

ANNUAL REPORT

PUSHPAGIRI RESEARCH CENTRE (PRC)

*Approved by KUHS for Ph.D. in Medicine, Dental, Nursing,
Pharmacy and Allied Sciences & recognized by DSIR,
Government of India*



April 2023 to March 2024

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ABOUT PUSHPAGIRI RESEARCH CENTRE (PRC)

Pushpagiri Research Centre (PRC) is a unit of Pushpagiri Medical Society, which has been the pioneering force in providing super specialty health care in Central Travancore region of Kerala State. Established in 2010, PRC has grown to become of the best research centers in the state, in private sector. Pushpagiri Research Centre features open-plan, multifunctional research laboratories, which have all the facilities for conducting inter-disciplinary biomedical research.

Pushpagiri Research Centre is a Scientific and Industrial Research Organization (SIRO) recognized by Department of Scientific & Industrial research (DSIR); Govt. of India. Kerala University of Health Sciences (KUHS) has also approved PRC for its Ph.D. programmes. The centre has received funding from prestigious agencies like DST, DBT, ICMR, KSCSTE and Bill & Melinda Gates foundation and has been part of many international research collaborations. PRC is unique among all the research centres of Kerala as it has active Memorandum of Understandings (MoUs) with an array of institutions from government and private sectors.





OUR VISION

We aim is to create breakthroughs in medical field, by taking research outcome from bench to bedside, with high ethical standards, and to develop transformative technologies, to meet growing challenges in the area of human health and illness, with an innovative approach. It provides a platform, to develop strategies of therapeutic intervention to improve the quality of life, and to alleviate human sufferings. Our state-of-the-art infrastructure, and domain of expertise, catalyzes the translation of laboratory research of academia and industry to hospital bed.

OUR HISTORY

Pushpagiri Group of Institutions is located in the heart of Tiruvalla, a scenic town in Central Travancore in Kerala. This land is blessed with the visit of Saint Thomas, the disciple of Jesus. It harbours Sri Vallabha Temple, Saint John's Cathedral, Parumala Church to enrich the rich spiritual heritage of Tiruvalla. This place is richly ornamented with the lush green paddy fields and coconut grooves. The branches of Pushpagiri Medical Society comprise of Pushpagiri Institute of Medical Sciences, Pushpagiri College of Dental Sciences, Pushpagiri College of Pharmacy, Pushpagiri College of Nursing, & Pushpagiri College of Allied Health Sciences.

Pushpagiri Research Centre better known by the acronym PRC is a Scientific and Industrial Research Organization (SIRO) recognized by the Department of Scientific and Industrial Research (DSIR), Ministry of Science & Technology, Government of India. It was initiated in the year 2009 and functions in Pushpagiri Medical College Campus as a Central Research Facility. PRC features open-plan, multifunctional research laboratory and it conducts, promotes research in interdisciplinary areas of sciences such as Tissue Engineering and Regenerative Medicine, Medical Biochemistry, Bioinformatics and Drug Designing, Medicinal and Phytochemical Research, Molecular Biology, Cell Culture, Microbial Technology, Cancer Research and Epidemiology studies.

PRC offers a unique, pluralistic and open research culture that is supported by high-end infrastructure and instrument facilities. Various research schemes are funded by

State & Central Government agencies like DST, DBT, ICMR, BRNS and International agencies like Bill and Melinda Gates Foundation, CEI, etc. PRC mainly focuses on translating the ideas from laboratory to commercial market. The Research Centre is currently carrying out various researches in wound healing, tissue regeneration, antimicrobial resistance and usage of novel phytocompounds, *in-silico* research and computational drug designing, molecular biology, virology, infectious disease, clinical epidemiological studies and clinical trials, which is in collaboration with various institutions. PRC is having MoU with various government institutes like CIFT-Kochi, MG University-Kottayam HLL, Trivandrum and private institutes like MACFAST Tiruvalla, Bishop Moore College Mavelikara, CUSAT (Cochin University of Science Technology), SJRI (St. John Research Institute, Bangalore, Stockholm University, Vellore Institute of Technology (VIT), Vellore.



From Left to Right: Dr. Leya Elizabeth Babu (Assistant Professor), Dr. Purnima C. (Veterinarian), Dr. Soumya RS (Scientist), Dr. Betsy A Jose (Assistant Professor), Dr. Aniket Naha (Scientist & Student Coordinator), Rev. Dr. Mathew Mazhavancheril (Director & Head), Dr. Yogesh Bharat Dalvi (Scientist), Mr. George Varghese (Assistant Professor & Coordinator), Dr. Nebu George Thomas (Professor & Scientist), Dr. Rosin George Varghese (Assistant Professor)

Pushpagiri Research Team

DIRECTOR'S MESSAGE



India's emergence as one of the world's major economies is being reflected by its increasing contribution to the world's high-quality scientific research and research publications. The contributors of this development have been played by many research institutes around the country. One such research- intensive Centre is Pushpagiri Research Centre. The research team at PRC is keen in investigating, evaluating and unfolding the mystery lying around the field of biology by isolating bioactive compounds from nature to development of new diagnostic kits by breaking the conventional thinking to make translational research i.e., from lab to bedside, a reality. The youthful and energetic atmosphere of the centre is our success which develops an ideal and fertile research ecosystem for faculty, staff, students and trainees. We conduct various training programmes (cell culture, animal handling, bioinformatics), workshops (molecular biology, cell culture, animal handling, *in-silico* drug designing) and conferences (Bioradiance) which provides platform to various budding scientists and innovators to showcase their research, technical, analytical and presentation skills. These events encompass various disciplines like disease biology, tissue engineering, immunology and others, which also provide open possibilities for the interactive sessions, collaborative ventures with the field experts and the centre itself.

Our mission is to understand, evaluate, screen bioactive compounds and development of drugs, kits for the betterment of human race using *in-vitro* (cell culture) and *in-vivo* (animal models) methods to develop a unique training of individuals in basic & translational sciences and promote collaborations between medical, veterinary and agricultural professionals with basic biology scientists. Over the past few years, the ability of PRC in making a major contribution in the field of biology has been greatly supported by various funding agencies like DST, DBT, ICMR, BRNS and International agencies like Bill and Melinda Gates Foundation. I thank all the advisors, supporters and well-wishers of PRC for their constant encouragements throughout these years. God Bless Us!!



Rev. Dr. Mathew Mazhavancheril
Director & Head, Pushpagiri Research Centre

COORDINATOR'S MESSAGE



I am pleased to forward this message for 20223 -24 annual report as the Coordinator of Pushpagiri Research Centre (PRC). It gives me immense satisfaction that over the years, PRC has made tremendous progress multidisciplinary research. Notably, it has now become a leading research and diagnostic virology centre in the Central Travancore region of Kerala State.

We are steadily making progress in highly competitive scientific research and is coming into limelight in national and international levels. The Institute has chosen contemporary frontier areas of research in the fields of tissue engineering, biotechnology, biochemistry, microbiology, bioinformatics, cancer, virology, molecular biology and clinical epidemiology. We have several memorandums of understanding (MoUs) with reputed research institutions in India for taking up collaborative research work/projects. PRC's annual scientific conference is a prestigious event named as "Bioradiance" which takes up relevant themes every year. Bioradiance is a well-attended scientific conference known across India. The report year's theme for Bioradiance was 'Microbiome – Little Bugs: Friends or Foe!' We also conduct periodic workshops and training sessions round the year.

PRC is a Department of Scientific and Industrial Research (DSIR) recognized institution. It is also a Ph.D. centre recognized by Kerala University of Health Sciences (KUHS). Apart from collaborative research initiative, we guide Masters Students (MD, MDS & M.Sc.) in their thesis studies. PRC has well equipped laboratories with *in-vitro* facilities and Committee for the Purpose of Control and Supervision of Experiments on Animals (CCSEA) approved Animal House.

PRC has crossed over 350 publications in peer-reviewed high impact factor national and international journals. PRC has more than 10 patents in its credit. PRC, a part of Pushpagiri Medical College, gives immense scope and opportunities in taking up research in medicine and basic sciences. I conclude this message by thanking all those who are instrumental in nurturing PRC over the years.

Sincerely,



George Varghese

Coordinator, Pushpagiri Research Centre

STUDENT COORDINATOR'S MESSAGE



It is with great pride and enthusiasm that I present the annual report of the PRC for the year 2023-2024. Since its inception, PRC has been a cornerstone of medical research under the Pushpagiri Medical Society, serving as the Central Research Facility for our various institutions. Our mission at PRC focuses on the '3P model' stands for Publication-Projects-Patents thereby fostering sustainable therapeutic regimens and translating clinical research into innovative products, patents and high-impact publications.

Our efforts in addressing antimicrobial resistance (AMR) by scrutinizing nosocomial pathogens and exploring sustainable therapeutic regimens through combination therapies have been particularly noteworthy. All our experiments adhere to CLSI standards and comply with the WHO and ICMR guidelines, ensuring the highest level of research integrity and quality. We have well-furnished high-end computational and *in-silico* drug designing facilities. Our Centre has made significant progress in the food biotechnology, environmental bioremediation, nanobiotechnology, clinical biochemistry, synthesizing novel scaffolds and biomaterials for tissue regeneration which have been patented from our institute. We perform and provide all preclinical analysis upon adhering to ISO guidelines, and clinical trials in compliance with DHR and CDSCO guidelines. The virology center is equipped with the state-of-the-art facilities that has been at the forefront in providing full-fledged diagnostic services and research.

We actively foster in guiding young exuberant minds towards research and innovation by providing internships, hands-on-trainings, project dissertations in alignment with science colleges and universities across the state and the country at large. We have active funded projects running in collaboration with several national and international agencies and universities which has immensely contributed in promoting medical research and innovations. We also provide services pertaining to accessibility of our high-end analytical instrumentation facilities on board at affordable rates. Cordially inviting all the young researchers to explore the best of our medical research facilities for gaining new heights in your career.

Best regards,



Dr. Aniket Naha (M.Sc., Ph.D.)
Scientist and Student Coordinator
Pushpagiri Research Centre

MANAGEMENT TEAM



**H.G. Most Rev. Dr. Thomas Mar
Koorilos**
Metropolitan Archbishop of
Tiruvalla & Patron



**Rev. Msgr. Fr. Issac
Parappallil**
Vicar General Archdiocese of
Tiruvalla, President



Rev. Fr. Dr. Biju Varghese
Chief Executive Officer,
Secretary



Shri. Jacob Punnoose, IPS
Principal Advisor



**Rev. Fr. Dr. Mathew
Mazhavancheril**
Director & Head
Pushpagiri Research Centre



**Rev. Fr. George
Valiyaparampil**
Director - College of Medicine
& Allied Science



Rev. Fr. Mathew Thundiyl
Hospital Administrator



Rev. Fr. John Padipurackal
Director Finance



Rev. Fr. Aby Vadakumthala
Director of Institutions
& Medicity

DSIR RECOGNITION



दूरभाष/TEL : 26962819, 26567373
(EPABX) : 26565694, 26562133
: 26565687, 26562144
: 26562134, 26562122
फैक्स/FAX : 26960629, 26529745
Website : <http://www.dsir.gov.in>
(आईएसओ 9001:2008 प्रमाणित विभाग)
(AN ISO 9001:2008 CERTIFIED DEPARTMENT)



भारत सरकार
विज्ञान और प्रौद्योगिकी मंत्रालय
वैज्ञानिक और औद्योगिक अनुसंधान विभाग
टेक्नोलॉजी भवन, नया महरूली मार्ग,
नई दिल्ली - 110016
GOVERNMENT OF INDIA
MINISTRY OF SCIENCE AND TECHNOLOGY
Department of Scientific and Industrial Research
Technology Bhavan, New Mehrauli Road,
New Delhi - 110016



F.No. 14/590/2011-TU-V

Date: 27th March 2023

The Director
Pushpagiri Medical Society
Pushpagiri Medical College Hospital Campus,
Pathanamthitta,
Tiruvalla – 689101, Kerala .

Subject: Renewal of Recognition of Scientific and Industrial Research Organisations (SIROs).

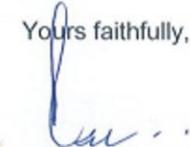
Dear Sir,

This has reference to your application for renewal of recognition of **Pushpagiri Medical Society, Tiruvalla, Kerala** as a Scientific and Industrial Research Organisation (SIRO) by the Department of Scientific and Industrial Research under the Scheme on Recognition of Scientific and Industrial Research Organisations (SIROs), 1988.

2. This is to inform you that it has been decided to accord renewal of recognition to **Pushpagiri Medical Society, Tiruvalla, Kerala** from **01.04.2023 to 31.03.2026**. The recognition is subject to terms and conditions mentioned overleaf.

3. Receipt of this letter may kindly be acknowledged.

Yours faithfully,



(Dr. P.K. Dutta)
Scientist - 'G'

Pushpagiri received the DSIR recognition for the 4th consecutive time

RESEARCH ADVISORY BOARD

ADVISORY COMMITTEE MEMBERS



Dr. Anil Sukumaran

BDS, MDS, Ph.D., FDS RCS (Ed), FDS RCPS (Glas), FICD, FPFA

Professor, Periodontics, Implant Dentistry
Hamad Medical Corporation, Qatar



Dr. Aji P. Mathew

Ph.D.

Professor, Department of Materials & Environmental Chemistry
Stockholm University, Sweden



Dr. Lakshmi S. Nair

M. Phil, Ph.D., FSBOI, FAIMBE, FNAI

Professor, Department of Orthopedic Surgery, University of Connecticut Health, Associate Director, The Connecticut Convergence Institute for Translational in Regenerative Engineering, Connecticut, USA



Dr. Jayachandran VP

M.Sc., Ph.D.

Lecturer, Applied Biology Section, Applied Sciences Department, University of Technology & Applied Sciences, PO Box 74,
AL-Khuwair, PC 133, Muscat. Sultanate of Oman



Dr. Sabu Thomas

Ph.D., FRSC, FeurASc, D.Sc. (UL, France), D.Sc. (UBS, France)

Chairman, Trivandrum Engineering Science & Technology (TrEST) Research Park, Trivandrum, Government of Kerala, India Former Vice Chancellor, MG University, Professor of Polymer Science & Engineering, Kottayam 686560, Kerala, India



Dr. Anand Anbarasu

M.Sc., M.Tech., Ph.D., FRSB (UK)

Professor, Department of Biotechnology
School of Bio Sciences and Technology
Vellore Institute of Technology, Vellore – 632014, Tamil Nadu, India



Dr. Nandakumar Kalarikkal

Ph.D., IIUCNN & SPAP

Associate Professor, Advanced Materials Laboratory, School of Pure and Applied Physics, International and Inter University Centre for Nanoscience and Nanotechnology, Mahatma Gandhi University, Kottayam-686 560, Kerala, India



Dr. Raghu KG

Ph.D. Rtd.

Chief Scientist, CSIR - National Institute for Interdisciplinary Science and Technology (NIIST), Trivandrum



Dr. Betsy Joseph

Ph.D.

MFDS RCPS (Glasg), Professor, Saveetha Dental College & Hospitals, Saveetha Institute of Medical and Technical Sciences, Chennai, India



Dr. K Rajankutty

B.Sc., BVSc. & AH, MVSc., Ph.D.

Scientist & Head, Small Animal Research Facility, Jubilee Mission Medical College & Research Institute, Trissur, 680005

ADJUNCT FACULTIES



Dr. Philip Mathew
MD
Official in World Health Organization (WHO)
Geneva, Switzerland



Dr. Mekha Grace Varghese
BDS, MDS
Tissue Engineering and Regenerative Medicine Laboratory
Pushpagiri Research Centre
Pathanamthitta, Tiruvalla, Kerala

FACULTY MEMBERS AND SCIENTISTS OF PRC

<p>Director & Head</p>		<p>Rev. Dr. Mathew Mazhavancheril</p> <p>[M.Sc., Ph.D., Post Doc (France)]</p>
<p>Coordinator & Pushpagiri Centre for Virology</p>		<p>Mr. George Varghese [M.Sc. (CMC Vellore)] Assistant Professor & Virology In-Charge</p>

<p>Medical Biotechnology & Computational Drug Designing Lab</p>		<p>Dr. Aniket Naha [M.Sc., Ph.D.] Scientist & Student Coordinator</p>
<p>Tissue Engineering & Regenerative Medicine Lab</p>		<p>Dr. Nebu George Thomas [MDS, Ph.D.] Scientist & Professor</p>
<p>Molecular Biology & Phytochemicals Research Lab</p>		<p>Dr. Yogesh Bharat Dalvi [M.Sc., Ph.D.] Scientist</p>
<p>Biochemistry Lab</p>		<p>Dr. Soumya R.S. [M.Sc., Ph.D., Post Doc] Scientist & Assistant Professor</p>
<p>Microbial Technology & Infectious Diseases Lab</p>		<p>Dr. Aniket Naha [M.Sc., Ph.D.] Scientist & Student Coordinator</p>

<p>Clinical Epidemiology Unit</p>		<p>Dr. Rosin George Varghese [MD] Assistant Professor</p>
<p>Public Health</p>		<p>Dr. Betsy A Jose [MD] Assistant Professor & Project Coordinator (CANCare)</p>
<p>Physiology</p>		<p>Dr. Leya Elizabeth Babu [MD] Assistant Professor</p>
<p>Veterinarian</p>		<p>Dr. Ampadi A. N. [MVSc, PGDAW, BVSc and Ah] Veterinary Officer</p>
<p>Secretary</p>		<p>Mr. Jacob P. Ouseph Executive, PRC</p>



PUSHPAGIRI
RESEARCH
CENTER

BIORADIANCE – 2023



Bioradiance

PUSHPAGIRI RESEARCH DAY 2023

National conference on
“Microbiome- Little bugs: friends or foe!”



Organised by

Pushpagiri Research Centre and Department of Microbiology,
Pushpagiri Institute of Medical Sciences and Research centre, Tiruvalla

Co-sponsored by

American Society for Microbiology (ASM)

| **Date** : 27th May 2023 |

Venue : Senate Hall, Pushpagiri Medical College Hospital

'Bioradiance' is a national research conference conducted annually and is a favorite for research scholars and bio-science students to update and gain knowledge on topics of current research. Over past years Bioradiance has covered topics like Bio-informatics, recent advances in research and diagnosis of cancer, cytogenetics and its applications, demystifying statistics, frontiers in diabetic research, Molecular techniques in microbial research, Toxicity current perspectives, COVID-19, emerging infectious diseases etc. Pushpagiri Research Centre (PRC) conducted its 11th annual national conference Bioradiance-2023 with the theme of "Microbiome- Little bugs: friends or foe!"

This annual conference is conducted for prompting research scholars, budding clinicians and bio-medical science students to keep abreast with the latest and motivate them thereby facilitating their opportunities as an innovator. The conference aims to highlight the research possibilities with emphasis on using newer modalities both for research and diagnostics. It will be of great use, in particular, for postgraduate students, researchers, clinicians, academicians and Ph.D. scholars who have the interest to learn from the experts.

