.92%, B is 75.08%, C is 65.69%, D is 74.55% and E is 22.80%. The normal Ejection Fraction (EF) for common people is 60% and above is (normal), Ejection Fraction (EF) 50% is (mild), Ejection Fraction (EF) below 50% is (severe). Next the study was performed in pressure by using sphygmomanometer which determines the blood pressure. The data was analyzed for ten people A,B,C,D,E,F,G,H,I,J, and K. The results are shown as normal, low and high blood pressure. To conclude that sound and pressure plays a paramount role in the medical field. Which leads to many discoveries and developments such as ultrasonogram, echocardiogram and sphygmomanometer by using elementary tools of physics. The physics methods and techniques in practice and research for the prevention, diagnosis and treatment of human diseases with a specific goal of improving human health and well-being.

Key words : Ultrasonogram, Echocardiogram, Sphygmomanometer

Synthesis and Characterization of Magnesium Ferrite/Polyvinylidene Fluoride Systems

Sumi K S & Sr. Morris Marieli Antoinette*

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

*E mail: marieli.fdcc@gmail.com

Abstract

Magnesium ferrite/polyvinylidene fluoride (MgFe_2O_4 -PVDF-HFP) cast films that work at room temperature were synthesized. For the fabrication of these films, Magnesium ferrite (MgFe_2O_4) nanoparticles are prepared using the sol-gel method and this magnetic filler is incorporated in the PVDF-HFP ferroelectric matrix in different concentrations. X-ray diffraction (XRD) analysis is done to study the structural properties of the prepared samples. The MgFe_2O_4 nanoparticles were found to be highly crystalline. The surface morphology of the samples is studied from the images obtained from the TEM analysis and confirmed that nano sized particles were synthesized. Dielectric Studies was done to study the dielectric parameters of the prepared composite systems. The prepared system possesses an excellent dielectric constant at room temperature.

Key words: Sol-gel, Magnesium ferrite, Dielectrics

Thermal degradation of vegetable oils studied using UV-Visible Spectroscopy

Haritha K C¹ & Gopakumar Ramakrishnan*

¹ Department of Physics, Sree Narayana College, Cherthala, Kerala

* E-mail: ramgopan@gmail.com

Abstract

Vegetable oils are the cooking medium in the preparation of a variety of tasty food materials. In order to reduce the cost, oils are often reused multiple times in food industries as well as in the household. Repeated heating can cause both physical and chemical changes in oils. Such damaged oils are known to be very harmful to health. Cardiovascular disease is one of the major diseases caused by the consumption of such oils. Here we report on the thermal degradation of four vegetable oils that are commonly used for cooking in Kerala; coconut oil, sesame oil, palm oil, and sunflower oil, studied using UV-Visible spectroscopy. The changes in the oil are often readily visible with the explicit color changes. This is further analysed by recording the absorption spectrum of the oils, after subjecting them to cooking-like heating cycles. In our experiments, coconut oil and sesame oil showed very significant changes on heating whereas palm oil and sunflower oil seemed to remain stable. Our results suggest that sesame oil and coconut oil are easily damaged by heating and may are not suitable for repeated heating or prolonged deep frying.

Key Words: Vegetable oil, U V Visible Spectroscopy, Heating, Colour Changes

Won Third Prize

Synthesis and Photoluminescence Studies of Dy³⁺ Doped CaWO₄ Nanophosphor



Vineeth K.K., K.J. Aravind, Jikku Varghese, Linju Ann Jacob*

Department of Physics, Kuriakose Gregorios College, Pampady, Kottayam, Kerala 686502 - India.

*Department of Physics, Baselius College, Kottayam, Kerala 686001 - India.

E-mail: linjusaju@gmail.com

Abstract

Pure and Dysprosium doped calcium tungstate nanoparticles were synthesized by simple co-precipitation method. Crystal structure of Dy³⁺ doped CaWO₄ nanoparticles was identified through X-ray diffraction studies which confirms the tetragonal phase of CaWO₄ crystal. Photoluminescence properties of the samples were investigated by excitation and emission studies. An intense and broad band with the maximum at 259 nm in the excitation spectrum of pure CaWO₄ by monitoring the emission of WO₄²⁻ at 425 nm is attributed to the charge-transfer absorption from the oxygen ligands to the central tungsten atoms inside the WO₄²⁻ groups. The emission spectrum

of the pure CaWO_4 phosphors shows a broad-band in the bluish green region with a maximum at 425 nm on 259 nm excitation. The intense and broad band in the excitation spectrum of Dy^{3+} doped CaWO_4 nanoparticles monitored at 574 nm is attributed to the charge-transfer band of the oxygen ligand and central tungstate atom. The emission spectra of Dy^{3+} doped CaWO_4 phosphor excited at 256 nm consists of an intense broad emission band centered at 444 nm (blue) which is assigned to the charge-transfer transition of WO_4^{2-} group while the other three narrow peaks are located at 486 nm (blue), 574 nm (yellow) and 660 nm (red). This confirms the existence of an efficient energy transfer from the host to dysprosium ions. Under direct excitation of Dy^{3+} ion ion at 352 nm, 366 nm and 386 nm, the emission spectrum of Dy^{3+} doped CaWO_4 phosphor exhibits sharp characteristic peaks of Dy^{3+} ion at 486 nm, 574 nm and 660 nm. The CIE chromaticity coordinates obtained for Dy^{3+} doped CaWO_4 nanophosphor falls in the cool white region. The cool white region contains more blue light, and looks brighter to the eye. Hence it can be used in areas where you may require more brightness.

Key words: Tungstate, Co-Precipitation Method, Charge-Transfer Band, Color Purity, Cool White Light

RF MAGNETRON SPUTTERED SnO_2 THIN FILM FOR GAS SENSING APPLICATION

Sadika Farsana S., Priya M.J, Dr. Pillai Aswathy Mohan*, Dr. M.K Jayaraj

Centre for Excellence in Advanced Materials, Cochin University of Science and Technology, Cochin, India

*E mail: pillaiaswathymohan@gmail.com

Abstract

This research work is focused on the successful development of Au electrode coated SnO_2 thin films for gas sensing application were carried out. Our method combines the RF magnetron sputtering technique with thermal evaporation for the sensor development i.e. thin film formation and electrode coating. Nano thin film of SnO_2 is coated above the glass substrate by varying the flow Oxygen/Argon ratio inside the sputtering chamber. Thus here successfully developed SnO_2 Nano thin film sample with O_2 : Ar = 0:10 and another sample of O_2 : Ar = 4:10. Then the developed samples are subjected to gold (Au) electrode deposition by thermal evaporation, in order to study the performance of both the samples for gas sensing application. The morphological characterization using FESEM reveals the homogeneous nature of thin film and its thickness. The thicknesses of prepared films were studied using ellipsometry. XRD reveals the structural features of both the samples. From the UV-Vis spectroscopy analysis, we have plotted the DRS spectra of SnO_2 nanostructures and band gaps are calculated from the corresponding Tauc plots. The most relevant gas sensing application was studied using four different types of 100 ppm test gases at a temperature of 200°C. The response of both the sensor samples for each test gases is noted. The inference for this study conformed to have that developed samples shows a highest gas response to H_2S than to others. Additionally, the measured gas sensors exhibit excellent selectivity, good consistency and high stability. The results evidently prove a new concept and effective applicable strategy for enhancing the gas response of less sensitive oxide semiconductor assisted by catalyst metal- loaded nanostructures. The synthesis strategy presents great potential for fabricating micro H_2S gas sensors in wafer-scale for practical applications.

Key words: RF Magnetron Sputtering, Thermal evaporation, Characterization, Gas sensing application

Won Excelsior Award**Oil And Its Sunscreen Action Studied By UV-VIS Spectroscopy**

Rahul P A., & Gopakumar Ramakrishnan*

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

E mail:rahulkumarijk@gmail.com,ramgopan@gmail.com

Abstract

Effects of solar radiation on earth surface are well known and a lot of studies are undergoing to reduce its dangerous effects on human beings. Due to the distortion in ozone layer and non uniformity of the ozone layer over the globe, the people living in tropic area receive more UV radiations, than the high latitude places. The continuous exposure of UV rays will lead to skin cancer and other skin problems. The sunscreens are widely used in order to prevent these radiations. But the chemicals present in them are sometimes allergic to some people. Or they even cause skin cancer. In some parts of southern India people were using oils such as coconut oil, sesame oil before taking bath. They claim that it will help to protect skin from sunstroke and other sun diseases. On heating these oils, and observing the UV spectrum coconut oil it shows that it blocks 40-60% of the UV radiation which fall on them. And sesame oil can block almost 40-80% of UV radiation which fall on it. So they can be used as sun protectors. The cheap rate and the availability of these oils in our market make them more user friendly when comparing to sunscreen oilmen's and lotions.