SPEAKERS OF BIORADIANCE – 2023

1		<p style="text-align: center;">Dr. Sabu Thomas [Ph.D.]</p> <p>Faculty Scientist and Principal Investigator, Pathogen Biology Division, Rajiv Gandhi Centre for Biotechnology, (National Institute under the Dept. of Biotechnology, Govt. of India), Trivandrum, Kerala, India</p> <p>Dr. Sabu is a lead researcher in Cholera, bacterial biofilms, antimicrobial resistance, probiotics, and a member of second Arctic Expedition</p>
2		<p style="text-align: center;">Dr. Rama Chaudhry [MD]</p> <p>Dean Research, SR Director and Professor, Microbiology, National Institute of Medical Science & Research, Jaipur; Ex. Dean Research, Former Professor and Head, Department of Microbiology, All India Institute of Medical Sciences, New Delhi, India</p> <p>Dr. Rama's areas of contribution include Mycoplasma infections, Vector borne diseases antimicrobial resistance, gut microbiota, anaerobic bacteriology as well as bacteriophages</p>

3		<p align="center">Dr. Kishore G. Bhat [MD]</p> <p>Clinical Microbiologist, Arihant Superspecialty hospital, Belgaum, Former Professor & Head, Department of Microbiology Former Director, Central Research Laboratory, Maratha Mandal's NGH Institute of Dental Sciences & Research Centre, Belgaum, Karnataka, India</p> <p>Dr. Kishore is credited with setting up a reference laboratory for oral microbiology by Rajiv Gandhi University of Health Sciences, Bangalore for isolation, identification and maintenance of oral Gram-negative anaerobes</p>
4		<p align="center">Dr. Beena Antony [Ph.D]</p> <p>Scientist & Head, Microbiology Division, Father Muller Research Centre; Professor, Department of Microbiology, Father Muller Medical College, Mangalore, Karnataka, India</p> <p>Dr. Beena's areas of contribution include works on Clostridium difficile, Gardnerella vaginalis, biofilm Production in Anaerobes, probiotics, microbiome, and dental pathogens</p>
5		<p align="center">Dr. Sherly Antony [MD PDCR]</p> <p>Young Ambassador of American Society for Microbiology (ASM) to India (2023), Pushpagiri Research Centre Coordinator and Assistant Professor, Department of Microbiology, Pushpagiri Institute of Medical Sciences and Research Centre, Tiruvalla, Kerala, India</p> <p>Dr. Sherly's areas of interest include infectious diseases, respiratory viruses, AMR, anaerobic bacteriology</p>

Proceedings of one day National Research Seminar on 'Molecular biology Techniques in Microbial Research' (Bioradiance- 2023)

Pushpagiri Research Centre and Department of Microbiology, Pushpagiri Institute of Medical Sciences and Research Centre (PIMS & RC) supported by American Society for Microbiology (ASM) organized Bioradiance 2023, a one-day National Conference with the central theme of "Microbiome- Little bugs: friends or foe!" on 27th May 2023. Though,

Bioradiance is being conducted annually since 2013, this was the first time it was conducted in a hybrid mode! It was also celebrated as Pushpagiri Research Day! It was an occasion of coming together of researchers and clinicians under one roof to share knowledge, discuss important scientific advancements in research and the way forward for research scholars, scientists and students of biosciences, medical, and dental branches from all over India.

The conference began with the first talk by Dr. Rama Chaudhry, Former International Ambassador of American Society for Microbiology (ASM) to India, Former Dean Research and Head, AIIMS, New Delhi, SR Director and Professor Microbiology, Dean Research, NIMS University, Jaipur who discussed the importance of the less talked organism, Bartonella and its high time we take it seriously. She stressed how important is we believe what we find out, and try to substantiate it by sound scientific knowledge and proof. This talk was followed by the inaugural programme.

The inaugural program began invoking God's blessings and grace for endowment of true wisdom. Dr. Sherly Antony, ASM young Ambassador to India and organizing secretary of Bioradiance 2023 welcomed all the luminaries to this conference including the chief guest, dignitaries, senior faculties, colleagues and of course the most vital people of the seminar, the participants. This was followed by the introductory address by Rev. Dr. Mathew Mazhavancheril, Pushpagiri Research Centre who spoke of the importance of research and on the commitment of faculty, towards a common goal of research and development of mankind. Thereafter, the chief guest of the ceremony, Dr. Sabu Thomas, Faculty Scientist and Principal Investigator, Pathogen Biology Division, Rajiv Gandhi Center for Biotechnology, TrivanDr.um, Kerala delivered the inaugural address where he stressed the significance of Microbiome and how our lifestyle changes have affected our flora thereby making us prey to various diseases. Then the conference was inaugurated by lighting of lamp symbolising the divine light by the dignitaries including Dr. Sabu Thomas, Rev. Fr. George Valiyaparambil, Dr. Kishore G Bhat, Dr. Beena Antony, Dr. Gaddam Vijayalakshmi, Dr. Sunil Rao, Dr. M.O Annamma and Dr. Sherly Antony. Dr. Sabu Thomas was honoured for his long research career by the Rev. Fr. George Valiyaparambil with a traditional Aramula kannadi. Dr. Sunil Rao felicitated Dr. Sabu

Thomas with a ponnada signifying his immense contributions in the Kerala state having several publications, funded projects and also mentored several youngsters and inculcated in them a passion for research and innovations. Rev. Fr. George Valiyaparambil, Director, PIMS & RC, inaugurated the first of its kind here, the Mar Athanasios Research Endowment award.

He spoke on why research should be undertaken and how the management is supporting the faculty of medical college with such kind of gestures. He congratulated all the winners of the award and prayed that all faculty take up more research work and come forward in the coming years to win the award. This was followed by distribution of prizes to the winners, Dr. Punya Chandran, Department of Physiology, Dr. Reeba Mary Issac, Department of Pathology, Dr. Sherly Antony, Department of Microbiology, Dr. Varkey S Kulangara, Department of Orthopaedics, and Dr. P. S. John, Department of Orthopaedics, PIMS & RC. Next Dr. Gaddam Vijayalakshmi, Vice Principal Pushpagiri Institute of Medical Sciences delivered the vote of thanks who thanked all the dignitaries, speakers, sponsors and delegates. There were around 210 delegates with poster presentations, making the event a grand success. The scientific sessions continued by Dr. Sabu Thomas, who spoke on 'Gut Microbiome: an emerging frontier to human health.' He condensed the topic in a very palatable manner for the students with various anecdotes of his personal experience. He was presented with a memento by Dr. M.O Annamma, Former Principal, PIMS & RC. The next invited lecture on the 'Molecular detection of oral microbiome in health and disease' by Dr. Kishore G Bhat, Clinical microbiologist, Arihant Super specialty Hospital, Belgaum His talk gave young researchers an insight to the mesmerising world of different molecular techniques.' He was presented a memento by Dr. Sunil Rao, Professor and Acting Head of Microbiology, PIMS & RC. This was followed by lunch.

Then we continued with the much-awaited talk by the Dr. Beena Antony on 'Dysbiosis of microbiome with an emphasis on *Clostridium difficile* and current perspectives'. She was presented with a memento by Dr. Kishore G Bhat for the very engaging and outstanding lecture.

The final talk of the day was by Dr. Sherly Antony, Coordinator, Pushpagiri Research Centre, and Assistant Prof., Department of Microbiology, Pushpagiri Institute of Medical Sciences and Research Centre, who gave a talk on 'A career in microbiology: the way forward with a peak into ASM.' Her lucid talk covered all the basics of how to proceed forward which proved to be very valuable for the budding research scholars as well as clinical microbiologists. She was presented with a memento by Dr. Nebu George Thomas, Professor, Dept. of Periodontics, Pushpagiri College of Dental Sciences and Scientist, Pushpagiri Research Centre.

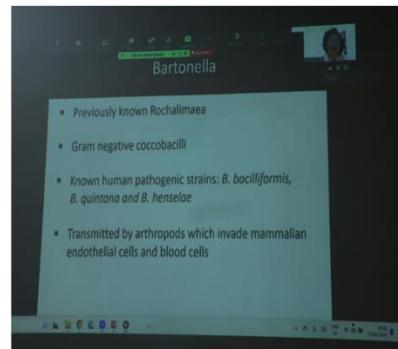
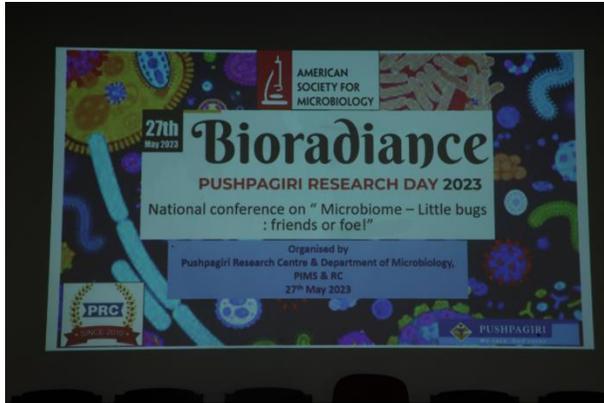
Meanwhile, the poster presentation began at 8.20 am in Lecture Hall 1 and 2 with 2 categories being held simultaneously i.e. General research, and Clinical cases and research respectively, to be inclusive to both the groups and fair on judgement. The judges for the category 1 were Dr. Sreeja Nair, Department of Microbiology, Dr. Prabha S.P, Department of Biochemistry, and Ms. Nisha Kurian, Department of Community Medicine, PIMS & RC. While the judges of Category 2 were Dr. Liya Roslin Joseph, Department of Pharmacology, Dr. Amrutha Mary Zachariah, Department of Physiology and Dr. Anjum Susan John, Department of Community Medicine, PIMS & RC who evaluated the posters from students from different colleges across Kerala and also online candidates from across India. The onsite and online sessions were managed smoothly and smartly by Dr. Soumya R S, Pushpagiri Research Centre, Dr. Leya Elizabeth Babu, Department of Physiology, Dr. Rosin George Varghese and Dr. Betsy A Jose, Department of Community Medicine, PIMS & RC.

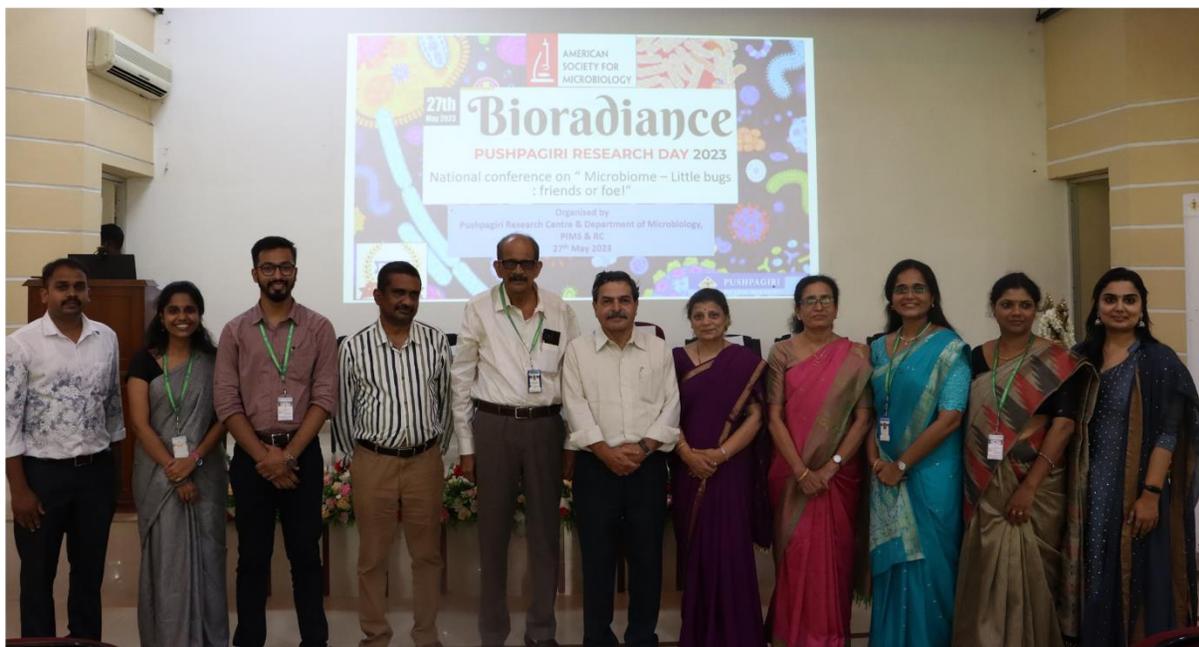
This was followed by the valedictory speech and announcement of the winners of Poster competition by Dr. Leya Elizabeth Babu. The winners of Category 1 were Dr. Ruby Varghese, Department of Chemistry and Biochemistry, School of Sciences, Jain, deemed to be University, Bengaluru, Dr. Namitha Vijay, PIMS & RC and Dr. Betsy Thomas, Pushpagiri College of Dental Sciences. While in the category 2 the winners were Dr. Amrithavarshini, Amrita School of Nanosciences and Molecular Medicine, Dr. Raksha Bhatt, St. Martha Hospital, Bangalore and Dr. Anju Mathew, Pushpagiri Institute of Medical Sciences and Research Centre.

The various prizes were handed over by Dr. Sunil Rao and Dr. Nebu George Thomas, to the winners. The valedictory session concluded with a vote of thanks by Dr. Sherly Antony, organizing secretary who thanked the ASM for co-sponsorship, the Directors of Pushpagiri Medical Society, the speakers, judges, all the organizing committee members of Bioradiance 2023, faculty, students, and supporting staff (IT, marketing, hospitality, catering) for the smooth functioning of the seminar. Indeed, the active participation of delegates, scientists, faculty members, students and research scholars from various Institutions were the highlight of the conference making it a successful and fruitful event. The programme ended with a promise to come back next year with eminent speakers on topics of international relevance and Bioradiance 2023 was closed!

PATRONS & ORGANISING COMMITTEE BIORADIANCE 2023

PATRONS	
His Grace Rev. Dr. Thomas Mar Koorilos (Archbishop, Tiruvalla Diocese)	
Rev. Fr. Jose Kallumalickal (CEO, Pushpagiri Group of Institutions)	
Rev. Dr. Mathew Mazhavancheril, (Director & Head, PRC)	
Rev. Fr. George Valiyaparambil (Director, PIMS & RC)	
Dr. Tomy Philip (Principal, Pushpagiri Institute of Medical Sciences and Research Centre)	
Dr. Mercy John Idikula (Professor & Head, Dept of Microbiology)	
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General Convener: Dr. Sunil Rao Padmaraj (Professor, Department of Microbiology)	
Convener: Mr. George Varghese	
Organising Secretary: Dr. Sherly Antony	
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Dr. Yogesh Bharat Dalvi	Dr. Nebu George Thomas
Dr. Soumya R.S.	Dr. Leya Elizabeth Babu
Dr. Rosin George Varghese	Dr. Sreeja Nair
Dr. Betsy A Jose	Dr. Aniket Naha
Dr. Aneeta Mary Jacob	Dr. Vinod Mathew
RECEPTION COMMITTEE	
Dr. Teena Jacob	Dr. Serene Varghese
Dr. Gokul Shankar	Dr. Saumya R
Dr. Megha Moni Thomas	Dr. Pavithra Padmakumar





RESEARCH FACILITIES OF PRC

a. Centre for Virology

virology@pushpagiri.in

Mr. George Varghese, M.Sc. Medical Microbiology (CMC Vellore),

surugv@pushpagiri.in



Pushpagiri centre for virology has groomed into a premier centre for viral diagnosis and research in Central Travancore. It is equipped with state of the art facilities. The mission of the centre is to initiate diagnostic services and research on viruses and viral diseases of humans. The centre is involved in providing diagnostic services and cutting-edge research on viruses and viral diseases in humans. It is equipped with state-of-the-art facilities. The mission of the Centre is to initiate diagnostic services and research on viruses and viral diseases of humans. The volume of work is managed by fully automated systems like CLIA, ELFA and ELISA. The hall mark of Pushpagiri Centre for Virology is



the Biosafety level-2 facility for molecular diagnosis and research. The lab is equipped with conventional and real time PCR facilities. The Centre also provides training programmes in PCR.

Diagnostic Viral Serology Facilities

The laboratory is handling various types of specimens, primarily from Pushpagiri Medical College Hospital. Serological diagnosis of HIV, Hepatitis viruses, including various HBV markers, HEV, HAV and Dengue Fever. Apart from ELISA's, the volume of work is managed by fully automated systems like CLIA (Chemiluminescence Immuno Assay – Abbot, USA) and ELFA (Enzyme Linked Fluorescent Assay - Vidas Biomerieux, France). The lab is giving valuable services during seasonal outbreaks of Influenza, Dengue etc.

Diagnostic Molecular Virology Facilities

The hall mark of Pushpagiri Centre for Virology is the diagnostic molecular virology. The lab is equipped with Conventional and real time PCR facilities. Apart from quantitative PCR's for HBV and HCV, diagnostic PCR for SARS CoV-2 and Leptospira is also available.

Quality Assurance

The lab is NABL accredited as per ISO 15189:2012 for Real Time quantitative HCV PCR and SARS CoV-2 qualitative PCR. The quality of the lab is evaluated by NABL assessments and internal audits. Lab follows strict internal quality controls measures as per guidelines.

Research Facilities

Research at virology has been aimed at elucidating the epidemiology in the local community, initiating and maintaining surveillance, studies in the genetic variations of viruses and developing affordable technologies for the provision of diagnostics for diseases in the near future. The centre trains students of basic and medical sciences for various internships, hands-on-training and dissertation projects.

Consolidated Statistics of Diagnostic Services Provided for April 2023 to March 2024

PUSHPAGIRI CENTRE FOR VIROLOGY	
(Statistics - April 2022 to March 2023)	
Test Name	No. of Tests
HIV	12351
HBsAg	13001
HCV	12920
HBeAg	60
HBeAb	0
HBcIgM	27
Anti Hbs Titer	809
HAV IgM	145
HEV IgM	49
Dengue NS1	1039
Dengue IgM	1039
Dengue IgG	1038
Influenza PCR	0
RSV PCR	0
JE PCR	0
Pan Entero PCR	0
HSV 1 & 2 PCR	0
VZV PCR	0
HBV Qualitative PCR	55
HBV Quantitative PCR	20
HCV Qualitative PCR	0
HCV Quantitative PCR	0
CMV PCR	0
Leptospira PCR	81
COVID-19 RT PCR	157
TOTAL INVESTIGATIONS	42791

Instrumentation Facilities



Refrigerator



**Deep Freezer
(-80°C)**



**Deep Freezer
(-20°C)**



**CO₂ Incubator
for Virology**



Dry Bath



Cooling Centrifuge



**Ultra Low
Temperature Freezer**



Laminar Air Flow



Vortex



**Miniature
Centrifuge**



**Weighing
Balance**



**Biosafety
Cabinet**



**Deep Freezer
(-20°C)**



Refrigerator



Thermal Cycler



Real Time PCR



**Real Time PCR
(QStudio5 Themo Fischer)**



Abbot CLIA



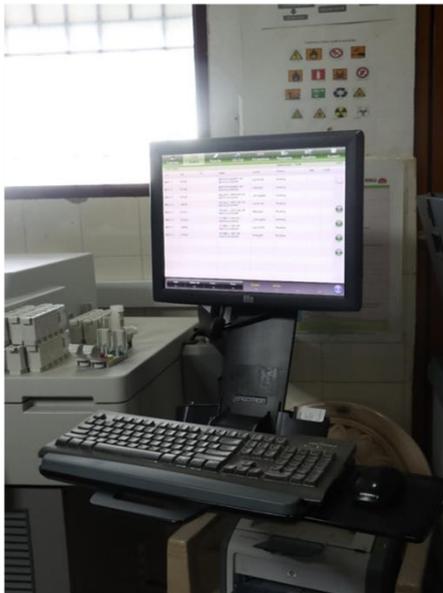
Incubator



**BIORAD
Connect R1**



Water Bath



**PC Attachment for
Microplate Reader**



Cooling Centrifuge



ELISA Washer



Centrifuge



Cyclo Mixer



Refrigerator



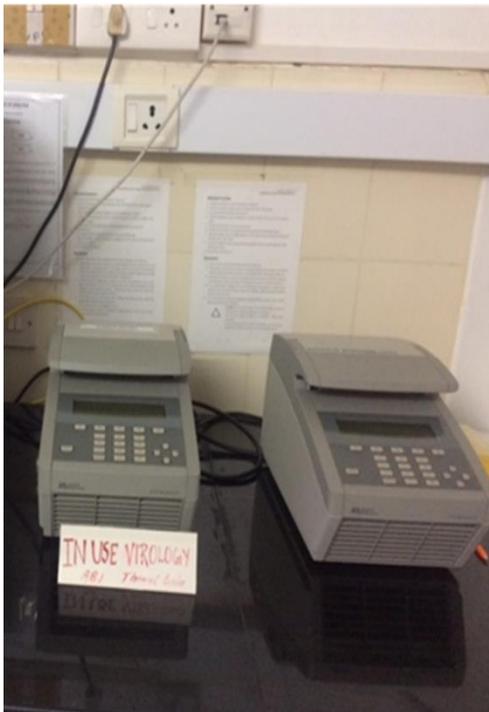
Biomerieux VIDAS Machine



Abbot's Architect CLIA Machine



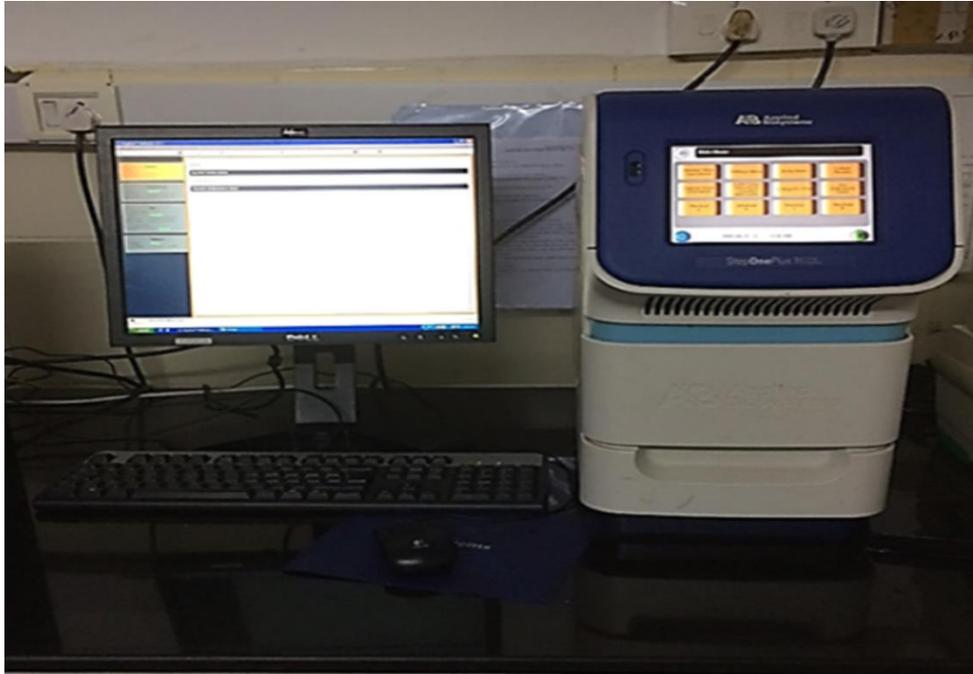
BSL-2 Facility



**Applied Biosystems
Thermocyclers**



**Refrigerated
Centrifuge**



Applied Biosystems Real Time PCR – Step One Plus



Applied Biosystems Real Time PCR – QuantStudio5



CO₂ Incubator



Microscope



Refrigerator



Weighing Balance



Laminar Air Flow



Double Distillation Unit



Water Bath



Magnetic Stirrer



UV – Vis Spectrophotometer

b. Medical Biotechnology and Computational Drug Designing Laboratory

Scientist: Dr. Aniket Naha, M.Sc., Ph.D., draniketnaha@pimsrc.edu.in



The Medical Biotechnology and Computational Drug Designing Laboratory is dedicated to understanding and addressing the causes of antimicrobial resistance through advanced techniques in genomics, proteomics, systems biology, and structural bioinformatics. Our research focuses on clinically significant nosocomial bacterial pathogens and developing sustainable therapeutic regimens by combining active phytochemicals from medicinal plants with effective antibiotics. All our experiments adhere to guidelines set by the World Health Organization (WHO) and The Indian Council of Medical Research (ICMR), following CLSI breakpoints and EUCAST standards.

We also emphasize isolating and characterizing novel probiotics with high nutritional value and enhanced immune-modulatory potential. Our lab has a proven track record of screening and characterizing novel probiotic strains from student projects, which are successfully deposited in the NCBI database. Equipped with cutting-edge workstations, we conduct extensive computational research to design novel antimicrobial peptides and lead molecules through computer-aided drug design (CADD). Our lab has successfully modeled several protein structures through computational experimentation and deposited them in the Protein Model Database for public use.

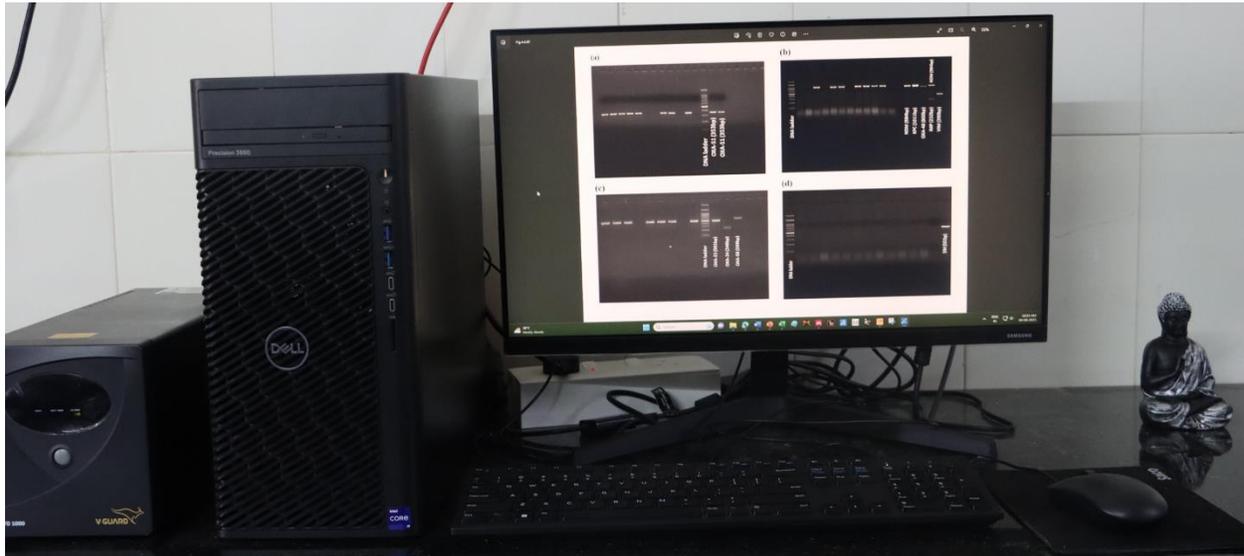
Our work also extends to bioremediation strategies for treating sewage and wastewater, as well as phyto-rhizoremediation techniques. The lab is extensively equipped with instruments for in-silico and in-vitro experiments, including advanced workstations for genomics and computational drug design, orbital shaking incubators, autoclaves, rotary shakers, water baths, precision weighing balances, heating mantles, heating plates with magnetic stirrers, Gel-doc instruments, and basic extraction and chromatographic setups for clinical, food, and environmental microbiological experiments.

The lab has received institutional funding for research and has a strong track record of publishing papers in international peer-reviewed journals. We are actively involved in guiding students for their dissertation projects and hands-on training activities. Dr. Aniket conducts several hands-on training sessions to help students cope with advanced and AI-based technologies.

Research Interests:

1. Antimicrobial Tolerance and Resistance in ESKAPE Pathogens: We investigate the mechanisms behind the emergence of antimicrobial tolerance and resistance in ESKAPE pathogens to develop strategies to combat these resilient bacteria.
2. Biofilm Assays and Quorum Sensing: Our research includes phenotypic and molecular characterization, biofilm assays, and studies on quorum sensing. We also screen for potential biofilm disruptors that could prevent or dismantle bacterial biofilms.
3. Phytochemical-Derived Antimicrobial Agents: We focus on identifying and screening effective antimicrobial agents derived from phytochemicals, exploring their potential as sustainable alternatives to conventional antibiotics.
4. Advanced Glycation End-Products (AGE) Inhibition: Our studies aim to elucidate the mechanisms by which phytochemical derivatives inhibit the formation of advanced glycation end-products (AGEs), which are implicated in chronic diabetic complications.
5. Bioelectricity Production via Microbial Fuel Cells (MFC): We investigate the production of bioelectricity using Microbial Fuel Cells (MFCs) from hospital waste and wastewater treatment plants, exploring sustainable energy solutions.
6. Systems Biology and Therapeutic Biomarkers: Utilizing systems biology approaches, we study protein-protein interactions (PPI) and host-pathogen interactions (HPI) to identify alternative therapeutic biomarkers in nosocomial pathogens.
7. Virtual Screening and Lead Optimization: Our research includes virtual screening, pharmacokinetics-pharmacodynamics (PK-PD) assessments, pharmacophore modeling, and lead optimization through quantum chemical density functional theory simulations.
8. Structural Bioinformatics and Molecular Dynamics: We employ structural bioinformatics techniques to validate the stability of novel theragnostic biomarkers with screened leads. This involves molecular docking, molecular dynamics simulations, and essential dynamics simulations to ensure the efficacy and stability of potential therapeutic agents.

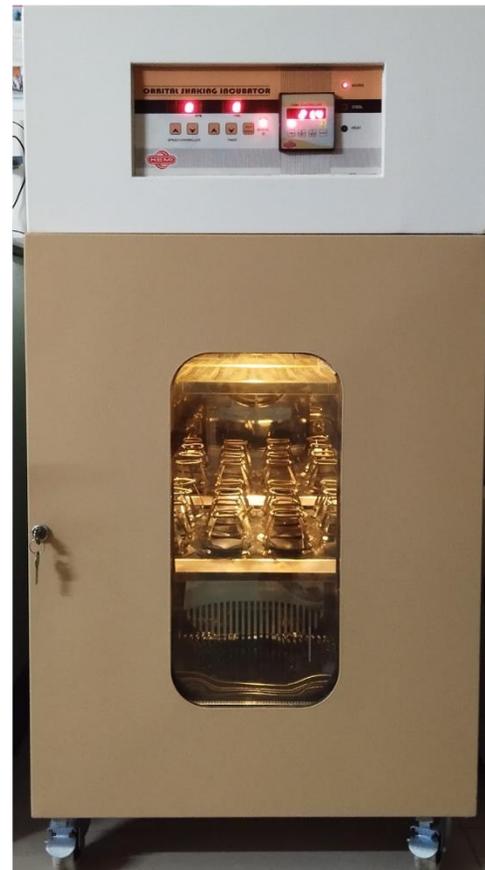
Instrumentation Facilities



Precision Tower Dell Workstation



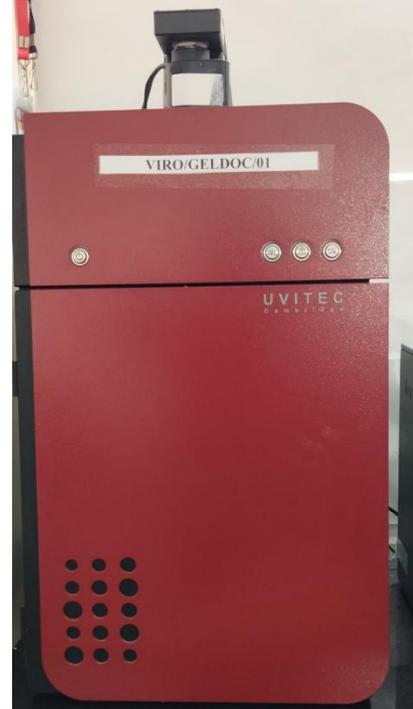
Ultra Cooling Centrifuge



Shaking Incubator



Water Bath



Gel Doc



Orbital Shaker



Autoclave



Colorimeter



Refrigerator



pH Meter



**Heating Plate with
Magnetic Stirrer**



**Precision Weighing
Balance**



**Bright Field
Microscope**



Vortex



**Heating
Mantle**

c. Microbial Technology Research & Infectious Disease Laboratory

Scientist: Dr. Aniket Naha, M.Sc., Ph.D., draniketnaha@pimsrc.edu.in



Involved in the testing of antimicrobials from natural products as well as synthetic materials that can lead to drug innovations and remediation strategies. The emergence of antimicrobial resistance is a global health problem. Hence solutions encouraging and facilitating the evolution of new antimicrobials are the necessity of the hour. Also new emerging & re-emerging infectious diseases are scrutinized with in depth analysis of the agents of infectivity, their molecular characterization and co-relation to severity of disease manifestations. Short term training programmes in basic clinical microbiology are offered.

Instrumentation Facilities



**Magnetic Stirrer with
Heating Mantle**



**Laminar Air
Flow**



**Simple
Microscope**



**Compound
Microscope**



Vortex



**Microbial Colony
Counter**



Centrifuge



**Bacteriological
Incubator**



**Ultra Cooling
Refrigerator (-20°C)**



**Hot Air
Oven**



**High Precision
Weighing Balance**



Refrigerator

d. Tissue Engineering Laboratory and Regenerative Medicine

Scientist: Dr. Nebu George Thomas, MDS, Ph.D.

nebugeorgethomas@pushpagiri.in



Involved in the development of scaffolds, using principles of engineering and life-sciences, which may help regenerate tissue lost due to various diseases or injuries. The goal of the lab is to develop scaffolds that have the ability to induce cellular response and stimulate regenerative cells. Focus on bone and skin regeneration in general, and periodontal tissue in particular. Also involved in studying interaction of

various biomaterials with tissue structures in the body. Preclinical analysis of scaffolds were performed as per ISO guidelines. The lab performs pre-clinical analysis of biomaterial as per ISO standard. The biomaterial are developed from marine sources and animal origin for tissue engineering application the test performed in the labs are:

✚ **In-vitro facilities:** Biomaterials Preparation and Extraction, Cytocompatibility, Cytotoxicity elution test, MTT cell proliferation assay, Surface culture test, Agar overlay assay

Clean room facility for fabrication of tissue engineering scaffolds for application in regenerative medicine with Lyophilizer facility

✚ **In-vivo facilities:** Genotoxicity, Mammalian test systems, Nonmammalian test systems, Intracutaneous Reactivity, Skin Sensitization Assay, Acute Systemic Toxicity, Hemocompatibility, Complement Activation, Thrombogenicity, Pyrogenicity, Carcinogenicity Implantation ,Performance and Efficacy Evaluation Osseointegration and Critical-Size Defects, Long-Bone Pressure Fitted Transcortical Placement, Trepined bone core repair, Mandibular Osteotomy Defect Repair, Osteomyelitis and Antimicrobial Treatments, Osteoinduction Models, Dental Implants and Guided Bone Regeneration, Teeth extraction procedure, Bone graft implantation procedure, Dental implant placement, Imaging, Live computed tomography (Cone beam CT-scan), Magnetic resonance imaging (MRI), Micro-computed tomography (micro-CT), Necropsy and Macroscopic Grading (Gross Pathology), Histology, Sample preparation , Nondecalcified (plastic) histology, Decalcified histology, Histopathology, Local effects on hard tissue, Local effects on soft (cartilage) tissues, Effects on major organs, Abnormal macroscopic findings and gross lesions, Histology Imaging, Histomorphometry

✚ **Histopathology lab-** Adaptor for disposable knife attachment, Albuminometer, Automated hematology analyzers-sysmex XN 1000, Mindray BC 6200, Automated urine analysers: FUS 1000, Uriplus 600, Balance for weighing organs, Binocular microscope, Bone saw, Hot air oven, Hot plate, Incubator

Instrumentation Facilities



Lyophilizer



Centrifuge



**Heating
Mantle**



Water Bath Shaker



Heating Chamber



Biosafety Cabinet



Microtome



**Hot Air
Oven**



**UV-Vis
Spectrophotometer**



**Heating Plate with
Magnetic Stirrer**



**Laminar Air
Flow**



**Miniature
Centrifuge**



Refrigerator



**Ultra Cooling
Freezer (-20°C)**

e. Phytoceuticals and Molecular Biology Research Laboratory

Scientist: Dr. Yogesh Bharat Dalvi, Ph.D., yogesh_dalvi@pushpagiri.in



The Phytoceuticals and Molecular Biology Research Lab is a leading laboratory dedicated to fundamental and translational research, with a strong focus on regenerative medicine. Through extensive exploration of plant and mushroom-based phytoceuticals, the lab aims to discover preclinical evidence for their potential in mitigating common diseases such as inflammation, diabetes, cancer, and tissue regeneration. The research involves both in vitro (biochemical and molecular biology)

and in vivo (animal model) studies. Committed to adhering to international standards, the lab has established standardized in vitro (cell line-based models) and in vivo (animal-based) protocols in accordance with OECD and ISO guidelines. Key areas of specialization include toxicity, inflammation, diabetes, cancer, guided tissue regeneration (GTR), guided bone regeneration (GBR), diabetic wound healing, and cartilage regeneration. The lab's ground-breaking work has been published in esteemed high-impact journals, showcasing its valuable contributions to the scientific community. Currently, the lab holds close 1000 citation and an impressive h-index of 14. Moreover, boasts with three patents for a tissue engineering scaffold with remarkable regenerative potential.

Our lab stands as a beacon of innovation in the realm of fundamental and translational research, with a primary focus on the dynamic field of regenerative medicine. Anchored in the heart of our pursuits is the extensive investigation of plant and mushroom-derived phytoceuticals. Through meticulous study and experimentation, we seek to unearth preclinical evidence showcasing the immense potential of these natural compounds in alleviating prevalent conditions, including inflammation, diabetes, cancer, and the regeneration of vital tissues. Our research canvas encompasses a dual approach, intertwining in vitro examinations rooted in biochemical and molecular biology with in vivo studies utilizing animal models. This holistic strategy ensures a comprehensive understanding of the complex interactions between phytoceuticals and biological systems. Committed to upholding global benchmarks, our lab has meticulously devised standardized protocols for both in vitro (cell line-based) and in vivo (animal-based) investigations, harmonizing our methodologies with the esteemed guidelines set forth by OECD and ISO.