Key Words: Oil, Sunscreen , UV Visible Spectroscopy, Protectors

Won Second Prize

Comparison Of Two Flavour And Three Flavour Neutrino Oscillations At Various Energies-The Probability Calculations Of Neutrino Oscillation For Both Two Flavour And Three Flavour Cases And Comparing It At Various Energies



Anju S & Rose Leena Thomas

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

Assistant Professor & HOD of Physics, St. Joseph's College for Women, Alappuzha.

E mail: anjusatheesan1998@gmail.com

Abstract

Neutrinos are the elusive particles that may hold the key to many of our universe's mysteries. Despite the numerous studies and more than 60 years since its discovery, the neutrino remains a mysterious and puzzling member of the standard model. This research aims at exploring one of the unique and mysterious property of the neutrino "The Neutrino Oscillation". This research work is focused on investigating the Probability calculations of Neutrino Oscillation for both two flavour and three flavour cases. Measurements of neutrinos originating from the sun or created by cosmic rays in earth's atmosphere have revealed that neutrinos change their flavour over time. The study of this event yields valuable information about neutrino masses and mixing as well as details about the flavour problem. On comparing the probability calculation results at various energies proves that flavour oscillation exist in both two flavour and three flavour cases when initial and final states are the same or different. Thus it is verified that the neutrino oscillations are true. At high energy regions it is observed that the possibility of neutrino oscillation to the same flavor state decreases with energy. But the probability of changing one flavor state to a different, remains active even though the frequency of oscillation is very low.

Key words:: Neutrino, Neutrino Oscillation, Probability, Flavour states, Energy

Blue Luminescent Graphene Quantum Dots from Direct Carbonization of Citric Acid for Fe³⁺ detection

Achumol Vikraman¹, Subin Thomas², Dhanya Jacob³, K. N. Madhusoodanan², Savitha Nalini^{1*}

¹ Department of Physics, Sree Narayana College, Cherthala, Kerala

²Department of Instrumentation, Cochin University of Science and Technology, Kerala ³ Department of Physics, Cochin University of Science and Technology, Kerala

* E-mail : nsavitha01@gmail.com

Abstract

Graphene quantum dots (GQDs) have drawn great interest due to their low toxicity and ease of synthesis. In the present work, GQDs are synthesized using the carbonization of citric acid and by dispersing carbonized products in water. The formation of GQDs was confirmed by Raman spectroscopy and X-ray diffraction (XRD). The Raman spectrum of GQDs has characteristic peaks at $\sim 1392\text{ cm}^{-1}$ (D peak) and 1597 cm^{-1} (G peak). The relative intensity of the D to G peak is 0.87, which is similar to that of other high-quality GQDs, and it indicates the dominance of armchair edges over zigzag edges. The absence of the D' band which appears at slightly higher frequencies than the G peak also supports the quality of the particles. The XRD profile is consistent with previous reports. GQDs show strong blue luminescence with excitation dependence and a good response to ferric ions. Figure: (a) GQD under day light (left) and UV light (right), (b) Raman spectrum of GQD, (c) Excitation dependent PL emission from GQD, (d) PL detection of ferric ion

Key Words: GQD, Citric Acid, Photoluminescence, Fe Sensing

Won Third prize

Gas Leakage Detection System using Arduino



Anila S & Sr. Morris Marieli Antoinette*

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

*E mail: marieli.fdcc@gmail.com, anilasudhababu@gmail.com

Abstract

In today's world, due to the busy schedule people rarely take care of utilizing the resources effectively. We know that gas is a useful component in the environment. Some gases do not cause any harm even if they are emitted in excess amounts but some do. Gas like LPG is used not only for cooking food in houses, but also in hotels, restaurants, and hospitals where there is human interaction. Also, we can see CNG operated vehicles. If there is any amount of leakage of these types of gases, it can cause huge destruction to life and property. Nowadays, home security has become a major issue because of the increasing leakage of gas. One of the preventive methods to stop accidents associated with the gas leakage is to install a gas leakage detection kit at vulnerable places. So to be safe from such situations, I have designed this project based on the ATmega328P microcontroller. The system makes use of an MQ-6 gas sensor. This sensor is used to detect any harmful smoke that is released in the atmosphere. I have programmed it in such a way that as soon as the smoke is detected, an alarm will be automatically switched on. This can alert the people when any gas that can cause great harm to living organisms is released so that they can take necessary precautions and steps to either prevent the smoke from spreading or evacuate the place quickly. The aim of this work is to propose and discuss a design of a gas leakage

detection system that can automatically detect and turn on an alarm during gas leakage. This system can be implemented in public areas such as hospitals, parks and schools as well as in every home to ensure the safety of all living and non-living things.

Key words: Gas Leakage Detection, ATmega328P, MQ-6 gas sensor, Alarm

Won Excelsior Award

Formulation of Einstein's Field Equations using the Mathematics of General Relativity, Einstein-Hilbert Action and Lagrangian Formulation



Christopher Thomas, Lally K. Cyriac*

Department of Physics, St. Stephen's College, Uzhavoor, Mahatma Gandhi University, India

*E mail: lallyjoy@gmail.com.

Abstract

Gravity is a natural phenomenon by which all things with mass or energy - including planets, stars, galaxies, and even light are attracted to one another. On Earth, gravity gives weight to physical objects, and the Moon's gravity causes the ocean tides. Gravitation is considered to come under the umbrella of 'Fundamental Interactions', in accordance with Quantum Gravity. Despite its importance, our knowledge of the Gravitation is poor, and most of the research and studied data is not comprehensible due to its complex and rigorous Mathematics involved in it. In this dissertation, three independent approaches are used for the Formulation of 'Einstein's Field Equation'. The traditional formulation as done by Einstein, followed by 'The Principle of Least Action' - 'The Einstein-Hilbert Action' and finally the Invariant Approach, 'The Lagrangian Formulation'. All three formulations require an amount of knowledge in Tensors and Spacetime Curvature, which is essential when dealing with the Field Equations. This work deals with the basic knowledge of Tensors and provide sufficient base in Curvature, Manifolds and the equations of motion - 'Geodesic Equation'. Thereafter, utilizing those formulate the Field Equation for 'Slow Moving Objects' and General Field Equations. The Lagrangian Formulation is done using the most basic substitution of Ricci Scalar as the Lagrangian value.

Key words: General Relativity, Lagrangian Formulation, Covariant Derivative, Parallel Transport, Riemann Curvature, Tensor, Geodesics

Won Second Prize**Arduino Based Smart Irrigation System For Sensing Soil Moisture Content****ELSA JOSEPH****FAHMA MUNEEH AHMED****SHABITHA B**

Fahma Muneer Ahmed, Elsa Joseph, Shabitha B, Bincy John*

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

*E-mail: bincyjohnfdcc@gmail.com, fahmanmuneer@gmail.com

Abstract

"You'll need a doctor, an engineer, a lawyer and a cop at least once in your life. But you need a farmer three times a day." Despite farmers being regarded as the backbone of our country, they are the ones who suffer the most to keep up their occupation. They are continuously confronted with several challenges, and the lack of innovation in this field only adds to their difficulties. Irrigation scheduling is one of the most common challenges with farm irrigation systems. It's all about answering the questions "When should I water?" and "How long should I water?" "As seen by recent developments, robotics and artificial intelligence have made life easier for practically everyone. As a result, we've chosen to use some of these sensor technologies to assist farmers with irrigation scheduling. We developed an Arduino based Smart Irrigation System that uses soil sensors to assess soil moisture content and pump water according to each plant's water requirements. Here we make use of Arduino UNO, a soil sensor, a water pump and a dc motor among other basic equipment's. As water is a conductor of electricity, the soil sensor actually measures the conductivity of soil which depends on the availability of water. So, using our Arduino UNO, we can program our system to automatically pump water when the conductivity falls below a specific threshold. The pump will automatically cease pumping when the water level reaches the required level. In this way we can minimize wastage of water to a great extent as not even a single drop of water would go in vain. We can also save time for the farmer as he no longer needs to walk acres of land watering his crops. We believe this technology will bring a considerable development in farming across India.