Within our specialized domains lie multifaceted expertise, spanning toxicity assessment, inflammatory processes, diabetes management, cancer interventions, guided tissue regeneration (GTR), guided bone regeneration (GBR), diabetic wound healing, and the intricate realm of cartilage regeneration. This diverse spectrum reflects our dedication to unravelling the biological processes and leveraging them for transformative advancements. The hallmark of our journey is the invaluable knowledge we've contributed to the scientific community through the publication of pioneering

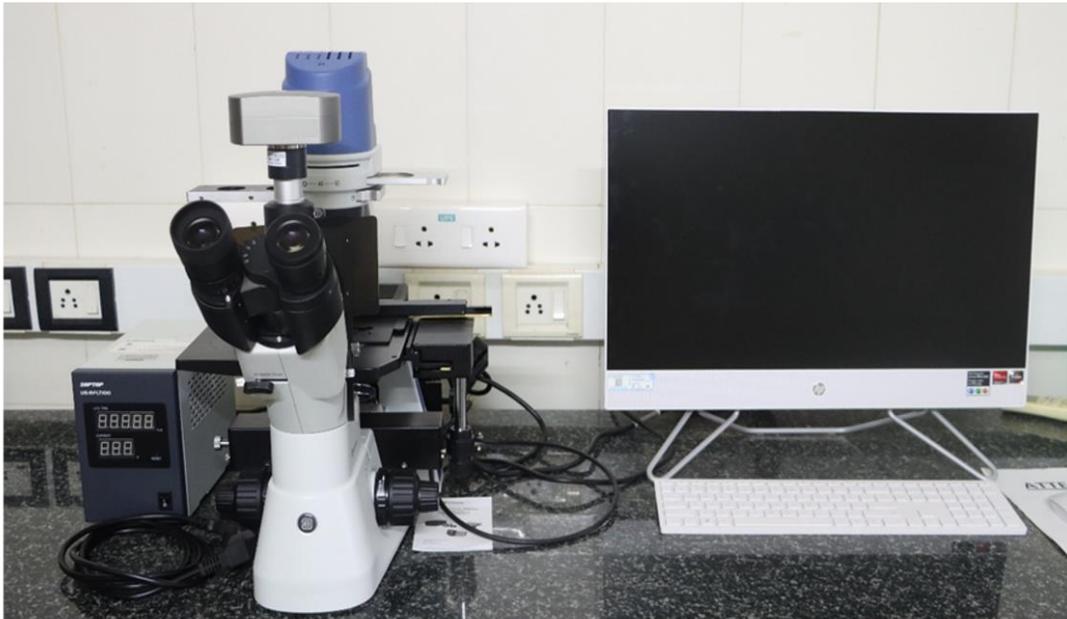
works in prestigious high-impact journals. These publications underscore the significance of our findings and their potential to reshape paradigms in medical science. A testament to our impact is our lab's remarkable h-index of 14, emblematic of the profound influence our work wields in shaping the course of scientific inquiry.

Furthermore, our pursuit of innovation has yielded tangible results in the form of patents. We proudly showcase patents for a tissue engineering scaffold and hydrogel, both distinguished by their exceptional regenerative potential. These patents stand as hallmarks of our dedication to translating scientific insights into tangible solutions that hold the promise of transforming lives. In summation, the Phytoceuticals and Molecular Biology Research Lab at Pushpagiri Research Centre is a dynamic crucible of knowledge, innovation, and transformative research. Driven by a commitment to excellence and a profound understanding of the intersections between nature and science, we stand at the precipice of new discoveries that have the power to reshape the contours of medical understanding.





Instrumentation Facilities



**Fluorescence and Inverted Microscope
with PC Attachment**



**Simple Microscope
with Camera
Attachment**



**Compound
Microscope with
Camera Attachment**



Laminar Air Flow



ELISA Plate Reader



CO₂ Incubator for Cell Culture



Cooling Centrifuge

f. Biochemistry Research Laboratory

Scientist: Dr. Soumya R.S, M.Sc., Ph.D., drsoumyars@pimsrc.edu.in



The Biochemistry Research Laboratory at PRC is equipped with state-of-the-art facilities and instruments, enabling cutting-edge research in biochemistry and related fields. The lab focuses on various research areas, including metabolic disorders, cardiovascular disease, enzyme kinetics, protein chemistry, and molecular biology. The Biochemistry Lab at PRC also offers training programs and internships for students and researchers, providing hands-on experience with advanced techniques and instruments. This gives an excellent opportunity for students to gain practical knowledge and contribute to ongoing research projects. Dr. Soumya is the present faculty in Biochemistry lab

Currently the lab research is focused on guar gum based mitochondrial antioxidants in invitro and in-vivo models. The works are mainly based on metabolic syndromes and synthesis of nanoparticles for various application in diabetics and atherosclerosis. In addition, the lab is focused on various studies that is submitted to ICMR, DST, DBT for funding in collaboration with national institute like CSIR-NIIST & Christ University Bangalore (MoU based collaboration)

Dr. Soumya is the current member secretary and animal house in-charge CCSEA approved animal house facility and she is the registered research guide of KUHS. And co-guiding PhD students from Vinayaka Mission Homoeopathic Medical College, Salem. The area of research involved in the lab is the identification of novel mechanisms for the prevention of cardiovascular diseases and other metabolic disease through dietary molecules, phytocompounds and nanoparticles. In addition, the lab research also focused on guar gum based mitochondrial antioxidants in cardiac hypertrophy through cell culture, animal experiments, molecular biology techniques, biochemical analysis and phytochemistry techniques. Apart from that the lab offers training programs in HPLC, cell culture and animal handling.

Besides the research lab revolves in mitochondria dysfunctional studies involving the key role in the etiopathogenesis of mitochondria in cardiovascular disease (CVD) and is regarded as an intriguing target for the development of innovative therapies. Oxidative stress, mitochondrial permeability transition pore opening, and excessive fission are major noxious pathways amenable to drug therapy. Several mitochondria-targeted drug delivery systems (DDS) have been optimized with improved pharmacokinetic and biocompatibility, lower toxicity and antigenicity for application in the cardiovascular field. The lab focuses on synthesizing triphenyl phosphonium conjugated rutin guar gum nanoparticles (Ru-TPP-GG) against angiotensin II (Ang II) induced hypertrophy in H9c2 cells. Ang II cells showed pathological hypertrophic responses and mitochondrial dysfunction which was evident from TGF β expression, cell surface area measurement and alteration of protein expression studies.

In addition, myocardial infarction (MI) studies using Isoproterenol [1-(3, 4-dihydroxyphenyl)-2-isopropylaminoethanol hydrochloride (ISO)] is a well-known model for studying MI is the key area of research for the lab. ISO is a synthetic catecholamine

and β -adrenergic agonist that is an important regulator of myocardial contractility and metabolism. The pathophysiological and morphological aberrations produced in the heart of the myocardial necrotic rat model are comparable with those taking place in human MI. Allicin (diallylthiosulfinate) is the active compound of garlic with wide range of health benefits. Locust bean gum (LBG) is a galactomannan with a wide range of biological applications. The allicin functionalized LBG nanoparticles (LBGAN) were synthesized in the lab through nanoprecipitation method and was characterized using particle size analysis, SEM and TEM was used for the *in vivo* studies.

Instrumentation Facilities



Weighing Balance



Vortex



Waterbath



Analytical HPLC with PC Attachment



Waterbath Sonicator

g. Clinical Epidemiology Unit

Assistant Professor: Dr. Rosin George Varghese, MD,
pushpagiriceu@pushpagiri.in

Assistant Professor: Dr. Betsy A Jose, MD, dr.betsyajose@pushpagiri.in



Established in 2015, the Clinical Epidemiology Unit (CEU) at Pushpagiri Research Centre is a distinguished affiliate of the India Clinical Epidemiology Network (IndiaCLEN), a one of the seven regional networks of INCLIN (International Clinical Epidemiology Network). The CEU is dedicated to enhancing research capacity within the institution and supporting high-quality research endeavours.

Objectives of CEU

1. **Building Research Capacity:** The CEU conducts regular training programs and workshops to equip researchers with the necessary skills and knowledge for conducting robust research.
2. **Professional Research Support:** The unit provides essential services such as sample size calculation, data analysis, protocol preparation, tool validation, and project preparation to support research and publication efforts within the institution.

Services Provided

The Clinical Epidemiology Unit offers its services to all institutions under the Pushpagiri Medical Society, ensuring comprehensive research support across the board. The CEU's professional services include:

1. **Sample Size Calculation:** Assisting researchers in determining the appropriate sample size for their studies to ensure statistical significance and reliability.
2. **Data Analysis:** Providing expertise in analyzing research data to draw meaningful and accurate conclusions.
3. **Protocol Preparation:** Guiding researchers in developing detailed and methodologically sound research protocols.
4. **Tool Validation:** Ensuring the tools and instruments used in research are valid and reliable for the intended studies.
5. **Project Preparation:** Supporting researchers in the comprehensive planning and preparation of research projects, including the development of project proposals and timelines.

Funded Projects

The Clinical Epidemiology Unit has led the implementation of many funded projects, including international ones. These projects span a wide range of research areas and have been supported by various national and international funding agencies. The CEU's expertise in project management, combined with its strong research support services, has enabled the successful execution of these projects, contributing significantly to the advancement of medical research and public health.

Clinical Trials

A significant area of the CEU's work is in the coordination of clinical trials. Under the auspices of the Institutional Review Board (IRB), which is registered with the Central Drugs Standard Control Organization (CDSCO), the CEU oversees the scrutiny and endorsement of clinical trial protocols. The CEU is instrumental in coordinating Phase III and Phase IV clinical trials within the institution, ensuring adherence to regulatory standards and the generation of high-quality clinical data. The Clinical Epidemiology Unit at Pushpagiri Research Centre is a pivotal component of the institution's research infrastructure, fostering a culture of rigorous scientific inquiry and advancing the field of clinical epidemiology through dedicated support and coordination.

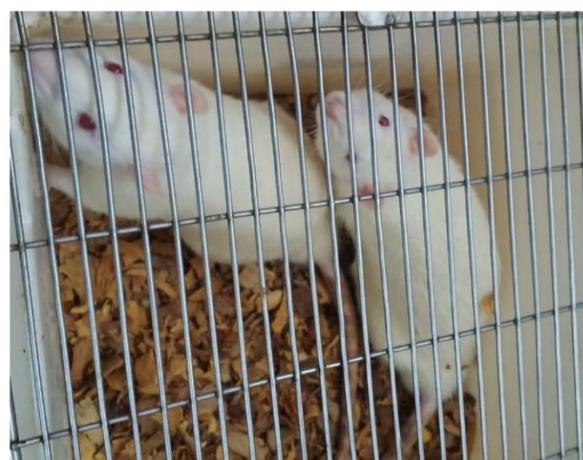
h. Animal House Experiment Facility

Chairman: Dr. Santosh Pillai, MD, drsantosh74@pushpagiri.in

Member secretary: Dr. Soumya R.S, M.Sc., Ph.D.,
soumyapadmakumar@gmail.com



Animal house in Pushpagiri Institute of Medical Sciences and Research Centre was established in the year 2008 (**Registration No: 602/PO/Re/S/02/CPCSEA**). It is registered with Ministry of Environment and Forests (Animal Welfare Division), Govt. of India. The **Institutional Animal Ethics Committee (IAEC)** was established in the Institute, in accordance with the standards established by the **Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA)**. The IAEC scrutinizes each project to ensure that it.



Animals for experimental purposes in the Animal House Facility

Members of CCSEA

Sl. No.	Name of the IAEC members	Designation in IAEC
1	Dr. Santosh Pillai	Biological Scientist cum Chairperson
2	Dr. Soumya RS	Scientist In-charge of Animal House Facility cum Member Secretary
3	Dr. Sreeja Nair	Scientist from different discipline
4	Dr. Punya Chandran	Scientist from different biological discipline
5	Dr. Unnikrishnan K	Veterinarian
6	Dr. Sachin J. Shenoy	Main Nominee
7	Dr. Nishant Kumar Gupta	Link Nominee
8	Dr. Prakash K. G	Scientist from outside the Institute
9	Dr. Sibi P.I.	Socially Aware Nominee

LIST OF ONGOING OR NEWLY GRANTED PROJECTS

Sl. No.	Title of the project	PI and Co-PI(s)	Funding agency (if applicable) and duration	Collaborating institutions
1	Comprehensive cancer screening and action for women in Kerala	Principal Investigators: Rev. Dr. Mathew Mazhavancheril Co-Principal Investigator: Dr. Betsy A Jose	Conferenza Episcopale Italiana	Pushpagiri Medical Society
2	Comprehensive Tribal TB Management Program for Decentralised TB Care Services	Principal Investigators: Saritha Susan Varghese Co-Principal Investigator: Dr. Betsy A Jose	ICMR Rs. 32L	Believers Church Medical College, Tiruvalla
3	Human Milk based Human Milk Fortifier for Preterm Infants	Principal Investigator: Dr. Yogesh Bharat Dalvi Co-Principal Investigator: Dr. Nebu George Thomas	Department of Biotechnology. Ministry of Science and Technology, Government of India, New Delhi, India, , Time span - 2020-2023	1. Bishop Moore College 2. Pushpagiri Research Centre, PIMS & RC 3. Mar Athanasios College for Advanced Studies Tiruvalla (MAC FAST) 4. St. John's Research Institute, Bangalore
4	Development and validation of biomedical and	Principal Investigator:	Central institute of fisheries	1. Pushpagiri Research

	cosmetic products from secondary fishery raw materials	Dr. Nebu George Thomas Co-Principal Investigator: Dr. Yogesh Bharat Dalvi	technology, Cochin India Kerala., Time span - 2020-2023	Centre, PIMS & RC 2. CIFT, Cochin
5	In vitro biocompatibility assessment of demineralized fish bone intended for periodontal regeneration	Principal Investigator: Dr. Nebu George Thomas Co-Principal Investigator: Dr. Yogesh Bharat Dalvi	Kerala State Council for Science, Technology and Environment. Time Span – 6 months 2021-2022	Oman Technical University
6	Fabrication of fish skin and collagen composite scaffolds loaded with drug molecules for simultaneous management of wounds and associated bacterial infections” under Block	Dr. Jaychandran VP, Dr. Umaima UI Hoqani, Dr. Shinisha Sujesh, Co-Principal Investigator: Dr. Nebu George Thomas, Dr. Yogesh Bharat Dalvi	Funding Program-funded by Ministry of Higher Education, Research and Innovation, The Sultanate of Oman, Dec 2021-Dec 2023	1. Pushpagiri Research Centre Innovation, The Sultanate of Oman
7	Preclinical evaluation of 3D printed polylactic acid loaded with fish scale derived hydroxyapatite based composite scaffolds intended for alveolar bone regeneration	Principal Investigators: Nebu George Thomas Co-Principal Investigator: Dr. Yogesh Bharat Dalvi,	Swedish Research Links	1. Stockholm University 2. CIFT, Cochin 3. VIT 4. Pushpagiri Research Centre, PIMS & RC

8	Socket preservation with fish scale derived hydroxyapatite: An <i>in-vivo</i> murine study	Prathibha P.M., Binsi P.K., K. George Varghese, Dr. Yogesh Bharat Dalvi, Nebu George Thomas, Zynudheen A.A., Ravishankar C.N.	CIFT Institutional Project 1000661052 [P- 115/2020(3)]	1. Pushpagiri College of Dental Sciences, Medicity 2. Pushpagiri Research Centre, PIMS & RC 3. CIFT, Cochin
9	Fabrication and <i>in-vitro</i> biocompatibility evaluation of porcine cholecystic extracellular matrix based guided tissue regeneration membrane	Dr. Nebu George Thomas, Dr. Yogesh Bharat Dalvi, Dr. TV Anil Kumar, Dr. Betsy Thomas, Dr. Aswani Raj		1. Sree Chitra Tirunal Institute for Medical Sciences & Technology 2. Pushpagiri Research Centre, PIMS & RC
10	Evaluation of the Tooth Remineralization Potential Of Natural Nanohydroxyapatite On Artificial Caries Lesions	Principal Investigators: Dr. Nebu George Thomas, Co-Principal Investigator: Dr. Yogesh Bharat Dalvi	CIFT	CIFT
11	Analysis of antibacterial efficacy of catechin, bioglass, and hydroxyapatite with hospital culture	Principal Investigators: Dr. Nebu George Thomas Co-Principal Investigator: Dr. Yogesh Bharat Dalvi	CIFT	CIFT
12	Designing novel antimicrobial peptide as ESBL inhibitor to combat	Principal Investigators: Dr. Aniket Naha	VIT	Vellore Institute of Technology, Vellore

	XDR. nosocomial pathogens	Co-Principal Investigator: Dr. Anand Anbarasu		
13	Characterization and screening of novel probiotics from indigenous fermented food products: Evidence through <i>in-silico</i> and <i>in-vitro</i> approaches	Principal Investigators: Dr. Aniket Naha Co-Principal Investigator: Dr. Soumitra Nath	GCC	Gurucharan College, Silchar
14	Bio molecular interaction of Carnosine and anti- TB drug: Preparation of functional bio peptide-based nanocomposites and characterization through in-vitro and in-silico investigations	Principal Investigators: Dr. Anand Anbarasu; Dr. Saravanan Natarajan Co-Principal Investigator: Dr. Aniket Naha Dr. Usharani Nagarajan	VIT	1. VIT, Vellore 2. NIRT, Chennai

PAPERS PRESENTED OR GUEST LECTURES DELIVERED

Sl. No.	Name of the Conference/Workshop/ CME/webinar	Title of the Paper or Talk	Place	Name of Scientist
1	Invited speaker for the National Conference 'Plant Biology and Biotechnology'	Bioinformatics and its application in Plant Biology	Gurucharan College, Silchar 15-17 th May 2023	Dr. Aniket Naha
2	ICCAR-2023	Novel V8C Mutant of SAAP-148 as a Potent ESβL Inhibitor Restoring	Assam University, Silchar, 16-18 th November, 2023	Dr. Aniket Naha

		Sulbactam Activity against Nosocomial XDR. <i>Acinetobacter baumannii</i>		
3	Biospectrum - 2023	Phytochemical Evaluation and Antimicrobial Efficacy of <i>Piper betle</i> against Carbapenem Resistant <i>Escherichia coli</i> : Evidence from <i>in-vitro</i> and <i>in-silico</i> Experimentations	MACFAST, Tiruvalla 30 th November - 2 nd December, 2023	Dr. Aniket Naha
4	Research Methodology Workshop	Facilities and Opportunities at PRC	Pushpagiri Institute of Medical Sciences and Research Centre, 12th December, 2023	Dr. Aniket Naha
5	National seminar on NanoGenPro Triad: Exploring the Future Science	Identification of a Novel Ursodeoxycholic Acid Derivative Targeting Parkin for Parkinson's Disease through Network Metrics, Structural Dynamics and Density Functional Theory Calculations	10 th January, 2024; SB College Changanassery	Dr. Aniket Naha
6	National seminar on NanoGenPro Triad: Exploring the Future Science	Optimizing Therapeutic Strategies: Enhanced Efficacy with a Novel SAAP Mutant Antimicrobial Peptide Against Clinical Strains of XDR. <i>Acinetobacter baumannii</i>	10 th January, 2024; SB College Changanassery	Dr. Aniket Naha
7	Invited talk: 2 Days National Seminar on Recent Developments in	Bioelectricity Production with Triple Anodic Chamber Microbial Fuel	17 th February, 2024, Karimganj College, Karimganj	Dr. Aniket Naha

	Science and Technology (NSRDST-2024)	Cell (MFC) in Static and Dynamic Environments		
8	Participated on International Conference on Emerging Trends and Innovations in Biotechnology 30 th November 2023 to 3 rd December 2023	Green synthesis of calcium carbonate nanoparticles using <i>Benincasa hispida</i> extract and their anti-inflammatory, anti-antioxidant and photo catalytic activity	School of Biosciences at Mar Athanasios College for Advanced Studies Tiruvalla (MACFAST)	Dr. Soumya R. S
9	'Oral presentation on National conference on advanced functional materials conducted by Kerala on 23-24, March 2023	Effect of allicin incorporated locust bean gum nanoparticles on isoproterenol induced myocardial infarction in rats.	VTMNSS College, Thiruvananthapuram, and KSCTEC, Thiruvananthapuram	Dr. Soumya R. S
10	National seminar on NanoGenPro Triad: Exploring the Future Science conducted on January 10 th 2024	Evaluation of antioxidant and photo catalytic activity of green synthesized calcium carbonate nanoparticles using <i>Benincasa hispida</i> extract	SB College Changanassery	Dr. Soumya R. S
11	Invited talk	Mitochondria – Fascinating Therapeutic Target	SN College for Women, Kollam	Dr. Soumya R. S
12	ICAN 2024 - 2 nd International Conference on Advanced Nanostructures	Tissue Engineering scaffolds for Craniofacial Regeneration	Catholicate College, Pathanamthitta	Dr. Nebu George Thomas
13	National Seminar on Recent Developments in Molecular Diagnostics and Regenerative Medicine	Application of Tissue Engineering scaffolds in regenerative medicine	Sethu Institute of Technology	Dr. Nebu George Thomas

14	International Conference 2023 “Emerging trends in plant science research”	Exploring the therapeutic potential of Phytoceuticals in tissue engineering: Harnessing the power of plants, algae and fungi	Catholicate College, Pathanamthitta, Kerala	Dr. Yogesh Bharat Dalvi
15	Bioradiance 2023	Ganoderma applanatum (Pers.) Pat., a white-rot fungus ameliorates doxorubicin-induced cardiotoxicity in a murine model: the decisive role of apoptotic and oxidative stress	May 27 th 2023, Tiruvalla	Dr. Yogesh B Dalvi
16	Bioradiance 2023	DIABETIC WOUND CARE MANAGEMENT: A promising approach with Zinc Alginate hydrogel loaded with Moringa bark extract	Tiruvalla 27.05.2023	Dr. Yogesh B Dalvi
17	Invited Talk	Unlocking Natures Healing Potential: Phytoceuticals In Tissue Engineering	Fergusson College, Pune	Dr. Yogesh Bharat Dalvi
18	ORAL presentation in International Conference on Multidisciplinary Approaches to Sustainable Development Goals (SDGs) & International Partners' Meet 2024	Ameliorative effect of <i>Phellinus caryophylli</i> (Agaricomycetes) Against the Complete Freund's Adjuvant-Induced Inflammation in Rodent Model: A Molecular Investigation - Yogesh Bharat Dalvi*, Ruby Varghese, Jiya Jose and Nebu Varghese	AT Rajagiri College of Social Sciences (Autonomous) & Rajagiri Business School Kochi, Kerala, India (January 10 & 11, 2024)	Dr. Yogesh Bharat Dalvi
19	ORAL presentation in International Conference on Multidisciplinary	Potential Anti-proliferative and Apoptotic Properties of <i>Capparis Moonii</i> : A	AT Rajagiri College of Social Sciences (Autonomous) &	Dr. Yogesh Bharat Dalvi

	Approaches to Sustainable Development Goals (SDGs) & International Partners' Meet 2024	Cellular and Molecular Approach - Pallavi Laxman Yadav, Ruby Varghese, Yogesh Bharat Dalvi*, Jiya Jose, Nebu Varghese, Nutan Padmanabha Malpathak	Rajagiri Business School Kochi, Kerala, India (January 10 & 11, 2024)	
20	POSTER presentation in The 8 th International Conference on Recent Advances in Material Chemistry (ICRAMC – 2024)	Biomedical Application of Polyherbal Extract & Silver Nanoparticles Incorporated in Sodium Alginate. Bhagyashri Somani, Kishor Bhosale, Yogesh Dalvi, Shraddha Kapadnis, Bharat Shinde, Archana Tanwar	organized by Department of Chemistry, SRM Institute of Science and Technology, Kattankulathur, Chennai (15-17 February, 2024)	Dr. Yogesh Bharat Dalvi
21	POSTER presentation in The 8 th International Conference on Recent Advances in Material Chemistry (ICRAMC – 2024)	Chitosan Hydrogels Infused with Polyherbal Extracts for Tissue Engineering. Bhagyashri Somani, Kishor Bhosale, Yogesh Dalvi, Aditi Joshi, Bharat Shinde, Archana Tanwar	organized by Department of Chemistry, SRM Institute of Science and Technology, Kattankulathur, Chennai (15-17 February, 2024)	Dr. Yogesh Bharat Dalvi
22	2 ND World Congress on NCD – International Conference	Designing a programme in the midst of a pandemic for screening cancers, mainly in women residing central Travancore, India	Indian Institute of Science, Bangalore	Dr. Betsy A Jose
23	Statistical analysis & Guidelines for writing IRB	Statistical analysis & Guidelines for writing IRB	Pushpagiri College of Dental Sciences	Dr. Rosin George Varghese
24	JBI Comprehensive Systematic Review Training Program	Comprehensive Systematic Review Training Program	March 21 to March 28, 2023	George Varghese
25	SITBioTALK' 23 National Seminar	Recent Developments in Molecular Diagnostics and Regenerative Medicine: Application of Tissue	Sethu Institute of Technology, Pulloor, Kariapatti, Virudhunagar	Dr. Nebu George Thomas

		Engineering Scaffolds in Regenerative Medicine.	district, December 21, 2023	
26	Research Methodology Workshop	Experimental study designs & Diagnostic test evaluation	PIMS & RC 12/12/23	Dr. Rosin George Varghese
27	Research Methodology Workshop	Descriptive Statistics	PIMS & RC 12/12/23	Dr. Rosin George Varghese
28	Clinical Club	Clinical Trials: The Ultimate Frontier of Scientific Discovery	PIMS & RC 14/12/23	Dr. Rosin George Varghese
29	Research Methodology workshop for post graduates- Pushpagiri College of Dental Sciences	Sessions on : 1. Experimental Study design. 2. Diagnostic test evaluation Descriptive statistics	Pushpagiri College of Dental Sciences 15/03/24	Dr. Rosin George Varghese

TRAINEE STUDENTS

Sl. No.	Name of the student	Date of Joining	Title of the project	Name of the Scientist
1	Ms. Elizabeth Annie George	1 st September, 2023	Designing novel antimicrobial peptide as ESBL inhibitor to combat XDR. <i>Escherichia coli</i>	Dr. Aniket Naha
2	Ms. Elizabeth Annie George	1 st September, 2023	Evaluation of antibacterial efficacy of <i>Piper betle</i> against gram negative ESKAPE pathogens	Dr. Aniket Naha
3	Tressa Sani	1 st September, 2023	Role of Natriuretic Peptides And Inflammatory Markers	Dr. Soumya R. S

			Levels In Hypercholesterolemia: A Case Control Study'	
4	Sruthi V.P	1 st September, 2023	Cardioprotective effect of <i>Oldenlandia Corymbosa</i> against Angiotensin II induced myocardial infarction	Dr. Soumya R. S
5	Krishnaja	15.09.2023	CIFT	Dr. Nebu George Thomas
6	Inthu Suresh	02.02.2024	CIFT	Dr. Nebu George Thomas
7	Rehna Babu	09.02.2024	CIFT	Dr. Nebu George Thomas

STUDENT PROJECTS

M.Sc. Project Students

Sl. No	Name	Topic	College & type	Name of Scientist
1	Elizabeth Annie George	Phytochemical evaluation and antimicrobial efficacy of <i>Piper betle</i> against carbapenem resistant <i>Escherichia coli</i> : evidence from <i>in-vitro</i> and <i>in-silico</i> experimentations	St Berchmans College, Changanassery	Dr. Aniket Naha
2	Vidhya Venugopal	Synergistic effect of <i>Terminalia chebula</i> fruit extract in association with susceptible antibiotics against <i>Escherichia coli</i> and <i>Pseudomonas aeruginosa</i>	St Berchmans College, Changanassery	Dr. Aniket Naha

3	Midhula Mohan	Assessing the susceptibility of colistin against <i>Klebsiella pneumoniae</i> and its potential management through the synergistic effect of active compounds from <i>Aegle marmelos</i>	St Berchmans College, Changanassery	Dr. Aniket Naha
4	Amina Haris	Efficacy of phytocompounds extracted from <i>Coriandrum Sativum</i> in synergism with the susceptible antibiotics against nosocomial <i>Klebsiella Pneumoniae</i> and <i>Pseudomonas Aeruginosa</i>	St Berchmans College, Changanassery	Dr. Aniket Naha
5	Anagha Darshan	Efficiency of phytocompounds extracted from <i>Azadirachta indica</i> in synergism with susceptible antibiotics against nosocomial <i>Pseudomonas aeruginosa</i>	CMS College, Kottayam	Dr. Aniket Naha
6	Treesa Sani	Green Synthesis of Calcium Carbonate Nanoparticles Using <i>Benincasa hispida</i> fruit extract & <i>In vitro</i> Evaluation of its Antioxidant & Anti-inflammatory Activities	St. Berchmans College (AUTONOMOUS), Changanacherry, (April –June 2023)	Dr. Soumya R.S
7	Anjali M.M	Study on <i>In vitro</i> Antioxidant and Antidiabetic Potential of <i>Tridax procumbens</i>	St. Berchmans College (AUTONOMOUS), Changanacherry, (April –June 2023)	Dr. Soumya R.S
8	Fathima Kabeer	Synthesis and Characterization of Guar gum nanoparticle and Quercetin Encapsulated Guar gum Nanoparticle	St. Berchmans College (AUTONOMOUS), Changanacherry, (April –June 2023)	Dr. Soumya R.S

9	Farzana Shajahan	<i>In vitro</i> Antioxidant and Free Radical Scavenging Activity of <i>Oldenlandia corymbosa</i>	St. Berchmans College (AUTONOMOUS), Changanacherry, (April –June 2023)	Dr. Soumya R.S
10	Akshara Raju	Green Synthesis, Characterisation and Evaluation of <i>In vitro</i> Antioxidant and Antidiabetic activity of Ferric Oxide Nanoparticle from Hibiscus Rosa sinensis Flower Extract	St. Berchmans College (AUTONOMOUS), Changanacherry, (April –June 2023)	Dr. Soumya R.S
11	Jomol. N. J	Synthesis and characterization of Calcium Carbonate Nanoparticles Using <i>Benincasa hispida</i> fruit extract.	MES College, Marampally, (April –June 2023)	Dr. Soumya R.S
12	Thaneesha Aziz	Phytochemical screening and cytotoxicity evaluation of <i>Oldenlandia corymbosa</i> : an <i>In vitro</i> approach	MES College, Marampally, (April –June 2023)	Dr. Soumya R.S
13	Sreelakshmi Nair	<i>In vivo</i> and <i>in vitro</i> biocompatibility assessment of P (VDF-TRFE) nanofiber loaded with cobalt ferrite nanoparticles intended for tissue engineering application	St. Mary's College for women	Dr. Nebu George Thomas
14	Shahanas Seethi	Preclinical analysis of PCL-PLA core shell membrane loaded with dopamine and zinc oxide intended for tissue engineering	St. Mary's College for women	Dr. Nebu George Thomas

		applications.		
15	Josna. K	Guided bone regeneration of PVDF Nickel Ferrite	CMS College, Kottayam, M.Sc. Dissertation	Dr. Yogesh Bharat Dalvi & Dr. Nebu
16	Ms. Jaitha S Kumar	Analysing The Efficacy Of Sodium Alginate Hydrogel Infused With Poyl-herbal Extracts For Modern Wound Care Management	VISTAS, Chennai, MSc. Dissertation, January-March 2023	Dr. Yogesh B. Dalvi & Dr. Nebu
17	Ms. Saba Shaji Noushad	Evaluation Of Anti-Inflammatory Property Of Aqueous Ethanolic Poly-Herbal Extract In CFA-Induced Rat Model	VISTAS, Chennai, MSc. Dissertation, January-March 2023	Dr. Yogesh B. Dalvi & Dr. Nebu
18	Ms. Sana Shaji Noushad	Evaluation Of Poly-Mushroom Extract In Treating Ethylene Glycol Induced Urolithiasis In Rat	VISTAS, Chennai, MSc. Dissertation, January-March 2023	Dr. Yogesh B. Dalvi & Dr. Nebu
19	Ms. Sneha Varghese	Exploring The In Vivo Biocompatibility Of PVDF-ZnO Composite Scaffold For Biomedical Applications	VISTAS, Chennai, MSc. Dissertation, January-March 2023	Dr. Yogesh B. Dalvi & Dr. Nebu
20	Ms. Sreelekshmi.S	In Vivo Evaluation Of Guar Gum Hydrogel Incorporated Poly Fungal Extract For Chronic Wounds In Rat	VISTAS, Chennai, MSc. Dissertation, January-March 2023	Dr. Yogesh B. Dalvi & Dr. Nebu
21	Akhila Mathew	Invitro and invivo anti-inflammatory activity of polyherbal formulation using carrageenan and CFA induced arthritis in murine model	MACFAST, Tiruvalla MSc. Dissertation, May –July 2023	Dr. Yogesh B. Dalvi & Dr. Nebu
22	Dona C. Jaison	Invitro and Invivo wound healing activity of polyherbal formulation Incorporated with gaur-gum hydrogel	MACFAST, Tiruvalla MSc. Dissertation, May –July 2023	Dr. Yogesh B. Dalvi & Dr. Nebu
23	Gayathry E.P.	In vitro and in vivo biocompatibility assessment of electrospun PVDF	MACFAST, Tiruvalla MSc. Dissertation, May –July 2023	Dr. Yogesh B. Dalvi & Dr. Nebu

		membrane incorporated with Zno		
24	Sayana P. Abraham	Invitro and invivo biocompatibility assessment of electrospun cellulose membrane incorporated with nitric oxide	MACFAST, Tiruvalla MSc. Dissertation, May –July 2023	Dr. Yogesh B. Dalvi & Dr. Nebu
25	Rhoda Ntuyan	Invitro and invivo wound healing activity of polyherbal formulation incorporated with Sodium alginate hydrogel.	MACFAST, Tiruvalla MSc. Dissertation, May –July 2023	Dr. Yogesh B. Dalvi & Dr. Nebu
26	Ms. Olivia Thokchom	Development of sodium alginate- based hydrogels integrated with polyherbal extract for diabetic wound healing	Pune University, MSc. Dissertation, February-April 2023	Dr. Yogesh B. Dalvi & Dr. Nebu
27	Ms. Sunitha Sable	In vivo biocompatibility evaluation of porcine cholecystic extracellular matrix-based guided tissue regeneration.	Pune University, MSc. Dissertation, February-April 2023	Dr. Yogesh B. Dalvi & Dr. Nebu
28	Dr. Sruthy Prathap	Evaluation of the activity of composite graft material synthesized From eggshell derived bone substitute 2(Hydroxyapatite) in a biocompatible matrix (Fish collagen) on bone healing and regeneration in the animal model (Wistar rats)	PhD, Yenapoya University	Dr. Nebu George Thomas & Dr. Yogesh B. Dalvi
29	Dr. Julie Thomas	Cardiometabolic disorders and periodontitis	PhD (Ongoing)	Dr. Nebu George Thomas & Dr. Yogesh B. Dalvi
30	Sonia Alex	Seroprevalence of Rubella IgG among pregnant women – A preliminary study among	St. Berchmans College	George Varghese

		antinatal cases in a tertiary care center.	(AUTONOMOUS), Changanacherry, (April –June 2023)	
31	Kavyalekshmi G Prasad	Synergistic effect of phytocompounds extracted from <i>Terminalia chebula</i> in association with susceptible antibiotics against nosocomial <i>Klebsiella pneumoniae</i> and <i>Staphylococcus aureus</i>	Amrita School of Biotechnology, Amrita University	Dr. Aniket Naha
32	Hanna Sherin NK	Exploring the antibacterial and antibiofilm potency of <i>Terminalia bellirica</i> in synergism with susceptible antibiotics against nosocomial <i>Pseudomonas aeruginosa</i> and <i>Acinetobacter baumannii</i>	University of Calicut	Dr. Aniket Naha

ICMR STS PROJECT

Sl. No.	Title	Student	Scientist
1	Proportion of metabolic syndrome among patients with uterine leiomyoma attending in a tertiary health care centre in south Kerala – A cross sectional study	Ms. Aswathy PS	Guide: Dr. Rachel Mathew Co guide: Dr. Betsy A Jose [Amount: Rs 50,000/-]
2	Prevalence of physical activity in underweight, overweight and obese young adults studying in different institutions in South Kerala, during the COVID -19 pandemic	Mr. Nina Verghese	Guide: Dr. Leya Elizabeth Babu [Amount: Rs 50,000/-]
3	IgG avidity combination screening for CMV infection in antenatal women in a tertiary care centre in South India	Jennath M Ashraf	Guide: George Varghese [Amount: Rs 50,000/-]

MDS THESIS

Sl. No.	Title	MDS Student	College	Scientist
1	In-vitro Biocompatibility Assessment of Chitosan Hydrogel Loaded with SOL-GEL Synthesized Bioglass Intended for Periodontal Regeneration	Dr. Vimal Thomas	Pushpagiri College of Dental Sciences, Medicity	Dr. Nebu George Thomas & Dr. Yogesh Bharat Dalvi
2	Fabrication and <i>in vitro</i> Biocompatibility Evaluation of a Porcine Cholecystic Extracellular Matrix Based Guided Tissue Regeneration Membrane	Dr. Betsy Thomas	Pushpagiri College of Dental Sciences, Medicity	Dr. Nebu George Thomas & Dr. Yogesh Bharat Dalvi
3	Evaluation of the antimicrobial efficacy of double antibiotic paste, catechin loaded chitosan nanoparticles, calcium hydroxide with catechin against <i>Enterococcus faecalis</i> : An <i>in vitro</i> Study	Dr. Johnson John	Pushpagiri College of Dental Sciences, Medicity	Dr. Nebu George Thomas & Dr. Aniket Naha
4	Biocompatibility – Chitosan-FSHA	Dr. Alenya MDS Student	Pushpagiri Dental College, Medicity	Dr. Nebu George Thomas & Dr. Yogesh Bharat Dalvi
5	Biocompatibility – Fishbone	Dr. Meenu MDS Student	Pushpagiri Dental College, Medicity	Dr. Nebu George Thomas & Dr. Yogesh Bharat Dalvi
6	<i>In vitro</i> biocompatibility assessment of chitosan hydrogel loaded with a fish scale derived hydroxyapatite	Dr. Bincy U – 1st year MDS,	Department of Periodontics, Sri Sankara Dental College, Varkala	Dr. Nebu George Thomas & Dr. Yogesh Bharat Dalvi

	intended for periodontal regeneration			
7	<i>In vitro</i> biocompatibility assessment of demineralized fish bone intended for periodontal regeneration (Dr. Nebu George, Dr. Yogesh Bharat Dalvi).	Dr. G Meenu – 1st year MDS, of Dental Sciences	Department of Periodontology and Implantology, Pushpagiri College	Dr. Nebu George Thomas & Dr. Yogesh Bharat Dalvi
8	'Preclinical analysis of fish scale derived hydroxy apatite intended for bone regeneration (Dr. Nebu George Thomas, Dr. Yogesh B. Dalvi).	Dr. Chinchu – 1st year MD	Department of Pharmacology, Pushpagiri Institute of Medical Science and Research Centre	Dr. Nebu George Thomas & Dr. Yogesh Bharat Dalvi

DETAILS OF Ph.D. SCHOLARS

Sl. No.	Name of the Ph.D. Candidate	Guide	Topic	Collaborative Institution
1	Dr. Sharlene Sara Baby	Guide: Dr. S. Sunil Co Guide: Dr. Yogesh Bharat Dalvi	DNA Methylation Biomarker as an Early Diagnostic Tool in the progression of Oral Squamous Cell Carcinoma	Kerala University of Health Sciences, Pushpagiri College of Dental Sciences
2	Dr. Julie Toby Thomas	Anil Sukumaran Dr. Nebu George Thomas	Cardiometabolic risk and periodontal disease	University of Helsinki, Finland
3	Dr. Sruthy Prathap	Dr. Nebu George Thomas	Evaluation of the activity of composite graft material synthesised from eggshell derived bone substitute (hydroxyapatite) in a biocompatible matrix (fish collagen) on bone healing	ICAR- Central Institute of Fisheries Technology

			and regeneration in animal model (Wistar rats)	
4	Saira Siraj E	Guide: Dr. Benley George Co-Guide: Dr. Betsy A Jose	Development and validation of a tool to analyze the social determinants of oral health outcomes among adults in rural and urban areas of south Kerala – a mixed methods approach	Azeezia College of Dental Sciences and Research, Kollam
5	Abdul Saheer P	Guide: Dr. Benley George Co-Guide: Dr. Betsy A Jose	The assessment of oral health status among older adults residing in old age homes and its association with factors affecting their Quality of life & Nutritional status– A multi centric cross-sectional study	Malabar Dental College, Edappal
6	Dr. Arun R Nair.	Guide: Dr. H Venkatesan Co-Guide: Dr. Soumya RS	A Comprehensive Characterization and in Silico Analysis of the Various Potencies of Homeopathic Medicine Arsenicum Album and Assessing its Effects on In Vitro Studies of Acute Promyelocytic Leukemia	Vinayaka Mission's Homoeopathic Medical College and Hospital, Salem

PUBLICATIONS IN PEER-REVIEWED JOURNALS AND BOOK CHAPTERS

Research Articles

1. Nath, Soumitra, Ashim Das Astapati, **Aniket Naha**, Indu Sharma, and Maulin P. Shah. "Algal-based membrane bioreactors for effective removal of hazardous and toxic contaminants: A comprehensive review." *Current Research in Biotechnology* (2024): 100201.