Key words: Arduino UNO, Soil Sensors, Water Pump, DC Motor

Won Third Prize

Radio Astronomy: Imaging the Sun at KU band using DTH Antenna



JUSTIN REJI



AKHIL K M



ABIN STEEV MATHEW

Abhishek Johri, Thomas Mathew, Justin Reji, Akhil K M, Abin Steev Mathew

Department of Physics, St. Stephen's College, Uzhavoor, Kottayam, Kerala-686634, India

E mail: akhilkm75@gmail.com, jstnreji@gmail.com, abinsteev@gmail.com

Abstract

The study of astronomical phenomenon and celestial bodies are important in understanding space beyond our comprehension. Since we are visual species, seeing or imaging is important to us. Radio Astronomy allows us to do both. Radio astronomers use different methods and instruments to visualize the space with the help of radio portion of Electromagnetic Spectrum that originates from energetic objects and other phenomenon. We intend to give everyone an opportunity to explore the unknown universe. Our project involves the imaging the Sun with an amateur Radio Telescope which consists of KU band LNB, a Dish Antenna and a mechanical mount, the telescope is able to receive Radio signals from the source and with the help of a Software Defined Radio hardware (SDR), the received signal then analyzed with software tools and recorded as CSV file containing Peak power points over a spectral power on span of different frequencies. By assigning different color for peak power points in span of spectral power with help of different plotting software and Programming methods like GNU plot, Python, we were able to produce the image of Sun with minimal equipment at frequency of 2.016 GHz. We hope our project to be the foundation of future innovative Radio Astronomy projects that are affordable for the young aspirants.

Key words: KU band, SDR, Peak Power Points, Imaging

Efficient Ambipolar Organic Field Effect Transistors By Utilizing Exciplex Emission

Kavya Rajeev, Dr. K. N. Narayanan Unni*

CSIR-NIIST, Industrial Estate, Pappanamcode, Kerala-695019, India.

*E-mail kavyarajeev4@gmail.com

Abstract

In the proposed work, we investigate the possibilities of the exciplex emission being utilized for the fabrication of ambipolar OLFETs (Organic Light emitting Field Effect Transistors). Spectroscopic studies of different combinations of electron and hole transporting materials will give idea about efficient exciplex combinations. Employing exciplex emission in ambipolar OLFETs will simplify the device architecture by eliminating additional transporting layers. AMOLED technology is an important element in the global display market. Employing OLFETs in the AMOLED technology may help to reduce the number of switching OFETs, increase aperture of pixels, brightness and lifetime. The simplified device architecture will also shed light on low-cost displays in future.

Key Words: Organic Light Emitting Field Effect Transistor, Ambipolar, Exciplex Emission

ZOOLOGY

Plenary Talk

Conceptual And Technological Advancements In Modern Scientific Research



Dr. E.V. Radhakrishnan

Former Principal Scientist & Head, Crustacean Fisheries Division, CMFRI, Kochi

Science education often adopts a narrow view of science that assumes the lay public is ignorant, which seemingly justifies a science education limited to a promotional narrative of progress in the form of scientific knowledge void of meaningful social context. He proposes that to prepare students as future concerned citizens of a technoscientific society, science education should be informed by science, technology, and society (STS) perspectives. A strong emphasis on mathematics over philosophy, symbols and attitudes is another hallmark characteristic of modern science that goes hand-in-hand with observability and the scientific method. Scientists make new discoveries by making careful observations and analyzing results in a way that is honest, objective, and based on what is already understood. This lesson will define objectivity and explain why it is important to scientific progress.

The five greatest scientific discoveries and inventions ever!

- 1 – DNA
- 2 – The Internet
- 3 – Antibiotics
- 4 – Medical imaging
- 5 – Artificial Intelligence

Modern science is commonly divided into three major branches: natural science, social science, and formal science. Each of these branches comprises various specialized yet overlapping scientific disciplines that often possess their own nomenclature and expertise. Modern science is important because it facilitates the process of learning, understanding, synthesizing, revising, and repeating the process for a better understanding of the world around us.

Technological advancement and economic growth are truly related to each other. The level of technology is also an important determinant of economic growth. The rapid rate of growth can be achieved through high level of technology. Thus, it is the technological progress which keeps the economy moving. By taking advantage of tech advancements, you can streamline your business operations, increase efficiency and productivity, and therefore gain a competitive edge in the marketplace. And don't worry, not all tech solutions cost a fortune

Science and technology help each other advance. Scientific knowledge is used to create new technologies. New technologies often allow scientists to explore nature in different ways and make new discoveries. Examples of technologies that have helped science advance include the telescope and microscope. Science and technology feed off of one another, propelling both forward. Scientific knowledge allows us to build new technologies, which often allow us to make new observations about the world, which, in turn, allow us to build even more scientific knowledge, which then inspires another technology and so on. The essence of how science and technology contribute to society is the creation of new knowledge, and then utilization of that knowledge to boost the prosperity of human lives, and to solve the various issues facing society.

Technology has completely changed the way humans live, and therefore has shaped human history. Telephones, the Internet, and engines allow people and goods to move from place to place much quicker, and we can communicate around the world instantly. Through science and technology, it is easier for inhabitants to communicate with other people around the globe. Science and technology enable every people to live in an easy and modern way of life. It opens the door and allows people to enter into a new world which is fully developed and well civilized. Used to support both teaching and learning, technology infuses classrooms with digital learning tools, such as computers and hand-held devices; expands course offerings, experiences, and learning materials; supports learning 24 hours a day, 7 days a week; builds 21st century skills; increases student engagement.

Won Second Prize

Study on Genetic Polymorphism of Methylenetetrahydrofolate Reductase [MTHFR, C677T] As A Potential Risk Factor For Congenital Heart Disease (CHD) In North Indian Population



Amrita Panja^{1,2†}, Abhishek Abhinay^{*3}, Antim Aakash Pakhira⁴

¹Cytogenetics Laboratory, Department of Zoology, Banaras Hindu University, Varanasi-221005, India

²Molecular Biology and Human Genetics Laboratory, Department of Zoology, The University of Burdwan, Burdwan-713104, India

³Department of Pediatrics, Institute of Medical Sciences, Banaras Hindu University, Varanasi-221005, India

⁴Department of Clinical Nutrition and Dietetics, Vidyasagar University, West Bengal, India

†E mail: amritapanj87@gmail.com, abhinayabhishek@gmail.com

Abstract

The etiology of congenital heart disease (CHD) is still not known properly. The variant alleles in the methylenetetrahydrofolate reductase (MTHFR) C677T gene help in elevating the serum homocysteine (Hcy) level which is an independent predisposing factor for generating CHD. The present study aimed at assessing the role of polymorphism of MTHFR C677T gene polymorphisms in CHD patients of Varanasi, Uttar Pradesh, North India. The present study included 36 unrelated CHD patients along with their parents. At the same time, 40 healthy control samples were included. MTHFR 677 C>T genotype was identified by polymerase chain reaction (PCR) followed by restriction digestion (RFLP) mechanism. There was a significant difference observed in MTHFR C677T gene polymorphism between the cases and controls ($p < 0.001$). Among the different etiological factors, increased maternal age, family history and teratogens are the major ones. Maternal MTHFR C677T genotype and periconceptional folate intake have important ascription towards CHD formation. The results designate that MTHFR C677T polymorphism has a substantial association with the development and progression of CHDs in the population of northern India. Folate supplementation might be the probable management strategy for reducing the risk of CHDs as maternal MTHFR C677T polymorphism has an important contribution.

Key Words: Congenital Heart Disease, Homocysteine, MTHFR, Polymorphism

Risk Assessment Of Biofilm Forming Bacteria On Plastic Debris From Popular Beaches Around Cochin - Kerala

Soumya* K., Lakshmi E., Bini Francis and A.A. Mohamed Hatha

Department of Marine Biology, Microbiology and Biochemistry, School of Marine Sciences, Cochin University of Science and Technology, Cochin – 682 016, Kerala, INDIA.

*E mail soumyak.kpb@gmail.com

Abstract

Increasing marine litter, especially plastics, besides being recalcitrant material offers an ideal substratum for the development of biofilms and long-term dissemination tool for microorganisms. Spread of multidrug resistant bacteria is of great concern as far as human health is concerned. In the present study we have characterized biofilm forming bacteria on plastic debris from the popular beaches of Kerala and carried out the risk assessment of the isolates in terms of their antibiotic resistance. Plastic samples were collected using three methods such as Big Microplastic Survey Method (BMS), Australian Microplastic Assessment Project (AUSMAP) and Marine Strategy Framework Directive (MSFD). A total of 108 bacterial strains were isolated from different types of plastics, polypropylene rope, EPS pieces etc. Preliminary characterization of the bacteria revealed that most of them were Gram positive. Scanning electron microscopy images revealed the direct attachment of bacteria onto plastic samples collected from beaches, which is further confirmed by biochemical tests to determine the biofilm forming ability of the bacteria. Most of them had the ability to form biofilm. Fourteen bacterial isolates which showed the ability to form biofilms were tested by Kirby Bauer method to determine the prevalence of resistance

against 14 different antibiotics used in human therapy. Results revealed that the following percentage of isolates were resistant to various antibiotics: ampicillin (33.33 %), Cefotaxime (26.67 %), Colistin (16.67 %), Cephalothin (16.67 %), Trimethoprim (13.33 %) and Chloramphenicol (6.67 %). None of the isolates were resistant to amoxicillin, co-trimoxazole, ciprofloxacin, cefpodoxime, gentamycin and tetracycline. The present study highlights that besides being a threat to marine flora, the plastic debris on beaches and coastal environments offer an ideal substratum for long distance dissemination of biofilm forming multi drug resistant bacteria which pose considerable threat to humans who frequent the popular beaches for recreation.

Key Words: Marine litter, biofilms, antibiotic resistance, beaches, Scanning Electron Microscopy

Retrieval Of Genomics Data For The Functional Analysis Of Tuna Species

Raisa KCP², Nadilla Maryam² and Rekha Govindan^{1*}

¹Department of Biochemistry, PM Sayeed Calicut University Centre, Andrott, Lakshadweep 682551

²Department of Aquaculture, PM Sayeed Calicut University Centre, Andrott, Lakshadweep 682551

E mail: rekha.govindan2000@yahoo.com

Abstract

The *Tunnus* aquaculture referred to as fattening or farming, is a capture-based activity from the wild for the development of welfare-centered and sustainable management strategies for tuna species. To overcome the bottle neck issues in tuna farming such as less stable maturation and spawning in captivity and a low seeding production, several farming groups are now into functional genomics approaches. They are getting more significant as they unravel the biological mechanisms at the gene and protein expression levels. Through Bioinformatics, the gene sequence data are generated that serves as an important resource employed for studying various aspects of Tuna ecology, migration and admixture, with strong applications in tuna aquaculture managements. Genetic sequence variability is being targeted over a range of molecular markers to elucidate appropriate management units for tuna. The present study aims to retrieve and analyze literature available from the genomics studies on tuna fish species for its functional analysis. In the present work, several bioinformatics databases were searched for the key words – tuna, genome studies, etc. The summarized works could provide an insight about mechanisms significant for tuna seafood industry, tuna aquafarm management and species conservation of the highly migratory and pelagic tuna fishes.

Key words: Tuna, Genome Data, Functional Analysis, Literature Survey

Won Third Prize

Study On The Postembryonic Development of *Striatoppia Milii* Balogh, 1958 (Acari: Oribatida: Oppiidae) on Microfungi *Trichoderma Harzianum*



K. K. Praveena¹ and T. R Sobha^{*2}

¹ Research Scholar, PG and Research Department of Zoology, Farook College (Autonomous), Calicut, Kerala 673632, India

² Assistant Professor, PG and Research Department of Zoology, Farook College (Autonomous), Calicut, Kerala
E mail: praveenaprasanth1993@gmail.com, sobharaghav72@gmail.com

Abstract

Oribatid mites are very important, numerically abundant soil arthropods, which can play an important role in biodegradation and mineralization in the soil ecosystem. Studies on the breeding biology of oribatid mites are very important because these studies will help to develop methods to use the biodegradation potential of oribatid mites in future research. The present paper is focused on the postembryonic development of an oribatid mite, *Striatoppia milii* collected from the soil sample at Kakkadampoyil, which is a part of moist deciduous forest located in the southern part of the Western Ghats situated in Calicut district of Kerala, India. The duration of developmental stages was traced on specially constructed culture cells with a base of plaster of paris and charcoal mixture (4: 1 ratio) maintained in the laboratory at a relative humidity of 80±2% and temperature of 27±2 °C. The life cycle of mite comprises 5 active instars followed by four quiescent stages at the end of each active stage with

slight variation in their respective duration. The duration of pre-oviposition, oviposition, and post-oviposition period were found to be 10 ± 2 , 6 ± 2 , and 13 ± 2 days. The ovipositional rate of mite species was observed to be 10-15 eggs per reproductive period. The total duration of the development was observed to be 19-23 days.

Key Words: Oribatida, *Striatoppia milii*, Postembryonic Development, Larvae, Nymphs

Won Excelsior Award

Salinity Induced Changes in Protease Activity of Halotolerant Bacteria Isolated From Rhizosphere *Avicennia* sp.



Aleena Dennis*, Wafha KA, Baby Divya

Department of Zoology, St Xavier's College for Women, Aluva, Kerala-683101, India.

*E mail: aleenadennis23@gmail.com

Abstract

Mangrove's ecosystems are subjected to wide fluctuations in salinity. The rhizosphere of these mangroves is an abode to a host of halotolerant bacteria that might be playing a vital role in helping the plant to tolerate salinity fluctuations. In the present study, an attempt was made to understand tolerance of rhizosphere associated bacteria to the varying saline conditions in the mangrove ecosystems. About 67 bacterial isolates obtained from the rhizosphere of *Avicennia* sp. were screened for proteolytic activity in skimmed milk agar. Of these, 12 isolates with high protease enzyme activity were cultured in skim milk containing 0%, 4% and 8% sodium chloride. Interestingly, an increased enzymatic activity was observed in 4% NaCl for majority of the bacterial strains. The results denote that the increased salinity of the habitat has positively influenced the enzymatic activity of the bacteria. A growth curve was also plotted by culturing a strain BA19 in nutrient broth with 0%, 4% and 8% NaCl concentration. Unlike the proteolytic activity, the growth curve indicated an increased efficiency of growth at 8% NaCl. The experiment provides the basis to link the adaptability of bacteria to the saline conditions of the mangrove areas and the increased metabolic activity in the optimum saline conditions.

Key Words: Halotolerant, Bacteria, Proteolytic activity, Mangroves, Rhizosphere

Case Study of Corona in Chellanam with Respect To TPR

M K Sreeja* & Dr. Aneymol V S

Department of Zoology (Model 2 Medical Microbiology), St. Xavier's college for women, Aluva, kerala-683101, India

E mail: *sreejaluckystar07@gmail.com

Abstract

The outbreak of Covid-19 is a major concern in all countries. India is also facing very tough task for controlling the virus outbreak. The Govt of Kerala has announced (last month of June 2021) Chellanam Grama panchayat, Kochi, Ernakulam has a higher test positivity rate (TPR) compared to other areas. Chellanam is a coastal area, where majority of them earn their livelihood through fishing. During this period of Covid-19 circumstances, 2nd variant virus got increased transmissibility than the 1st variant, even vaccinated ones are also showing positive, transmission is higher via social mobility. This study will be helpful for other areas to control covid -19 outbreak in their respective regions. This study concluded with suggestive measures for decreasing "TPR" due to higher TPR rate compared to other coastal areas in respect of Chellanam Gramapanchayat.