2. **Aniket Naha**, and Sudha Ramaiah. "Novel antimicrobial peptide SAAP mutant as a better adjuvant to sulbactam-based treatments against clinical strains of XDR. *Acinetobacter baumannii*." *Probiotics and Antimicrobial Proteins* 16, no. 2 (2024): 459-473.
3. **Thomas, N. G., Y. B. Dalvi**, N. Fijol, J. Shilpa, Rekha Unni, P. K. Binsi, M. G. Varghese, A. P. Mathew, and Sukumaran Anil. "Fish scale derived hydroxyapatite incorporated 3D printed PLA scaffold for bone tissue engineering." *New Journal of Chemistry* (2024).
4. Chacko, Sobi K., Raneesh Balakrishnan, Nandakumar Kalarikkal, and **Nebu George Thomas**. "Ternary Fiber Mats of PVDF-HFP/Cellulose/LiFe₅O₈ Nanoparticles with Enhanced Electric, Magnetoelectric, and Antibacterial Properties: A Promising Approach for Magnetic and Electric Field-Responsive Antibacterial Coatings." *ACS Applied Polymer Materials* 6, no. 2 (2024): 1429-1438.
5. Joy, Shilpa, and **Nebu George Thomas**. "Gymnemic acid-conjugated gelatin scaffold for enhanced bone regeneration: A novel insight to tissue engineering." *Biotechnology and Applied Biochemistry* 70, no. 5 (2023): 1652-1662.
6. Paul, Veena, T. Aby Mathew, Nazia Rasheed, Annie Susan Thomas, and **Nebu George**. "Photofunctionalization of Dental Implant Surfaces-A Histomorphometric Animal Study." *Journal of Pharmacy and Bioallied Sciences* 15, no. Suppl 1 (2023): S646-S650.
7. Ittycheria, Prameetha George, Thomas George Veliyaveetil, Annie Kitty George, Saumya John, **Nebu George Thomas**, and Sunu Alice Cherian. "Effectiveness of Platelet-Rich Fibrin with Decalcified Freeze-Dried Bone Allograft Compared to Decalcified Freeze-Dried Bone Allograft Alone in Mandibular Grade-II Furcation Defects: A Quasi-Experimental Study." *Pesquisa Brasileira em Odontopediatria e Clínica Integrada* 23 (2023): e210126.
8. Manjubaashini, N., P. Bargavi, **Nebu George Thomas**, Nikhil Krishnan, and S. Balakumar. "Chitosan bioactive glass scaffolds for in vivo subcutaneous implantation, toxicity assessment, and diabetic wound healing upon animal model." *International Journal of Biological Macromolecules* 256 (2024): 128291.

9. Vellappally, Sajith, Sachin Naik, Rohit Philip Thomas, Omar Alsadon, Haya Alayadi, Mohamed Hashem, Maram Ali M. Alwadi et al. "Knowledge of the monkeypox 2022 outbreak among dental hygienists and students in Saudi Arabia: A cross-sectional study." *International Journal of Dental Hygiene* 22, no. 1 (2024): 187-193.
10. Zachariah AM, John S, David A, Thomas AU, **Babu LE**. Prevalence of stress and its association with vitamin D status in undergraduate medical students. *Natl J Physiol Pharm Pharmacol* 2023;13(12):2440-2445.
11. Ninan Vergis Punchamanni, **Leya Elizabeth Babu**. Prevalence of physical activity in underweight, overweight and obese young adults studying in different institutions in south Kerala, during the covid -19 pandemic *Int J Med Pub Health* 2024; 14 (2); 340-346
12. **Leya Elizabeth Babu**, Sajit Varghese. prevalence of hypomagnesemia in Type 2 Diabetic patients attending a tertiary care hospital in South India- A cross sectional study. *Int J Acad Med Pharm* 2023; 5 (4); 1982-1985. DOI: 10.47009/jamp.2023.5.4.397
13. **Thomas Nebu George, Yogesh Bharat Dalvi***, N. Fijol, J. Shilpa, Rekha Unni, P. K. Binsi, M. G. Varghese, A. P. Mathew, and Sukumaran Anil. "Fish scale derived hydroxyapatite incorporated 3D printed PLA scaffold for bone tissue engineering." *New Journal of Chemistry* (2024).
14. Varghese, Ruby, **Yogesh Bharat Dalvi***, Namitha Vijay, and Vikram Gowda. "Ganoderma applanatum (Pers.) Pat. augments antitumor activity of doxorubicin and provides chemoprevention to murine tumor model." *Indian Journal of Experimental Biology (IJEB)* 61, no. 08 (2023): 606-613.
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1. Shilpa Joy, Mridula Sreedharan Nikhil, Rojin Abraham, Sherin Sara George, **Nebu George Thomas**, and Anil Sukumaran Micro - and Nanoscale Technologies in Drug Delivery A Contemporary Chemical Approach - Green Synthesis of Nanoparticles in Biomedicine Pub Date: Forthcoming November 2024 CRC Press Hard ISBN: 9781774918388
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SPECIAL ACHIEVEMENTS LIKE AWARDS, MoUs, ORATIONS, PATENTS

1. **Rev. Dr. Mathew Mazhavancheril** and **Dr. Soumya** signed a MoU with CSIR-NIIST & Christ University Bangalore
2. Application Number: Indian Government IPEXP235.Y22; Title: Process for the Fabrication of Multi-Layered Porcine Cholecystic Extracellular Matrix (CECM) For Tissue Engineering Application; Inventors: **Dr. Nebu George Thomas**, **Dr. Yogesh Bharat Dalvi**, Dr.Thapasimuthu Vijayamma Anilkumar, Mr. Pratheesh Kanakarajan Vijayakumari
3. Application Number: Indian Government 202441045392; Title: Antimicrobial Effect of Catechin-Doped Bioactive Glass Nanoparticles; Inventors: Dr. Sheena S Raj, Dr. A. Devadathan, **Dr. Nebu George Thomas**, Dr. Emil George
4. Technology Developed: ICAR- Central Institute Of fisheries Technology Has Developed the Technology Bioceramic Hydroxyapatite from Fish Source For Dental Regeneration” (Product)
5. **‘Best paper award’** received by **Dr. Betsy A Jose** in the 2nd World Congress on NCD – International Conference on the topic ‘Cancer screening during COVID-19 Pandemic’ at the Indian Institute of Science, Bangalore

6. **Dr. Betsy A Jose** served as the **Resource Person** for the 14th i-KAP session for Dental house surgeons at the Pushpagiri College of Dental Sciences
7. **Dr. Betsy A Jose** served as the **Evaluator** for the Preliminary Assessment of the Young Innovators Programme 5.0 Category 2 and 3
8. **Dr. Betsy A Jose** served as the **Resource Person** for Research Methodology Workshop for PG students of Pushpagiri College of Dental Sciences
9. **Dr. Betsy A Jose** attended a workshop on 'Transforming Research using AI' at JJM Medical College, Davengere
10. **Dr. Betsy A Jose** served as the **Chairperson** in the 14th National Conference on Students' Medical Research – NATCON '24 for PG and UG students
11. **Dr. Betsy A Jose** and **Dr. Rosin George Varghese** served as the Coordinators for Guest Lecture for 'Evidence in Public Health – Generating Evidence' by Dr. Saritha Susan Varghese
12. Best Oral Presentation "Exploration of tissue engineering potency of Polycaprolactone scaffold incorporated Ganoderma extracts (Research scholar Category) (**Dr. Yogesh** and Namitha Vijay). Date: 27.05.2023
13. Best Oral Presentation "Development of sodium alginate-based hydrogels integrated with polyherbal extract for diabetic wound healing (Student Category) (Dr. Yogesh and Olivia Thokchom). Date: 27.05.2023
14. Submission of full patent: Anilkumar TV., Thomas NG., Pratheesh KV., Dalvi YB., Praveen KS, Varghese N, Lekshmi UN., Thomas B., A Process for The Fabrication of Multi-Layered Porcine Cholecystic Extracellular Matrix (CECM) For Tissue Engineering Applications Indian provisional patent application number IP-202341003820
15. Oyedeji, Adebola Omowunmi, JOSEPH, Rose Jacquilin Puthenpurackal, Oluwafemi, Samuel Oluwatobi, DALVI, Yogesh Bharat, THOMAS, Sabu. "Nano Poly (Lactic-Co-Glycolic) Acid Encapsulated Tinospora cordifolia and Uses Thereof". Indian provisional patent application number IP-202321050944. (28th July 2023)

POST GRADUATION THESIS – M.Sc., MD, MDS

Phytochemical evaluation and antimicrobial efficacy of *Piper betle* against carbapenem resistant *Escherichia coli*: evidence from *in-vitro* and *in-silico* experimentations

Elizabeth Annie George, Dr. Aniket Naha

ABSTRACT

Antimicrobial resistance is a major global health concern due to their ability to evade the effects of potent antibiotics especially emergence of resistance against drugs of last resort like carbapenem. The emergence and spread of carbapenem-resistant *Escherichia coli* (CRE) pose a significant threat to public health causing urinary tract infections, gastroenteritis and hemorrhagic colitis. The current study aimed to decipher the combination therapy of phytochemicals extracted from *Piper betle* with susceptible antibiotics that envisages retardation in resistance rate. Biochemical characterization, growth on selective media and antibiotic susceptibility tests confirmed the selected isolates as CRE. Qualitative and quantitative screening of active compounds revealed presence of flavonoids, phenolics, tannins, and carbohydrates. Thin layer chromatography resulted in separation of multiple bands where the bands predicted as nicotinic acid, riboflavin, pheophytin a some of which are predicted to have potent antibacterial efficacy. Further validation through column chromatography under varying solvent system resulted in collection of polar and non-polar fractions which has shown significant zone of inhibition in Muller Hinton agar plates. Further, on assessment of synergistic potency with these fractions, increased inhibition zones were observed which clearly indicates the efficacy of the principal compounds from *Piper betle*. Further, *in-silico* validations confirmed the inhibition potency through intermolecular interaction patterns of the predicted active compounds with the putative drug targets from *Escherichia coli*.

Keywords: Antimicrobial resistance, Phytochemicals, chromatography, antimicrobial susceptibility testing, synergistic activity, molecular docking, protein ligand interaction.

Synergistic effect of *Terminalia chebula* fruit extract in association with susceptible antibiotics against *Escherichia coli* and *Pseudomonas aeruginosa*

Vidhya Venugopal, Dr. Aniket Naha

ABSTRACT

Antimicrobial resistance is a global concern affecting lives in millions per year with increased mortality and morbidity amongst patients. Currently, there has been researches to elucidate alternate therapeutic options upon exploring the synergism of phytochemicals with susceptible antibiotics, which has a multifaceted efficacy. In the present study, medical plant *Terminalia chebula*, has been subjected to multiple tests to check its antibacterial potency against nosocomial carbapenem resistant strains of *Escherichia coli* and *Pseudomonas aeruginosa*. Routine biochemical characterisation has confirmed the *E. coli* to be an extended spectrum β -lactamase producing strain while *P. aeruginosa* was confirmed as multi-drug resistant strain. Qualitative and quantitative estimation for phytochemicals from methanolic extract of *T. chebula* have shown the presence of flavonoids, phenolics, tannins and glycosides which may have diverse roles as antibacterial compounds. Further, chromatographic examination through thin layer chromatography revealed presence of multiple bands which could be chebulagic acid, gallic acid, ellagic acid, galloyl glucose. column chromatography of extract under three different solvent systems eluted multiple fractions containing active compounds based on their polarity index. Antibiotic susceptibility testing revealed antimicrobial potency of these fractions and also revealed synergistic effect when combined with susceptible antibiotics as understood from increased inhibitory zones in Muller Hinton Agar plates. Qualitative estimation revealed that the studied strains produced strong biofilm while quantitative microtiter assay revealed antibiofilm efficacy of the extract. Therefore, from the present study, it can be revealed that combination therapy with susceptible antibiotics and phytoextract of *T. chebula* could prove effective due to its multi-target specificity and it could result in retardation of gaining resistance against the classical antibiotics in use.

Keywords: ESKAPE pathogens, Antibiotic resistance, Phytochemicals, *Terminalia chebula*, Chromatography, Combination Therapy

Assessing the susceptibility of colistin against *Klebsiella pneumoniae* and its potential management through the synergistic effect of active compounds from *Aegle marmelos*

Midhula Mohan, Dr. Aniket Naha

ABSTRACT

Antimicrobial resistance (AMR) causes global threat to the human health. Ongoing researches that focus on AMR indicate the dangerous scenario created by the carbapenem resistance such as high rate of morbidity and mortality. Carbapenem resistant *K. pneumoniae* (CRKp) has aroused widespread attention owing to its very limited therapeutic options, and this strain has increased rapidly in recent years. The present study aims to lower the resistance of carbapenem resistant nosocomial pathogen *K. pneumoniae*. Colistin is the currently available drugs against carbapenem resistant strains so it considered as the last resort treatment for bacterial infection, but its continuous use may lead to emergence of colistin resistant strain. As a remedy the carbapenem resistance of the given strain can combat by synergistic activity of the susceptible antibiotic with the drugs obtained by rotary evaporation of *A. marmelos* leaf extract and the fractions obtained by column chromatography. *A. marmelos* is a medicinal plant widely used in Ayurveda and proven that its phytochemicals have many pharmacological effects including antimicrobial activity and antioxidant activity. Thus, the investigation conclude that global health problem created by carbapenem resistance *K. pneumoniae* can be controlled to some extent by introducing nature friendly medicinal plant *A. marmelos*

Keywords: *Phytochemical, Chromatography, Anti-oxidant, Anti-microbial resistance, Methanolic extraction*

Efficacy of phytochemicals extracted from *Coriandrum Sativum* in synergism with the susceptible antibiotics against nosocomial *Klebsiella Pneumoniae* and *Pseudomonas Aeruginosa*

Amina Haris, Dr. Aniket Naha

ABSTRACT

Carbapenem-resistant bacteria pose a serious threat to public health due to the few available treatments and the high fatality rates linked to infections caused by these bacteria. In recent years, there has been a great interest in exploring new methods with phytochemicals to tackle these drug-resistant bacteria. *Coriandrum sativum*, a medicinal plant with long history of traditional use and has shown a different pharmacological activity, including antibacterial action. The goal of this study was to find out the synergistic effect of phytochemicals present in *Coriandrum sativum* and the antibiotics against Carbapenem-resistant nosocomial strains of *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*. The phytochemicals in *C. sativum* were determined by the *in-silico* screening. The methanolic extraction of *C. sativum* was done as the initial step. Qualitative and quantitative estimation of phytochemicals from methanolic extract of *C. sativum* have shown the presence of flavonoids, phenols and tannins which may have diverse roles as antibacterial compounds. Further, chromatographic examination through thin layer chromatography showed multiple bands and column chromatography of extract under two different solvent systems eluted multiple fractions containing active compounds based on their polarity index. The individual and synergistic effects of phytochemicals in *C. sativum* and the antibiotics determined by agar disk diffusion method revealed the antimicrobial potency of the *C. sativum* fractions. Therefore, from the present study, it can be revealed that combination therapy with susceptible antibiotic and phytoextract of the *C. sativum* could prove effective against *K. pneumoniae* and *P. aeruginosa* due to its multitarget specificity and the ability to slow down the phase of getting resistance against the classical antibiotics in use.

Keywords: *Phytochemicals, Antibiotic resistance, Chromatography, Susceptibility, Combination Therapy*

Synergistic effect of phytochemicals extracted from *Terminalia chebula* in association with susceptible antibiotics against nosocomial *Staphylococcus aureus* and *Klebsiella pneumoniae*

Kavyalekshmi G Prasad, Dr. Aniket Naha

ABSTRACT

Antimicrobial resistance (AMR) posed a significant global health threat as newer antimicrobials and combination therapies have shown clinical ineffectiveness. The therapeutic spectrum of most susceptible antibiotics is narrowing due to indiscriminate and overuse of them. Therefore, the present study aimed to investigate the antibacterial potency of methanolic and ethanolic phytoextracts of *Terminalia chebula* in synergism with routine susceptible antibiotics administered against nosocomial strain to broaden the therapeutic spectrum of action. Bacteria isolated from urine and pus samples were subjected to morphological, cultural and biochemical characterization. Biochemical characterization and growth on selective media confirmed the selected strains as *Staphylococcus aureus* and *Klebsiella pneumoniae*. Antibiotic susceptibility test was thereafter performed showing *Staphylococcus aureus* and *Klebsiella pneumoniae* were MDR. and XDR. respectively. Biofilm forming potential indicated *Staphylococcus aureus* and *Klebsiella pneumoniae* were strong biofilm producers. Polar and nonpolar phytoextracts and the R_f value of different bands on TLC plates were identified as chebulagic acid, chebulinic acid, ellagic acid and gallic acid. Qualitative analysis of phytochemical determined the presence of phenols, tannins, flavonoids, amino acids, saponins and glycosides. Antibacterial potency of the extracts was examined through Kirby-Bauer disk-diffusion method, the efficacy of phytochemical against bacteria were performed by both plant extract alone and in association with susceptible antibiotics, resulted in enhanced zone of inhibition when compared to antibiotic alone. Broth microdilution for MIC₅₀ of plant extract were predicted as 8µg/ml for *S. aureus* and 12µg/ml for *K. pneumoniae*. Remarkably presence of phytochemicals found in plant extract provide therapeutic agents that can augment the antimicrobial activity of antibiotics and to develop a successful treatment strategy to overcome this multi-drug resistance.