Key words: Test Positivity Rate, Social Mobility, Vaccination, Community, Virus Variants

Potent Phytocompound Leads From *Adiantum latifolium* In Combating SARS-CoV-2 And Associated Bacterial Pathogens



Simna Siddique., Dr Pradeep Kumar R*

Department Zoology, Government College for Women, Thiruvananthapuram, Kerala 695014

*E mail: simnasiddique123@gmail.com

Abstract

The present pandemic COVID-19, caused by a novel coronavirus SARS-CoV-2, took the life of millions of people. Though repurposed drugs are used for treatment, their role is not satisfactory due to their ineffectiveness or side effects. The overall mortality of COVID-19 is due to viral infection and associated bacterial coinfections or secondary infections. Indiscriminate use of antimicrobial agents may lead to the emergence of drug-resistant microbial strains, another possible worrisome outcome of COVID-19. So, there is an urgent need for antiviral drugs to combat SARS-CoV-2 and an antibacterial drug to treat secondary bacterial diseases. Plants have been used as a source of various antimicrobial agents since time immemorial. Molecular docking could be used to anticipate the target selection and identification of bioactive phytocompounds from medicinal plants. The present study aimed to evaluate the antimicrobial property of bioactive compounds from the fern, *Adiantum latifolium* Lam. against SARS-CoV-2 and other pathogenic bacteria found in COVID-19 patients. The phytocompounds 22-hydroxyhopane and 3 β -Acetoxy-21 α -H-hop-22 (29) ene from *A. latifolium* have strong binding affinity to viral target proteins with binding energy from -5.77 to -9.80 kcal/mol and inhibition constant 0.07 to 58.51 μ M. For bacterial targets, binding energy varies from -6.82 to -9.28 kcal/mol and inhibition constant 0.16 to 10.10 μ M. MDS and MMPBSA of best ranked complex further validated the antiviral efficacy of the compound. Literature survey followed by IR study could predict the presence of the two compounds in ethyl acetate and hexane extracts of leaves of *A. latifolium*. The extracts confirmed *in silico* proven antibacterial efficacy of phytocompounds against six pathogenic bacteria viz., *Bacillus cereus*, *Staphylococcus aureus*, *Proteus mirabilis*, *Pseudomonas aeruginosa*, *Escherichia coli* and *Klebsiella pneumoniae* that cause superinfections in COVID-19 patients. The study unveiled phytocompound leads from *A. latifolium* that might serve to combat COVID-19 and associated bacterial coinfections, but requires further studies.

Key words: *Adiantum latifolium* Lam, SARS-CoV-2, 22-hydroxyhopane, 3 β -Acetoxy-21 α -H-hop-22(29)ene

Won Excelsior Award

Salivary IL6 For Detection Of Potentially Malignant Oral Disorders



Ramsheena Paymbrot*¹, Dr. Sahaya Shibu², Hiba Shiyas³, Abdul Majeed Kummangal⁴

¹Al Zayan Family Health Care, ²SAFI Institute of Advanced Study, ³Assistant Professor, KMCT Dental

College, ⁴Associate Director, SKROLLS, Scientific Publishing Academy

E mail: ramshimajee@gmail.com

Abstract

Cytokines and chemokines have been analyzed in patients with oral squamous cell carcinoma and potentially malignant disorders as a biomarker to predict malignant transformation. Cytokines play a major role in modulating the immune response, and are either proinflammatory (IL-1, IL-8, IL-6, TNF- α and TGF- β), or anti-inflammatory (IL-2, IL-4, IL-10, IL-12, and IFN- γ). We selected interleukin-6 (IL-6) because it is a multifunctional interleukin

reported to be altered in potentially malignant oral disorders and in malignant lesions. Present study was done to compare concentration of IL-6 in PMD patient with healthy controls. This study was designed to estimate the levels of salivary IL-6 in potentially malignant disorders (PMDs) (leukoplakia, lichen planus, oral submucous fibrosis (OSF) and compare them with healthy controls. The aim was to evaluate its efficacy as a potential biomarker for these diseases. The study sample comprised of saliva samples from 12 patients diagnosed with potentially malignant lesions and 12 healthy volunteers. The enzyme-linked immunosorbent assay (ELISA) test was used to measure concentrations of IL-6 levels in four groups: 4 patients with leukoplakia, 4 with lichen planus, 4 with OSF and 12 with healthy controls and the concentration of IL-6 was compared among the PMD patients and healthy individuals. The levels of salivary IL-6 concentration were found to be significantly elevated in patients with PMDs as compared to the healthy control group ($p < 0.0001$). Patients with OSF had significantly higher IL-6 concentrations in their saliva compared to patients with other premalignant lesions. Our results suggested that salivary IL-6 can be utilized as a potential biomarker to predict malignant transformation of PMDs. The present study was done with very few samples size. Hence, possible role of IL-6 to predict transition of premalignancy to malignancy needs further research with larger sample sizes with patients having oral malignancy. Saliva as a diagnostic biofluid offers a number of advantages over blood-based testing. The role of IL-6 in PMD if validated further by future research can provide an easy diagnostic tool as well as a prognostic indicator for patients undergoing treatment. Therefore, it could open up new avenues to find out novel diagnostic tools for the prediction of malignant transformation of PMD

Key words: Potentially malignant disorders (PMDs), Saliva, Cytokine- Interleukin-6, ELISA

Diversity and Foraging Behaviour of Native Spiders From Nedumbrakkad, Cherthala, Alappuzha

Aiswarya K M*, Chithra K S, Praveen P B, Hisana S, Amala Lawrence, Narmanini S

Department of Zoology, St.Michael's College, Cherthala , Alappuzha, Kerala, India

E mail: amika0016@gmail.com

Abstract

Spiders play a major role in maintaining ecological equilibrium. Many spiders feed on noxious insects like houseflies and mosquitoes which are vectors of human disease. They also eat arthropods including other Araneae. They are considered as suitable biological indicators of ecosystem changes and habitat modification. Their small body size, short generation time and high sensitivity to temperature and moisture changes are the reasons behind this. Their ability to suppress pest abundance in agro ecosystem shows their ecological roles in pest control. Our study was mainly focused on the hunting strategy of native spiders from Nedumbrakkad region located in Cherthala. Whenever we sight a spider in the natural habitat, we start to observe their characters like morphology, web construction and hunting approach. We introduced a living prey into the web and observed the behavioural changes performed by the spider. We tried to photograph each and every change using a digital camera and often by mobile phone camera. Our ethological study was focused on the range of behaviour and different activity performed by the spiders. Although all these spiders look same, each one has two distinct personality types; aggressive and docile. Many studies have proven that aggressive spiders are mainly focusing on the prey capturing, construction of the web and defending the colony, while docile ones are focusing on parental care. In our study we had made a detail analysis about the hunting behaviour of 15 native spiders coming under 8 different family viz; Araneidae, Cheiracanthiidae, Salticidae, Hersiliidae, Thomisidae, Pholcidae, Tetragnathidae, Sparassidae and Agelenidae. Argiope anasuja, Gasteracantha germinate, Nephila pilipes, Anepsion maritatum are the species coming under the Family Araneidae. Plecypus paykuli, Phintella vitara and Epeus indicus belong to the family Salticidae, Cheiracanthium species coming under the family Cheiracanthiidae. Oxytate virens belongs to the family Thomisidae. Leucauge ponde, Olios millet, Agelenidae, and Anepsion maritatum are the less studied species in our project. From all these observations we have arrived at certain baseline information regarding the hunting strategies of different spiders belonging to 9 different families. The charismatic nature of spiders makes it extra ordinary, easy to attract even the most biophobic individual into arachnid-based discussions and activity.

Key Words: Spiders, biological indicators, Nedumbrakkad, Thomisidae, Pholcidae, Sparassidae

The Effectiveness of Antimicrobial Resistance of Weaver Ant in Present Covid Scenario

Aveline Feyona Faber, Keerthi.K.Prasad, Jeba Malar*

Department of Microbiology, SD College, Alappuzha

E mail: pwjeba@gmail.com

Abstract

The weaver ant, *Oecophylla smaragdina* have been a component of the conventional diet of sundry tribal population in India. It has been reported that the prevalence of Covid-19 pandemic is comparatively less in such population which in turn is contributed by the immune boosting properties of their conventional diet that includes ant salads. Predicated on the reviewed facts, in this project we investigated the antimicrobial property of weaver ant, *Oecophylla smaragdina* against human pathogens. Extracts of *Oecophylla smaragdina* were prepared employing three different solvents such as methanol, ethanol and acetone. The prepared extracts were analyzed for their antimicrobial activity against culled human pathogens utilizing agar well diffusion method and agar disc diffusion method. The results of the study revealed that the extracts of weaver ant showed antimicrobial activity against human pathogens. The antibacterial property is that ants produce different chemicals and volatile compounds that contribute to their antimicrobial and antioxidant properties. These chemicals are mostly produced in response to prey attack and they have both antimicrobial as well as antioxidant properties. It has been inferred from the current study that the weaver ants have the intrinsic facility to fight against microbial pathogens and can contribute to a bulwark mechanism of their natural habitats such as trees and plants. Consequently, this species can be further explored as an efficacious biocontrol agent in agricultural crops to amend the crop yield and economy of the current agricultural practices.