KEYWORDS: Antimicrobial resistance, Phytochemicals, methanolic & ethanolic extract of *Terminalia chebula*, *Staphylococcus aureus*, *Klebsiella pneumoniae*

Exploring The Antibacterial and Antibiofilm Potency of *Terminalia bellirica* in Synergism with Susceptible Antibiotics against Nosocomial *Pseudomonas aeruginosa* and *Acinetobacter baumannii*: An *in-silico* and *in-vitro* approach

Hanna Sherin NK, Dr. Aniket Naha

ABSTRACT

Antimicrobial resistance (AMR) is a serious threat to public health due to the lack of sufficient treatments and high rate of infection spreading among people. Phytochemicals along with susceptible antibiotics has proven a successful strategy at this point. *Terminalia bellirica* is an oldest medicinal plant having a wide range of pharmacological activities such as antioxidant, antimicrobial, antidiarrheal, anticancer, antihypertensive, hepatoprotective & antipyretic agent. The study was aimed to explore the antibacterial and antibiofilm potency of *T. bellirica* in synergism with susceptible antibiotics against nosocomial *P. aeruginosa* and *A. baumannii*. The methanolic extract of *T. bellirica* fruit was prepared using Soxhlet extraction process and rotary evaporation and finally crude extract with concentration of 20 µg/ml was obtained. Crude extract was subjected to separate column chromatography based on polarity that resulted in the formation of non-polar and polar fractions. Presence of flavonoids, glycosides, reducing sugar, terpenoids, steroids and total carbohydrates were detected under qualitative analysis. Isolation, morphological characterization, biochemical test and cultural characteristics were done and identified as Gram-negative *Pseudomonas* (P1, P2, P3) and *Acinetobacter* (A1, A2, A3). Biofilm test tube assay was conducted and P3 was the stronger biofilm former P2, P3, A2, A3 were medium, A1 was the weak biofilm former compared to others. Antibiotic susceptibility test was performed and the strains P1, P2, P3, were confirmed as MDR, whereas, A1, A2, did not show any zones and hence was confirmed as PDR. A3 was found to be sensitive to all antibiotics. Zone of inhibition (ZOI) of phytocompound was analyzed. Crude extract was found to be more effective against all strains of *Pseudomonas* and *Acinetobacter* giving increased ZOI. Microtiter plate antibiofilm assay was used to determine inhibition of biofilm formation. This work manifests a method, where the antimicrobial activity of antibiotics can be enhanced and optimized through synergism with *T. bellirica* fruit extract.

KEYWORDS: Antibiofilm; Antibiotic susceptibility test; Antimicrobial resistance; Synergism; Zone of inhibition

Synergistic effect of *Carica papaya* leaf extract in association with susceptible antibiotics against nosocomial *Acinetobacter baumannii*

Jibymol Baby, Dr. Aniket Naha

ABSTRACT

Antimicrobial Resistance or AMR is a serious public health problem and one of the global public health threats facing humanity. The present study aims to assess the synergistic effect of phytochemicals extracted from *Carica papaya* leaf with susceptible antibiotic on two nosocomial strains of *Acinetobacter baumannii*. The strains are citrate and catalase positive identified through biochemical tests. Screening of phytochemicals in the *Carica papaya* leaf done by using IMPPAT and AntiBac-Pred databases. Papaya is widely used as a medicinal plant. Papaya leaf is enriched with good qualities like antioxidant capacity, antibacterial effect, immunity boosting power and anti-malarial effect etc. Qualitative estimation of phytochemicals of crude extract showed the presence of quinones, saponins, phenol and tannin. Total flavonoid count present in the extract can be founded by aluminum chloride colorimetric method. The test tube assay of biofilm indicates that the bacterial strains to be studying are biofilm producers. The enzymatic assay revealed that the bacterial strain is cellulase and amylase positive. The various phytochemicals are segregated by using column and thin layer chromatography and three new phytochemicals such as Rutin, quercitrin and kaempferol identified in S2 fractions. These identified phytochemicals expected as the element which confer antibacterial property to the papaya leaf. Kirby-Bauer disk diffusion method showed that phytochemicals present in the S1 and S2 fractions have a specific antibacterial effect which is also confirmed with agar well diffusion method. The study concludes that the phytochemicals found in the C. Papaya leaf extract have antibacterial effect and it varies with strains. The research will give a new way for antibacterial therapeutic option.

Keywords: *Phytochemicals, Chromatography, Agar well diffusion, Anti-microbial resistance*

***In vitro* antioxidant and free radical scavenging activity of Oldenlandia corymbosa**

Thaneesha Aziz, Farsana Shajahan & Dr. Soumya R.S

ABSTRACT

The main aim of this study is to investigate the antioxidant capacity of *Oldenlandia corymbosa* Linn. leaf. The preliminary phytochemical study and *in vitro* antioxidant study was performed on methanolic extract of *Oldenlandia corymbosa* leaf. Phytochemical analysis shows the presence of phenolic compounds, tannins, alkaloids, glycosides, quinones, coumarins, steroids and saponins. The total phenolic content of methanolic and hexane extract of *Oldenlandia corymbosa* leaf was determined. The antioxidative potential of plant methanolic extract was determined by DPPH, metal chelating, hydroxyl radicals, reducing power, nitric oxide (NO) and superoxide scavenging activity were compared with standard antioxidants such as gallic acid, EDTA, catechin, quercetin and ascorbic acid showed that the methanolic extract of *Oldenlandia corymbosa* leaf is a valuable free radical scavenger in oxidative stress-induced illness states and a possible source of natural antioxidants.

Keywords: *Oldenlandia corymbosa* Linn. Leaf, free radicals, natural antioxidant

Synthesis and Characterization of Guar Gum Nanoparticle and Quercetin Encapsulated Guar Gum Nanoparticle for Therapeutic Applications

Fathima Kabeer & Dr. Soumya R.S

ABSTRACT

Polysaccharides have exceptional qualities, including biocompatibility, biodegradability, renewable origin, and ease of modification, polysaccharides have recently received a lot of interest in a wide range of applications. Development of polysaccharide nanoparticles and promotion of their usage in a variety of fields, particularly biomedicine, have received significant scientific attention. Nanotechnology for the treatment and diagnosis has been emerging recently as a potential area of research and development. In the present study, the preparation of guar gum nanoparticle (GGN) and quercetin incorporated guar gum nanoparticles (GGQ) have been prepared by nanoprecipitation and were characterized by particle size analysis, scanning electron microscopy (SEM) analysis, X-ray diffraction (XRD) analysis and Fourier-transform infrared spectroscopy (FTIR) analysis to confirm the nanostructure of the particles. Particle size analysis revealed that GGN and GGQ possess a particle size range between 40 to 500nm and showed polydispersity. SEM imaging data also confirmed the formation of spherical or irregular nanoparticles with quercetin incorporation. XRD data showed that after quercetin incorporation GGQ shows partial crystallinity from amorphous nature of GGN. IR spectral analysis suggests that after loading of quercetin into guar gum nanoparticle there shows a transformation of functional groups. Various *in vitro* antioxidant assays (total phenolic content, total reducing power, ABTS (2,2'-azino-bis-(3-ethylbenzothiazolin-6-sulphonic acid), hydroxyl radical and metal chelating activity assays) revealed significantly high antioxidant potential of GGQ compared to GGN. The IC_{50} value of GGQ was $5.63\mu\text{g ml}^{-1}$, $29.17\mu\text{g ml}^{-1}$, and $21.80\mu\text{g ml}^{-1}$ for metal chelation, hydroxyl, ABTS assay respectively. The overall results indicated that quercetin in combination with guar gum nanoparticle exhibits high antioxidant potential with therapeutic value.

Keywords: polysaccharide nanoparticles, fenugreek, guar gum, antioxidant

Green synthesis, characterization and evaluation of in vitro antioxidant and antidiabetic activity of ferric oxide nanoparticle from *Hibiscus rosa sinensis* flower extract

Akshara Raju & Dr. Soumya R.S

ABSTRACT

In this work, ferric oxide nanoparticles were synthesised by *Hibiscus rosa sinensis* flower extract, and their in vitro antioxidant and antidiabetic studies were performed. The preliminary phytochemical screening of plant extract was done and revealed the presence of phytochemicals, including saponins, phenols, terpenoids, flavonoids, cardiac glycosides, carbohydrates, alkaloids, and steroids. The ferric oxide nanoparticles were then characterised by Scanning Electron Microscopy- Energy Dispersive X-Ray analysis (SEM-EDX), Fourier transform Infrared spectroscopy (FTIR), particle size analysis, and X-ray diffraction (XRD). The results showed that the synthesised ferric oxide nanoparticles were spherical with a rough surface. FTIR analysis showed different absorption peaks of the functional group present in the ferric oxide nanoparticles, in the particle size analysis the prepared particles were polydisperse with a size range of 40 to 300 nm and showed a crystalline structure with XRD. These nanoparticles were further studied for antioxidant assays and showed that they had the property of free radical scavenging and could act as antioxidants with therapeutic potential. The nanoparticles were further studied with antidiabetic assay by checking the inhibition of alpha-amylase and alpha-glucosidase enzyme activities. The result concludes that green synthesised ferric oxide nanoparticles have the potential of treating hyperglycemia and could serve as drug lead in the treatment of diabetes.

Keywords: ferric oxide nanoparticles, *Hibiscus rosa sinensis*, antioxidants, antidiabetics

Study on In vitro Antioxidant and Antidiabetic Potential of *Tridax procumbens*

Anjali M.M & Dr. Soumya R.S

ABSTRACT

Oxidative stress plays a major role in diabetic physiopathology; hence, the interest of using natural antioxidants as therapeutic tools exists. The aim of this study was the evaluation of in vitro antioxidant activity and antidiabetic potential of methanolic extract of *Tridax procumbens* against key enzymes linked to hyperglycaemia. Antioxidant activity was performed using 2,2'-diphenyl-1-picrylhydrazyl (DPPH), 2,2'-azino-bis-3-ethylbenzothiazoline-6-sulfonic acid (ABTS) radicals, hydroxyl radical scavenging, metal chelation and total reducing power methods. The α -Glucosidase and α -Amylase inhibitory activities were investigated using an in vitro model. Moreover, phytochemical analysis of tested extracts was carried out. The methanolic extract of *T. procumbens* exhibited the antioxidant activity for both DPPH and ABTS methods, IC₅₀ = 184.304 μ g/mL and IC₅₀ = 116.308 μ g/mL, respectively. The free radical scavenging activity for hydroxyl radicals were found to be in a concentration dependent manner with IC₅₀ = 235.6369 μ g/mL. The metal chelating activity was also found to be high, 176.855 μ g/mL and reducing power showed good linear relation with standard. However, the methanolic extract possessed the inhibitory effect towards α -glucosidase (IC₅₀ = 389.66 μ g/mL) and α -amylase (IC₅₀ = 169.08 μ g/mL). The results showed that methanolic extract of *T. procumbens* leaves could be a significant source of medically important natural compounds.

Keywords: antioxidant, *Tridax procumbens*, free radicals, antidiabetic

Green Synthesis of Calcium Carbonate Nanoparticles Using *Benincasa hispida* fruit extract & In vitro Evaluation of its Antioxidant & Anti-inflammatory Activities

Treesa Sani, Jomol N.J & Dr. Soumya R.S

ABSTRACT

In this study calcium carbonate nanoparticles were synthesized by green synthesis method using *Benincasa hispida* (ash gourd) extract. The green synthesis method for nanoparticles preparation is a cost effective, and environment friendly technique. The ash gourd extract which served as the natural reducing agent & capping agent in the synthesis of calcium carbonate nanoparticles is tested for the presence of various phytochemicals. The synthesized calcium carbonate nanoparticles were characterized by various techniques such as particle size analysis, scanning electron microscopy, FTIR, and XRD and these synthesized particles were assayed for its anti-oxidation & anti-inflammatory properties *in vitro*. The particle size analysis results showed that the synthesized calcium carbonate nanoparticles were of 40-200 nm in size which is confirmed with SEM and XRD data. The SEM analysis showed that the particles are having flake like morphology. EDX data also quantified the elemental composition of calcium carbonate nanoparticles. The XRD results confirmed that the synthesised nanoparticles are crystalline in nature. After synthesis of calcium carbonate nanoparticles, the *in vitro* antioxidant assays and anti-inflammatory assays were done to identify the corresponding potential of calcium carbonate nanoparticles. This study demonstrated that the green synthesized calcium carbonate nanoparticles can be used as a potent antioxidant & anti-inflammatory agent in future.

Keywords: Calcium carbonate nanoparticles, antioxidant activity, anti-inflammatory assays, particle size

Fabrication and *in vitro* biocompatibility evaluation of a porcine cholecystic extracellular matrix based guided tissue regeneration membrane

Dr. Betsy; Dr. Nebu George Thomas; Dr. Yogesh Bharat Dalvi

ABSTRACT

Periodontitis is an inflammatory condition of the teeth's supporting tissues caused by the combination of microorganisms, leading to the progressive destruction of the periodontium by developing periodontal pockets, gingival recession, or a combination of the two. The conventional treatment modalities result in repair of the attachment apparatus but the ultimate goal of periodontal therapy is regeneration and restoration of tooth's supporting apparatus. Although conventional periodontal treatment (scaling & root planning, flap surgery) improves clinical outcomes. Hemostatic function leads to early wound stabilization solubility in physiological conditions which results in difficult clinical manipulation, post operative infections and early rupture at the defect site guided tissue regeneration applications for regenerative periodontal procedure. Collagen materials have been utilized in medicine and dentistry because of their proven biocompatibility and capability of promoting wound healing. Collagen based membranes have some beneficiary properties such as hemostasis, weak immunogenicity and ability to augment tissue thickness. Drawbacks are risks of disease transmission, lower mechanical strength and rapid resorption. Unfortunately, this membrane in India has been crippled of very high cost. The present work proposes to develop decellularized porcine cholecystic extracellular matrix (CECM) based GTR membrane with desirable physical and biological properties intended for periodontal regeneration at affordable cost. They have shown excellent regenerative potential for graft assisted healing and tissue remodeling of skin wounds, subcutis, skeletal muscle and in animal models. It contains collagen (type I), sulphated glycosaminoglycans, elastin, and many growth factors such as basic fibroblast growth factor (FGF), vascular endothelial growth factor (VEGF) and transforming growth factor (TGF- β) with superior regenerative potential. So, our aim is to fabricate porcine CECM based GTR membrane and to compare *in vitro* biocompatibility (in terms of cytotoxicity and cell proliferation) ISO 10993-5:200911, commercially available Healiguide^R to induce periodontal regeneration.

Keywords – Acellular dermal matrix, Bone grafts, commercially available Healiguide[®], Porcine Cholecystic Extracellular Matrix, Periodontal regeneration, Periodontitis

In-vitro biocompatibility assessment of chitosan hydrogel loaded with sol-gel synthesized bioglass intended for periodontal regeneration

Vimal; Dr. Nebu George Thomas; Dr. Yogesh Bharat Dalvi

ABSTRACT

According to its definition, periodontitis is a "inflammatory disease of the tissues supporting the teeth caused by specific microorganisms or groups, resulting in progressive destruction of the alveolar bone and periodontal ligament." While the attachment mechanism is repaired by conventional treatment modalities, the ultimate objective of periodontal therapy is the regeneration and restoration of the tooth's supporting structure. Therefore, occlusive barrier membranes, bone grafts, growth factors, and cell-based therapies are among the regenerative methods that have been explored thus far and have shown some degree of success. A appropriate bioactive three-dimensional scaffold that plays a crucial role in periodontal tissue creation is something that researchers are constantly searching for. Because it is so affordable, research into the application of chitosan hydrogel loaded with sol gel produced bioglass as a biomaterial in tissue engineering is very promising. They support cell adhesion, proliferation, and differentiation and have good osteoconductivity, which makes them a desirable option in the regenerative situation. A wide range of biomaterials with biological activity, including antiviral, antibacterial, antifungal, antiprotozoal, anthelmintic, anti-inflammatory, immunosuppressive, neuroprotective, and non-toxic properties, can be found in the marine environment. For application as a bone transplant in the future, chitosan hydrogel filled with sol gel -synthesized bioglass is a promising option. The objective of the study was to the in vitro biocompatibility of chitosan hydrogel loaded with sol gel synthesized bioglass which could potentially be used as a bone graft with the possibility to induce periodontal regeneration.

Keywords – Bone grafts, chitosan hydrogel loaded with Novabone®, chitosan hydrogel loaded with sol gel synthesized bioglass, Periodontal regeneration, Periodontitis

***In vivo* and *in vitro* biocompatibility assessment of p (vdf-trfe) nanofiber loaded with cobalt ferrite nanoparticles intended for tissue engineering application**

Sree Lakshmi Nair; Dr. Nebu George Thomas; Dr. Yogesh Bharat Dalvi

ABSTRACT

Applications of scaffold-based therapies disrupt the natural signaling pathways making it necessary to develop scaffolds using piezoelectric biomaterials that can act as a mechano-electrical transduction system. P (VDF-TRFE) is a smart biomaterial that can generate bioelectric signals analogous to native tissue in response to the applied stress that can stimulate signaling pathways for enhanced tissue generation at the impaired site. This study evaluates the biocompatibility of P (VDF-TRFE) nanofiber loaded with Cobalt Ferrite. P(VDF-TRFE)-CoFe₂O₄ nanocomposites were tested for their cytotoxicity and cell migration *in vitro* through MTT and Scratch assay using the cell lines L929 indicating a good tolerance to the biomaterial. For *in vivo* biocompatibility assessment, the scaffolds were subcutaneously implanted in female immunocompetent rats. Following implantation, the scaffolds and the surrounding tissue were resected on the 7th, 14th, and 28th day. The histological analysis revealed an initial inflammatory foreign body response induced by the implanted material on the 7th-day post-implantation. Following this, there was a gradual reduction in inflammation. Finally, on the 28th day there was no inflammation and healthy tissue surrounding the scaffold can be seen with active fibroblast migration. Blood vessels were present throughout the study indicative of pro-angiogenic properties of the native scaffolds. The scaffolds were less deformed throughout the study showing a low degradation rate and hence can be used as long-term implants. Altogether, the results of the test performed both *in vitro* and *in vivo* conclude that the P(VDF-TRFE) nanofiber along with Cobalt ferrite is biocompatible and can be a promising candidate in tissue engineering applications warranting further exploration in clinical use.

Keywords- mechano-electrical transduction system, nanocomposites, immunocompetent, biocompatibility

Preclinical analysis of PCL-PLA core shell membrane loaded with dopamine and zinc oxide intended for tissue engineering applications

Shahanas Seethi; Dr. Nebu George Thomas; Dr. Yogesh Bharat Dalvi

ABSTRACT

Tissue engineering and regenerative medicine is a field of development of biomaterials leading to the practice of combining biologically activated molecules or growth factors, scaffolds, and cells into functional tissues. It is intense in developing novel biomaterials that support the invasion and proliferation of living cells for potential application in tissue engineering and regenerative medicine. Decellularization of existing tissue formed the basis of one major approach to producing 3D scaffolds for such purpose an innovative approach PCL- PLA core-shell membrane loaded with dopamine and zinc oxide scaffolds is used in the present study. In vitro as well as In vivo biocompatibility evaluations such as Cell viability, wound healing assay, inflammation, and angiogenesis were evaluated. In vitro MTT assay and scratch assay analysis on L929 cells show no cytotoxicity, cell viability increases above 80% as well as improves cell growth and wound closure at different time intervals. The in vivo biocompatibility evaluation was with experimental Sprague Dawley rats followed by histopathological analysis of the harvested biomaterial after the implantation. The formalin-coated hematoxylin & eosin (H&E) stained serial sections of samples which were harvested on the 1st week, 2nd week, and 4th week indicate inflammation and angiogenesis. The scaffold has more amount of angiogenesis and the week 4 histopathological results reveal low inflammation and high angiogenesis. The PCL -PLA core-shell membrane scaffold doesn't alter the morphology of cells but promotes cell attachment, cell growth, and proliferation. This study demonstrates that the scaffold is biocompatible and nontoxic as it promotes tissue regeneration and can offer a potential approach in tissue engineering applications.