Key words: *Oecophylla smaragdina*, Weaver Ant, Covid-19 pandemic, Diet, Ant Salads, Antimicrobial Activity

Evaluation Of Morphological Malformation And Hsp70 Gene Regulation Response On Carbofuran 3G Exposed Zebrafish (*Danio rerio*) Embryos



Sreelekshmi P*

Department of Biotechnology, Mar Athanasius College, Kothamangalam, Ernakulam, Kerala-686666, India

E mail: sreelekshmip278@gmail.com

Abstract

Carbofuran 3G is a broad-spectrum insecticide and nematicide that controls a wide range of foliar pests, soil pests, and nematodes. Despite strict regulation, and being banned in Kerala, it is extensively employed in agriculture, and as a result, contamination of food, water, and air has become imminent, posing detrimental health effects to humans, animals, birds, fish, and wildlife. Heat shock proteins are involved in many pathological and physiological processes, and zebrafish has proven to be an excellent model for analyzing Hsp responses during the developmental stages. The goal of this study was to analyze how carbofuran affected the development of zebrafish embryos as well as to investigate the relative expression of the Hsp70 gene in zebrafish embryos by exposing them to a range of carbofuran concentrations. Zebrafish embryos (5 hpf) were exposed to different carbofuran concentrations ranging from 3000 µg/L to 45000 µg/L, along with a control group, and were monitored for 120 hrs. For more than half of the zebrafish, concentrations exceeding 9000 µg/L led to substantial developmental abnormalities such as spine curvature, yolk sac edema, tail deformity, and pericardial edema. At concentrations higher than 6000 µg/L, the heartbeat rate was observed to be significantly lower than that of the control groups. In addition, the mortality rate was also analyzed, which was higher in extreme concentrations. The hatching rate was found to be normal in all the groups. Furthermore, qPCR analysis of Hsp70 gene expression in zebrafish embryos was observed to be upregulated in samples with high concentrations of carbofuran. Thus, treatments of carbofuran at higher concentrations have been shown to have a lethal and teratogenic effect on

zebrafish embryos. These results might be useful as tools to determine the contamination of carbofuran in the aquatic environment.

Key words: Zebra Fish, Carbofuran, Insecticide, Hsp70, Abnormalities, Aquatic environment

Won Third Prize

Control Methods Against Whitefly- *Bemisia Tabaci*



Aiswarya S. Babu, Anju S., Athira Andrew, Ayisha N., Jariya N., Sherin Francis, Remya James*

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

*E mail: remya.james@gmail.com

Abstract

This study reviews on the efficacy of many natural control solutions against Whitefly, *Bemisia tabaci*. It focuses on application of biological, chemical and integrative methods, as well as host plant resistance on different vegetable as well as fruit plants in potager. Whiteflies have become a crop protection issue as they carry and transmit diseases that have a global impoverishment or depletion of food production and estimated economic dissipation. Understanding how whitefly orchestrate destruction occurs, would bring down the farmer's frustration. Each of the method was applied and observed for 2 weeks and the reduction or elimination of the colony was noted. The mean number of whitefly adults per 10 leaves of each of the three colonies of Whitefly population (I, II, III) was observed in 3, 5 & 7 days after each spray method and then spotted for further reappearance. As per the results evaluated, the integrative pest management method (IPM) played advantage over other methods with respect to effective colony reduction, as well as reduced negative consequences. While biological methods are tedious and long-winded process, chemical solutions were correlated with unsteady plant growth, making them prone to secondary infections. Thus, the overall study implies the potentiality of Integrative methods to control whiteflies, since it shows high efficacy in reduction of whitefly population and proves to be ecologically sound, compared to chemical methods which showed 100 % efficiency.

Key words: *Bemisia tabaci*, Host Plant Resistance, Spray Method, IPM

Microorganisms As a Cure to Eutrophication

Anirudh G Nair, Aveline Feyona Faber, Anupama Shiji, Dr David Jayasheelan

Department of Microbiology, Nehru Arts and Science College, Kuniamuthur, Coimbatore, 641105

E mail: anirudhggopakumar@gmail.com

Abstract

Phosphorus, it is an element prevalent in many compounds of nature. The growth of vertically all flora crops, Algae and bacteria utilities phosphorus as a key element. As a result, phosphorus is used in large quantity as fertilizer both on industrial scale and household. In human aspect as phosphate production is vast and done in effectively as it is partially utilized before leaching into the environment by surface or soil leaching. Phosphorus is a key contributing cause to eutrophication which is the detonation of water quality to cause algae growth. Algae grow in the presence of two nutrients, Nitrogen and phosphorus. As of the two nutrients phosphorus is considered more important as it is the limiting nutrient. Phosphorus management is of extreme importance as giving algae blooms indirectly leads to consumption of available oxygen and produce dead zones, causing permanent ecosystem damage. In the first light of serious surrounding this serious issue logical solution is to limit the concentration of phosphorus in water ideally even before phosphates are released. This is where the wastewater

phosphate removal treatment come in handy and are extremely critical. By using organism such as phosphorus accumulating organism phosphorus can be treated. For this treatment first the effluent water is screened followed by primary treatment, secondary treatment removes biomass, and the third treatment is by phosphate accumulating organism. Then the effluent is finally polished and discharged. This method of treatment can be used in agriculture setting, milk production, municipal wastewater treatment and to clean industrial effluent.

Key words: Phosphorus, Water Quality, Algae Blooms, Effluent

Won Second Prize

Molecular Evolution of Corticotropin-Releasing Hormone (Crh) Gene Family In Primates



Pavithra Prasad and Ashalakshmi C N

Department of Biotechnology, CMS College (Autonomous), Kottayam, Kerala - 686001, India

E mail: pavithra20400@gmail.com

Abstract

The corticotropin-releasing hormone (CRH) family genes express neuropeptides that play a prominent role in the regulation of the physiological response to stress and anxiety in vertebrates. CRH family consists of five genes namely CRHR1, CRHR2, UCN1, UCN2 & UCN3 in mammals. The present study involved a comparative genomic analysis of the five CRH family genes for twelve candidate Primates belonging to great apes, lesser ape, old-world macaques and new world macaques. The nucleotide sequences for genes were obtained via insilico database searches. The study inferred relationships among the candidate primates by constructing gene based phylogenetic trees. The phylogeny was constructed using Maximum Likelihood (ML) approach and Neighbour joining (NJ) method as implemented in MEGA X 10.2.6. Model adequacy testing and bootstrap also done to assess reliability of output phylogeny. The individual gene trees as well as the combined gene data were compared with the standard species phylogeny. Overall, the gene trees and combined phylogeny shows deviations from the actual species tree of primates under study. Exceptions include ML and NJ trees of CRHR1 and UCN3 genes, which showed signatures of actual species relationships. Previous studies reported evolutionary compilations of CRH genes like gene duplication and gene loss across taxa. This could be attributed to the conflicting tree topologies obtained here. However, among the CRH gene family, CRHR1 gene could explain relationship among Hominidae, and which is indicative of the conserved nature of this gene. The study also inferred the trends of natural selection in CRH genes via Codon Z test by estimating dN/dS. The general trend showed purifying selection is operating in these genes across lineages. Purifying selection purges harmful mutations and hence conserves functionalities of genes across lineages. CRHR1 showed strong purifying selection, indicating its function is conserved across primates. Overall, the present study provided understanding over the molecular evolution of CRH family genes. Hence this study calls for in depth investigation of molecular origins of the primate stress-response system in future.

Key words : CRHR1, Primates, Maximum Likelihood Method, Neighbor Joining Method

Won Excelsior Award

Neuron Restrictive Silencer Factor Regulates Epstein-Barr Virus Life Cycle In EBV-Associated Cancer Cells



Vinod Soman Pillai¹, Gayathri Krishna¹, Mohanan Valiya Veetil^{2*}

¹Department of Biotechnology, Cochin University of Science and Technology, Cochin, Kerala-682022, India.

²Institute of Advanced Virology (IAV), Life Sciences Park, Thonnakkal, Thiruvananthapuram, Kerala-695317

*E mail: mohanwiwi@gmail.com, mohanan.iav@kerala.gov.in

Abstract

Epstein Barr virus or human herpesvirus-4 (EBV/HHV-4), is a common human virus with almost 95% incidence. EBV infects both B cells and epithelial cells and is etiologically linked with neoplastic cancers of lymphoid and epithelial origin. The virus displays a biphasic life cycle, lytic and latent, and the latency-lytic switch transition in the EBV genome is activated by the availability of host cellular transcription factors. The host cellular neuron restrictive silencer factor or RE1-silencing transcription factor (NRSF/REST) is a transcriptional repressor that functions as a major repressor of neuronal gene expression in non-neuronal cells as well as in various cellular processes. NRSF represses the gene expression by forming a repressor complex with HDAC1, sin3A, sin3B and RCOR1. In the present study, we investigated the role of NRSF in EBV life cycle and its role in inducing latency in EBV-associated cancer cells. Our studies demonstrated higher levels of NRSF protein in the EBV infected lymphoma cell lines and epithelial cancer cell line compared to the uninfected control cells. Additionally, a very high level of NRSF was present in the cytoplasmic and nuclear fractions of EBV infected cells compared to the level of NRSF present in cytoplasmic and nuclear fractions of uninfected cells. Decreased interaction of NRSF with β TrCP (Beta transducin repeat containing protein) and reduced degradation of NRSF leads to high cellular levels of NRSF in the EBV-infected cells. Proximity Ligation Assay (PLA) demonstrated that NRSF forms a repressor complex that represses the transcription of viral genes in EBV infected lymphoma and carcinoma cell lines. The disruption of NRSF with NRSF inhibitor X5050 revealed that inhibition of NRSF protein in infected cells could lead to lytic activation of EBV. Further studies on EBV mediated oncogenesis and role of NRSF could bring more insights into EBV biology.

Key words: EBV, Oncogenesis, NRSF, Molecular Interactions

Won Third Prize

Delineation of Potential Biodiversity Area In Outside Forests of Available Protected Areas



Praveena Dev^{1*}, Chripts N. R.², Reshmi V.¹

¹Department of Zoology, Sree Narayana College, S. N. Puram. P.O, Alappuzha-688 582, Kerala, India

² Centre for Environment and Development, Thozhuvancodu, Vattiyoorkavu P O., Thiruvananthapuram - 695013, Kerala, India.

E mail: praveenadev7507@gmail.com

Abstract

Effectiveness of biodiversity conservation in protective areas of forest become fulfill when housed all biodiversity rich areas. A study conducted in Agasthyarmalai Biosphere Reserve (ABR), a tropical evergreen forest of southern part of the Western Ghats. Here identified well biodiversity areas outside of existing protected areas. Initially four

forest patches selected in Achancovil, Kulathupuzha, Palode, and Paruthipally ranges from the satellite images analysis. Based on population, abundance, endemic and Rare Endangered Threatened (RET) status of Mammals, Amphibians, Birds, Reptiles and Butterflies, prepared the thematic maps in ArcGIS 10.2 platform. Weighted overlay analysis has been performed to get and prioritise potential biodiversity areas.

Key words: Agasthyarmalai Biosphere Reserve, Rare Endangered Threatened status, ArcGIS 10.2 Platform

The Structure And Dynamics Of The Evolution Of “Diagnosis Of Fasciolosis” – A Knowledge Graph Analysis

Linshina T*, PA Ahammad Shareef

Department of Zoology, P.S.M.O College, Tirurangadi, Malappuram, Kerala, 676306, India

E mail: linshisiraj@gmail.com

Abstract

Livestock industry has been faced with various types of bottlenecks that affect its productivity. Fascioliasis is a neglected infectious zoonotic disease caused by food and water borne trematode parasites of the genus *Fasciola*, either *Fasciola hepatica* or *Fasciola gigantica* in temperate and tropical regions, respectively, that infects a wide variety of domestic and wild mammals, including humans. Difficulties in diagnosis is one of the reasons which make this disease complicated. Nowadays, the diagnosis of fasciolosis done by very primitive coprological analysis to advanced immunodiagnostic and molecular methods. our study focuses (i) to track down the progression and evolving research currents in the diagnosis of fasciolosis (ii) to demonstrate review of research trends in diagnosis of fasciolosis (iii) to elucidate the knowledge diffusion by pointing out the prominent research associations among the author, organizations, and countries and (iv) to come up with a thematic advancement model to roadmap in future research trends in diagnosis of fasciolosis. We also tried to trace the knowledge bursts in this field. We used citation network analysis as an aid to depict the status of knowledge and upcoming trends in “diagnosis of fasciolosis ‘using bibliographic data. The succeeding section bring forth the features of CNA, cluster analysis, bibliographic coupling, co-citation and the associated co-occurrence and co-author networks. The third section deals with the results and discussion.

Key words: *Fasciola*, Fasciolosis, Diagnosis, Citation Network Analysis, Web of Science



RICERCA 2021

RESEARCH & DEVELOPMENT FOR NATION BUILDING

NATIONAL ONLINE RESEARCH PROJECT PRESENTATION COMPETITION

Organized by

**RESEARCH COMMITTEE
ST JOSEPH'S COLLEGE FOR WOMEN,
ALAPPUZHA**

In Collaboration with

**KERALA SASTHRA SAHITHYA PARISHAD
&
SOCIETY OF BIOTECHNOLOGISTS, INDIA**

St. Joseph's College for Women, Alappuzha, affiliated to University of Kerala is a prestigious institution standing at the vanguard of higher education for women in Kerala, set in the heartland of the historical town of Alappuzha. The college was recognized as a COLLEGE WITH POTENTIAL FOR EXCELLENCE (CPE) by the UGC in 2016. The state-of-the-art lab equipments funded by DST - FIST, the newly emerging Diamond Jubilee Complex housing the Research Wing, and other digital and infrastructural additions help make the college an academician's hub. The research committee of the college leaves no stone unturned to foster the spirit.

Kerala Sasthra Sahithya Parishad is a people's science movement of Kerala, India. KSSP, with the motto "science for social revolution", chose as its mission, the challenge of empowering common man with the tools of science and technology so that, its immense benefits do not remain the monopoly of a privileged minority.

Society for Biotechnologists (India) is an association dedicated to the advancement of Biotechnology, especially with an aim to unite scientists, students, academicians, doctors, industrialists and professionals. The Society also serves as a link between various specialized fields of theoretical and applied Biotechnology and promotes the exchange of scientific information through workshops, conferences and publications in emerging areas of biotechnology.

RICERCA has been organized to provide a common platform for students, research scholars and faculty to:

- Share research ideas and research updates.
- Involve in discussions from critical perspectives and improve presentation skills.
- Understand the research projects undertaken in concerned disciplines.
- Motivate young minds to undertake interdisciplinary, multidisciplinary and trans disciplinary research in the future.



Dates to Remember

Last date of submission of abstract and registration
26TH SEPTEMBER, 2021

Date of announcement of abstracts selected for presentation
28TH SEPTEMBER 2021

Contact Us

Dr Bhagya D (Research Co-ordinator) Ph: 9495626256
E mail: ricercacompetitions@gmail.com
Dr Kumari Nisha S: 9495482686
Dr Sreekala G : 9947647551



RICERCA 2021

Guidelines

- Competition is for UG, PG, research scholars and faculty from Life Science, Mathematical Science, Social Science & Humanities.
- Two projects each, from UG and PG and one paper each from research scholars and faculty can be submitted from each department in the college. The projects may be supervised by different teachers.
- Abstract of projects should be submitted as word file in the registration link provided for individual subjects and also should be mailed to ricercacompetitions@gmail.com
- Group projects can be submitted but only one student will be allowed to present the project.
- Individual students (presenters and group members) can register for the project presentation competition.
- The presenter has to upload the abstract in the google form registration in the format of template provided in the following link. The abstract must include topic title, name of student/students (in the case of group projects for UG), name of the supervising teacher and the department and college address with mail IDs of presenter and supervising teacher. The presenting students' name must be underlined. Abstract- 300 words, Font- Times New Roman, 10pt font size, 1 point line spacing, key words 5.

Abstract template link

<https://bit.ly/3n608QK>

- Only academic year 2020-2021 UG ,PG, research scholar and faculty projects need to be submitted.
- The submitted projects will be evaluated by an expert committee and the projects recommended by the committee will be called for the online power point presentation competition. Others get the opportunity to participate in the event.
- The judges' decisions will be final and the host retains the discretion to terminate discussions/ presentations if situation demands.

- The abstracts will be published in an **E publication** with ISBN Number
- **Excelsior award** will be given to the best paper in each category.
- All registered candidates will be provided with **E certificates** for participation and/or presentation.
- The best papers win the possibility of getting published in **UGC CARE listed journals**.

*Conditions apply.

Platform : Google Meet
Presentation time : 8 Minutes

Registration Fees

UG & PG students	: Rs 100
Research Scholars	: Rs 200
Faculty	: Rs 400

Transaction Details

For Research Committee, St. Josephs College for Women Alappuzha

Beneficiary Name : Bhagya D
Bank Name: South Indian Bank
Account Number : 04450530000000164
IFSC : SIBL0000445
Branch Name : Convent Square Alappuzha

*Please give your name in transaction and purpose as registration fee





Registration Links

Sl No	Subject/Category	Tentative Date	Theme of Plenary Talk	Subject Wise Registration Link for RICERCA
	INAUGURATION	05-10-21	Research & Development for Nation Building.	
1	Literature/Allied	06-10-21	Literature and Sustainability	https://forms.gle/okDMRMCQqyGb8syXA
2	Zoology/Allied	06-10-21	Current Research Trends in Zoology	https://forms.gle/zyjFctHS9nJFUEQn6
3	Botany/Allied	06-10-21	Emerging Trends in Life Sciences	https://forms.gle/m5svktpRy7QuodnD6
4	Physics/Allied	07-10-21	Recent Trends in Physics	https://forms.gle/9Y5Z1NtqDGhZNyMc6
5	Chemistry/Allied	07-10-21	New Gen Materials In Chemistry	https://forms.gle/aBxV3FjRUmNnaZGF9
6	History/Allied	08-10-21	Recent Trends in Historiography	https://forms.gle/pfyimaecMySZKyhd9
7	Mathematics/Allied	08-10-21	Recent Trends in Mathematics	https://forms.gle/zKpqj6dU8ASNAf4h9
8	Commerce/Allied	09-10-21	Open Banking	https://forms.gle/PJ8rVMwbWkBKsSw79
9	Home Science/Allied	09-10-21	Research Opportunities in Home Science	https://forms.gle/GJyzk31RZ8cFAcpq7
	VALEDICTORY SESSION	11-10-21		

Organizing Committee

Rev Dr Sr Annie Mathew, Manager, St Joseph's College for Women Alappuzha
 Dr Rita Latha D'couto, Principal, St Joseph's College for Women, Alappuzha
 Dr Bhagya D, (Research Co-ordinator), Assistant Professor, Department of Home Science
 Dr Kumari Nisha S, Assistant Professor, Department of Chemistry
 Dr Sr Morris Marieli Antoinette, Assistant Professor, Department of Physics
 Dr Sreekala G, Assistant Professor, Department of Physics
 Dr Pinkie Cherian, Assistant Professor, Department of Botany
 Dr Suleena V S, Head, Department of Commerce
 Ms Anjali George, Assistant Professor, Department of English
 Ms Remya James, Head, Department of Zoology
 Dr Diana K J, Assistant Professor, Department of Botany
 Ms Namitha Sara Mathew, Assistant Professor, Department of Mathematics
 Ms Chithra K S, Assistant Professor, Department of Mathematics
 Dr Ramya K, Assistant Professor, Department of Chemistry
 Ms Meenu Treasa Joseph, Lecturer, Department of History
 Dr Archana Das, Lecturer, Department of Zoology



RICERCA 2021

RESEARCH & DEVELOPMENT FOR NATION BUILDING

NATIONAL ONLINE RESEARCH PROJECT PRESENTATION COMPETITION

Organized by

**IQAC & RESEARCH COMMITTEE
ST JOSEPH'S COLLEGE FOR WOMEN,
ALAPPUZHA**

In Collaboration with

**KERALA SASTHRA SAHITHYA PARISHAD
&
SOCIETY OF BIOTECHNOLOGISTS, INDIA**

Date & Time

**5th October 2021
10:30 AM**



Platform : Google meet

Programme Schedule

10:30	Opening Session	Ms Anjali George (Assistant Professor, Department of English)
10:35	Welcome Address	Dr Anju M Neeliyara (IQAC Coordinator)
10:40	Presidential Address	Rev Dr Sr Annie Mathew (Manager St Joseph's College for Women Alappuzha)
10:45	Principals Address	Dr Rita Latha D'couth (Principal, St Joseph's College for Women Alappuzha)
10:50	Introducing Speaker	Dr Bhagya D (Research Coordinator)
11:00	Inaugural Speech	Dr G Gopakumar (Former Vice Chancellor, Central University of Kerala, Kasargod)
11:40	Felicitation	Prof Dr Edathil Vijayan (FNASc. President, SBTI)
11:45	Felicitation	Dr. T Pradeep (Chairman, Alappuzha District Sub Committee for Education, Kerala Sasthra Sahitya Parishath)
11:50	Vote of thanks	Dr Sr Morris Marieli Antoinette (Assistant Professor, Department of Physics)

INAUGURAL SPEAKER

Dr. G. Gopakumar



Former Vice Chancellor, Central University of Kerala.
An internationally renowned scholar in Political Science, specialized in Indian Politics, Comparative Politics and International Relations, besides being a noted psephologist.

He was formerly UGC- Emeritus Fellow, ICSSR Senior Fellow, Dean of Social Sciences, and Professor and Head, Department of Political Science, Director, V.K. Krishna Menon Centre for International Relations, Coordinator, Nehru Studies Centre, Survey Research Centre and UGC-SAP in the University of Kerala. He was also the Director General of the Institute of Parliamentary Affairs, Government of Kerala. He has 45 years of teaching and research experience: published 12 books and over 153 research articles and successfully guided 28 Ph.D. scholars.

He has won several international and national fellowships that include UGC-Research Scientist Award, Indo-French Cultural Exchange Award, International Visitors' Leadership Award (USA), Salzburg Award, Fulbright Scholar Award, Shastri Mobility Award (Canada), Shastri Indo-Canadian Award (University of Calgary and MC Gill University), Visiting Professor, University of Calgary, Canada, Visiting Professor, (Claremont Graduate University, USA), Australia-India Council Senior Fellow (Monash University, Melbourne), Visiting Research Fellow (University of New South Wales, Sydney, and Prince of Songkla University, Phuket, Thailand). He is a member of several national and international bodies including Indian National Commission for Cooperation with UNESCO and Chairperson of NAAC Peer Team visits.

ST. JOSEPH'S COLLEGE FOR WOMEN

ALAPPUZHA, KERALA, INDIA - 688 001

*Affiliated to University of Kerala, College with Potential for Excellence
Re-accredited with B++ Grade by NAAC*



RICERCA 2021

NATIONAL CONFERENCE

RESEARCH & DEVELOPMENT FOR NATION BUILDING

NATIONAL ONLINE RESEARCH PROJECT PRESENTATION COMPETITION

Organized by

IQAC & RESEARCH COMMITTEE
ST JOSEPH'S COLLEGE FOR WOMEN,
ALAPPUZHA

In Collaboration with

KERALA SASTHRA SAHITHYA PARISHAD
&
SOCIETY OF BIOTECHNOLOGISTS, INDIA

Date & Time

21 Oct 2021

03:00 PM



Platform : Google meet

VALEDICTORY PROGRAMME

- Opening Session** : **Ms Nimisha Francis**
(Assistant Professor, Department of English)
- Welcome Address** : **Dr Bhagya D**
(Research Co ordinator)
- Presidential Address:** **Dr Rita Latha D couto**
(Principal, St Joseph's College for Women Alappuzha)
- Valedictory Address :** **Dr Gabriel Simon Thattil**
(Professor & Head, Department of Commerce,
University of Kerala)
- Announcement of**
EXCELSIOR award : **Dr Sreekala G**
(Assistant Professor, Department of Physics)
- Feedback**
- Felicitation** : **Dr Anju M Neeliyara**
(IQAC Co ordinator, St Joseph's College for Women,
Alappuzha)
- Vote of thanks** : **Dr Pinkie Cherian**
(Assistant Professor, Department of Botany)

Guest of Honour



Dr Gabriel Simon Thattil

Professor and Head, Department of Commerce &
Director, IQAC
University of Kerala

Dr Gabriel Simon Thattil is serving as General Secretary of Indian Accounting Association which has 50 branches across the country and coordinator for the flagship career guidance scheme for school children- My Career My Dream. An approved Research Guide of the University of Kerala, Trivandrum, both in the faculty of Commerce and in the faculty of Management Studies, his areas of interest for projects include Banking, Rural Finance, Human Resource Management, Cooperation Analysis of Financial Statements and Working Results of Business Enterprises.

Certificate Sample





RICERCA NATIONAL CONFERENCE 2021

Research & Innovation For Nation Building

PROCEEDINGS

Research Committee & IQAC
In Collaboration With
KSSP & SBTI



St Joseph's College For Women Alappuzha
Kerala, India

ISBN:978-93-89817-66-9