Keywords- core-shell membrane, biocompatibility, Decellularization, 3D scaffolds, L929 cells

Analysing the Efficacy of Sodium Alginate Hydrogel infused with Polyherbal extracts for Modern Wound care management

Jaitha S Kumar, Dr. Yogesh B. Dalvi, Dr. Nebu George Thomas

ABSTRACT

This study aims to evaluate the effectiveness of sodium alginate hydrogel infused with polyherbal extract for modern wound care management. The wound-healing properties of the polyherbal extract are well established, and the use of hydrogels for wound management is gaining popularity due to their ease of application and superior therapeutic outcomes. The sodium alginate hydrogel provides a moist environment that promotes wound healing, reduces pain, and prevents infections. The polyherbal extract is added to the hydrogel to enhance its healing properties. In this study, the efficacy of the sodium alginate hydrogel infused with the polyherbal extract is analyzed through in vivo experiments. In vivo wound, healing studies proved that sodium alginate incorporated polyherbal extract is an excellent wound healing agent, and wounds get healed completely. The wound treated with sodium alginate contracted to 50% by the 10th day and was completely healed by the 20th day. From the histopathological analysis, it could be seen that the sodium alginate-treated skin tissue exhibited superior features. The images revealed extensive fibrosis in the dermis, higher angiogenesis, and epithelization. This proved that the sodium alginate incorporated has very good wound-healing properties and can be used as potential wound-healing aid.

KEYWORDS - Sodium alginate hydrogel, Polyherbal extract, Wound healing properties, Histopathological analysis, Angiogenesis, Therapeutic outcomes

Evaluation of Anti-Urolithiatic Property of Aqueous Ethanolic Poly-mushroom extract: An *in-vitro* and *in-vivo* Study

Sana Shaji Noushad, Dr. Yogesh B. Dalvi, Dr. Nebu George Thomas

ABSTRACT

Urolithiasis, also known as urinary stones, is a common urological disorder with high prevalence worldwide. Calcium oxalate stones are the most common type of urinary stones, accounting for 70-80% of all cases. Although several treatment options are available, the recurrence rate of urinary stones remains high. Therefore, there is a need to explore natural remedies for the prevention and management of urinary stones. Present study was aimed to rationalize the traditional use of poly-mushroom extract in urolithiasis and to explore its possible underlying mechanism. In-vitro crystallization assays were performed to determine the inhibitory effects of poly-mushroom extract against crystal nucleation, aggregation and growth. In-vivo urolithiasis model was developed in rats by the administration of 0.75% ethylene glycol in drinking water. The anti-urolithic effects of poly-mushroom were evaluated by analyzing urine analysis and histological parameters. The in-vitro results revealed that the poly-mushroom extract has potent anti urolithiatic ability in both nucleation assays (with a maximum inhibition of $55.80 \pm 2.01\%$ at $300\mu\text{g/ml}$ extract concentration), aggregation assay (with a maximum inhibition of $26.52 \pm 1.58\%$ at $300\mu\text{g/ml}$ extract concentration). The in-vivo findings reveal superior nucleation and anti-aggregation efficacy in the preventive intervention group, whereas the curative group exhibits crystal aggregation albeit with smooth margins, which do not inflict tissue harm opposite to that of the negative control group. These observations were corroborated by histological evaluation.

KEYWORDS – Urolithiasis, Poly-mushroom extract, Calcium oxalate stones, Crystal nucleation, In-vitro crystallization assays, Anti-urolithic effects

Evaluation of Anti-Inflammatory property of Aqueous Ethanolic Poly-herbal extract in CFA-induced Rat model

Saba Shaji Noushad, Dr. Yogesh B Dalvi, Dr. Nebu George Thomas

ABSTRACT

Inflammation is a crucial immune response that helps the body survive infections and injuries. However, it also contributes to the development of many prevalent diseases, including rheumatoid arthritis, atherosclerosis, and asthma. While steroidal and non-steroidal anti-inflammatory drugs are available, they often come with side effects and high costs and can't be used for a longer duration. Therefore, researchers have turned to natural sources, such as herbs, to find new anti-inflammatory compounds. Poly-herbal formulations are popular worldwide due to their medicinal and therapeutic uses. In this study, Sprague Dawley rats were divided into four groups, and Complete Freund's adjuvant was used to induce inflammation on the tibiotarsal joint of the right hind limb. The negative control group was given saline, and the positive control group received Diclofenac (10mg/kg). Two treatment groups were given different doses (30mg/kg and 15mg/kg) of a poly-herbal extract provided by Yogesh Bharat Dalvi, PRC, Thiruvalla. The anti-inflammatory effect of the extract was compared to the positive control using rat paw edema measurements, GAIT analysis from days 1-28, and radiological assessment using X-rays on days 1, 14, and 28. Polyherbal extract administration significantly reduced rat paw swelling, associated symptoms, and joint erosion compared to control groups, as shown by X-ray analysis, while gait analysis score decreased significantly from day 1 to day 25.

KEYWORDS - Inflammation, Immune response, Atherosclerosis, Sprague Dawley, Diclofenac, Gait analysis score

***In-vitro* and *in-vivo* Wound Healing Activity of Ethanolic Extract of *Chassalia curviflora* Incorporated with Guar-Gum Hydrogel**

Dona C. Jaison, Dr. Yogesh B Dalvi, Dr. Nebu George Thomas, Dr. Teena Merlin

ABSTRACT

Wound healing is crucial for preventing infections and restoring tissue function, ensuring the overall health and well-being of individuals, as well as preventing potentially life-threatening complications associated with injuries. Wound care has received a lot of attention, with a focus on innovative therapeutic strategies and the development of technologies for the management of both acute and chronic wounds. With the available background information in this field, the present study was designed to determine the wound-healing activity of ethanolic extract of *Chassalia curviflora* incorporated with Guar gum hydrogel. The *in vitro* wound healing studies were carried out using L929 mice fibroblast cells during MTT assay. The developed Guar gum hydrogel was found to be self-healing, self-adhering, and injectable. Excision wound healing was adopted on Sprague Dawley rats to understand the wound contraction effect of the plant extract over a period of 20 days' time. The wound treated with plant extract contracted to 50% by the 10th day and was completely healed by the 20th day, which was much faster and similar to the positive when compared with other groups. H and E-stained histological sections of test tissue treated with plant extract showed extensive epidermis formation, re-epithelialization, collagen deposition, and hair follicles. Thus, in our present study, it could be shown that the above-mentioned plant extract incorporated with guar gum hydrogel can be utilized as a promising biomaterial for faster and cost-effective wound healing applications.

KEYWORDS - Wound healing, *Chassalia curviflora*, Guar gum hydrogel, L929 mice fibroblast cells, Excision wound healing, Histological evaluation

***In-vitro* and *in-vivo* Biocompatibility Assessment of Electrospun PVDF Membrane Incorporated with ZnO**

Gayathry EP, Dr. Yogesh B Dalvi, Dr. Teena Merlin

ABSTRACT

Tissue engineering has the potential to replace or enhance biological processes, avoid the need for organ transplantation, and create structurally similar functional scaffolds to those found in native tissues. An innovative approach to PVDF incorporated with different concentrations of hydroxyapatite synthetic scaffolds is used in the present study. In vitro as well as In vivo biocompatibility evaluations such as cytotoxicity, hemolysis, RBC aggregation, inflammation, and angiogenesis were evaluated. In vitro MTT assay analysis on L929 CELL LINE-mouse fibroblast shows no cytotoxicity, cell viability increases above 95% as well, and improves cell growth and proliferation. The aim of this study was to screen the cytotoxicity and evaluate the biocompatibility of PVDF synthetic scaffold for tissue engineering. The MTT assay was performed with the extracts of the scaffold showing that the nanoparticle PVDF scaffolds did not exhibit any toxic effect on the L929-mouse fibroblast cell line and it shows more viability in the two incubation periods. After 4 weeks of subcutaneous implantation, the entire scaffolds were completely degraded and maintained good integrity. In histopathological analysis, there is no inflammatory reaction or rejection which indicates that the scaffold has good histocompatibility. The PVDF scaffold doesn't alter the morphology of cells but promotes cell attachment, cell growth, and proliferation. This study demonstrates that the scaffold is biocompatible and non-toxic as it promotes tissue regeneration and can offer a potential approach in tissue engineering applications.

KEYWORDS - Biocompatibility, PVDF (Polyvinylidene fluoride), Hydroxy apatite, Hemocompatibility, Cytotoxicity.

Exploring the *IN-VIVO* Biocompatibility of PVDF-ZnO composite scaffold for Biomedical applications

Sneha Varghese, Dr. Yogesh B. Dalvi, Dr. Nebu George Thomas

ABSTRACT

Tissue engineering has the potential to replace or enhance biological processes, avoid the need for organ transplantation, and create structurally similar functional scaffolds to those found in native tissues. Biocompatibility is crucial in developing biomedical devices/materials, with the rising demand for implants and tissue engineering, making it essential in research. In this study, we have investigated the biocompatible nature of Piezoelectric materials (PVDF) incorporated ZnO nanoparticles. This may lead to improved tissue regeneration and overall better performance in tissue engineering. This aims to analyze the in vivo biocompatibility of PVDF incorporated with ZnO with different concentrations. The biocompatibility of this scaffold was tested in rat models by implanting sterile PVDF synthetic scaffolds subcutaneously in female Sprague Dawley rats weighing between 200- 300g. The rats were grouped into 4 groups for 4 weeks of study (week 1, week 2, week 3, and week 4). After 7, 14, 21, and 28 days, the scaffold and surrounding tissues were surgically removed and analyzed histopathologically. The formalin-coated hematoxylin & eosin (H&E) stained serial sections of samples which were harvested on the 1st week, 2nd week, 3rd week, and 4th week indicate inflammation and angiogenesis. The scaffold has more amount of angiogenesis as an increase in concentrations of ZnO and the week 4 histopathological results reveal low inflammation and high angiogenesis. The study confirmed the non-toxic and non-immunogenic nature of the PVDF/ZnONp scaffold, making it suitable for medical applications. This synthetic scaffold showed antibacterial qualities because ZnO was combined with PVDF.

KEYWORDS - Biocompatibility, Polyvinylidene fluoride (PVDF), ZnO (Zinc oxide), Tissue engineering

***In-vitro* and *in-vivo* Biocompatibility Assessment of Electrospun Cellulose Membrane Incorporated with Nitric Oxide**

Sayana P Abraham, Dr. Yogesh B Dalvi, Dr. Nebu George Thomas, Dr. Teena Merlin

ABSTRACT

Tissue engineering has the potential to replace or enhance biological processes, avoid the need for organ transplantation, and create structurally similar functional scaffolds to those found in native tissues. An innovative approach to CELLULOSE incorporated with different concentrations of hydroxyapatite synthetic scaffolds is used in the present study. In vitro as well as In vivo biocompatibility evaluations such as cytotoxicity, haemolysis, RBC aggregation, inflammation, and angiogenesis were evaluated. In vitro MTT assay analysis on L929 CELL LINE-mouse fibroblast shows no cytotoxicity, cell viability increases above 90% as well, and improves cell growth and proliferation. The aim of this study was to screen the cytotoxicity and evaluate the biocompatibility of CELLULOSE synthetic scaffold for tissue engineering. The MTT assay was performed with the extracts of the scaffold showing that the nanoparticle CELLULOSE scaffolds did not exhibit any toxic effect on the L929-mouse fibroblast cell line and it shows more viability in the two incubation periods. After 4 weeks of subcutaneous implantation, the entire scaffolds were completely degraded and maintained good integrity. In histopathological analysis, there is no inflammatory reaction or rejection which indicates that the scaffold has good histocompatibility. The CELLULOSE scaffold doesn't alter the morphology of cells but promotes cell attachment, cell growth, and proliferation. This study demonstrates that the scaffold is biocompatible and non-toxic as it promotes tissue regeneration and can offer a potential approach in tissue engineering applications.

KEYWORDS - Biocompatibility, CELLULOSE, Hydroxy apatite, Hemocompatibility, Cytotoxicity.

***In-vivo* Evaluation of Guar Gum Hydrogel incorporated Poly-Mushroom extract for Chronic wounds in rats**

Sreelekshmi.S, Dr. Yogesh B.Dalvi, Dr. Nebu George Thomas

ABSTRACT

Chronic wounds are widespread. It is estimated that 1 to 2% of the population will experience a chronic wound during their lifetime in both developed and undeveloped countries. The conventional medicines used for the treatment of chronic wounds are laying the open wound, debridement of necrotic tissues, and change of dressings until healthy granulation tissues are formed (medicines are Bacitracin, Neosporin, polysporin) But these possess serious side effects such as severe pain, significant emotional and physical distress, lack of sleep. In this context we propose polyfungal extracts known for its biological properties such as antitumour, anticancer, antioxidant, antifungal activities that are incorporated with guar gum biopolymer for tissue regeneration. Studies in India have reported higher rates of wound infections from 23% to 38% due to chronic wounds. The conventional medicines used for the treatment of chronic wounds are Bacitracin, Neosporin, and polysporin. Although widely used serious side effects observed are severe pain, nausea, lack of appetite, significant emotional and physical distress, and lack of sleep. In this context we propose to explore the angiogenic property of poly fungal extracts that are already known for their biological properties such as antitumor, anticancer, antioxidant, and antifungal activities. Guar gum is a biopolymer derived from the seeds of the guar plant. It has been used in a variety of applications, including food. pharmaceuticals, and cosmetics, due to its unique properties such as thickening. stabilizing, and emulsifying. In recent years, guar gum has also been studied for its potential use in tissue regeneration.

KEYWORDS - Bacitracin, Neosporin, polysporin, polyfungal extracts, guar gum biopolymer

***In-vitro* and *in-vivo* Anti-inflammatory Activity of *Chassalia curviflora* Ethanolic extract**

Akhila Mathew, Dr. Yogesh B. Dalvi, Dr. Nebu George, Dr. Teena Merlin

ABSTRACT

Inflammation plays an important role in various diseases with high prevalence within the population such as rheumatoid arthritis, atherosclerosis, and asthma. Since ancient times, medicinal plants have been utilized as therapeutic agents to treat a variety of illnesses and enhance general health. The ethanolic leaf extract of *Chassalia curviflora* (Wall.) Thwaites is used in this study, which belongs to the family Rubiaceae. The genus *Chassalia* has several medicinal properties. The main objective of this study is to assess the pharmacological potentials of *C. curviflora* ethanolic leaf extract in the therapeutic areas of inflammation and arthritis. The CCELE of low-dose and high-dose were prepared and evaluated for their *in vitro* toxicity study by MTT. Further, the anti-inflammatory and anti-arthritic activity of CCELE were evaluated by *in vivo* models such as carrageenan-induced paw edema, and Complete Freund's adjuvant (CFA) induced arthritis model in rats. Animals were divided into four groups (negative control, positive control, test low dose, and test high dose). The negative control group was given saline, and the positive control group received Diclofenac (10mg/Kg). Two treatment groups were given different doses (100mg/Kg and 250mg/Kg) of CCELE. The extract produced significant dose-dependent inhibition of carrageenan-induced acute and CFA-induced chronic inflammation in Sprague Dawley rats. The anti-inflammatory effect of the extract was compared to the positive control using GAIT analysis from day 1 to 22, radiological assessment using X-ray on the 22nd day and histopathological analysis were performed for the evaluation of the extent of joint destruction.

KEYWORDS – *Chassalia curviflora*, CCELE, MTT assay, Carrageenan-induced paw edema, Ethanolic leaf extract.

Assessment of Ethanolic Extract of *Elaeocarpus serratus* Incorporated with Guar-Gum Hydrogel for enhanced *in vitro* and *in- vivo* Wound Healing Efficacy

Rhonda Ntonya, Dr. Yogesh B. Dalvi, Dr. Nebu George, Dr. Teena Merlin

ABSTRACT

Wound healing is a complex physiological process, and the quest for innovative therapies continues. This study investigates the potential of an alcoholic extract of *Elaeocarpus serratus* incorporated into a guar gum (GG) hydrogel for enhanced *in vitro* and *in vivo* wound healing efficacy. The extraction of the plant material was conducted using a Soxhlet apparatus to ensure the extraction of active compounds. The GG hydrogel was prepared as a self-healing, injectable, and adhesive formulation crosslinked with Borax, maintaining its crucial physical properties while incorporating the plant extract. *In vitro* studies with MTT assay revealed that the extract was non-toxic to L929 cells for up to 72 hours, affirming its biocompatibility.

Furthermore, the research involved training in animal handling and restraining to facilitate *in vivo* assessment. Animal models were treated with GG hydrogel infused with the plant extract (test), hydrogel alone (blank), silver nitrate gel (positive control), and negative control. Results demonstrated that the test group exhibited accelerated wound closure rates (100%), comparable to the positive control (97% \pm 2.9%), blank 90.9 \pm 3.4%, and significantly faster than the negative control (67.9% \pm 3.6%).

This research generates compelling preclinical evidence supporting the potential of *E. serratus* extract combined with GG hydrogel as an effective wound-healing therapy. Further investigations, including clinical trials, are required to validate its safety and efficacy in human subjects.

KEYWORDS - Wound healing, *Elaeocarpus serratus*, Guar gum hydrogel, MTT assay, *In vitro* and *in vivo* studies, Accelerated wound closure

Guided Bone Regeneration of PVDF and PVDF Nickel Ferrite

Josna K, Dr. Yogesh B. Dalvi, Dr. Nebu George Thomas

ABSTRACT

Poly (vinylidene fluoride) (PVDF) membranes have been extensively applied to scientific research and industrial process due to their outstanding properties such as high thermal stability, good chemical resistance, and membrane-forming properties. Guided bone regeneration is presumed to be achieved when the osteoprogenitor cells are exclusively allowed to repopulate the bone defect site by preventing the entry of non-osteogenic tissues. The application of a membrane to exclude non-osteogenic tissues from interfering with bone regeneration is a key principle of GBR. To provide adequate conditions for the regeneration of damaged bone, it is necessary to develop piezoelectric porous membranes with antioxidant and anti-inflammatory activities. In this study, poly (vinylidene fluoride) (PVDF) and PVDF Nickel Ferrite were used. The in vitro bone regeneration studies were carried out on L929 mice fibroblast cells during MTT and Scratch assays which mimicked the original bone regeneration. In vivo study proved the tissues to be biocompatible, and non-inflammatory with the incorporation of the given material. The bone regeneration model was adopted on Sprague Dawley rats over a period of 8 weeks. Thus, in our present study, it could be shown that PVDF Nickel Ferrite can be utilized far better than PVDF as a promising material where spontaneous tissue and bone regeneration was possible.

KEYWORDS - Poly (vinylidene fluoride) (PVDF) membranes, guided bone regeneration (GBR), piezoelectric porous membranes, antioxidant and anti-inflammatory activities, PVDF Nickel Ferrite, bone regeneration model

Phytotherapeutic Hydrogels for Diabetic foot ulcer: *in-vitro* and *in-vivo* investigation

Sable Sunita Tukaram, Dr. Yogesh B. Dalvi, Dr. Nebu George Thomas

ABSTRACT

Diabetic foot ulcers (DFUS) significantly impact the global diabetic population, with 85% of amputations in diabetics being preceded by DFUs. Additionally, diabetics with neuropathic DFUs have a 45% estimated mortality rate within five years after amputation. India has a high prevalence of diabetes, accounting for 17% of global diabetes patients, and is projected to increase from almost 80 million to 135 million by 2045, according to the Indian Diabetes Association. Although advanced treatment options for DFUs exist, their high cost may be a barrier for middle-class individuals. Hydrogels are being investigated for wound care due to their moisture control, biodegradability, biocompatibility, and biosafety. Therefore, this study aimed to investigate the potential of a Sodium alginate-based hydrogels with polyherbal (JAS-01) plant extract (SAPE) cross-linked with Zinc Chloride and Guar gum-based hydrogel enriched with polyherbal (JAS-01) extracts cross-linked with Borax for DFU care. The study synthesized a Guar gum-based hydrogel loaded with poly-herbal extracts (GGPH) and tested it for self-healing and injectability at various concentrations. The study followed ISO19033 guidelines to evaluate *in vitro* cytocompatibility of SAPE and GGPH. An *in vivo* study was conducted on diabetic Sprague Dawley (SD) rats using a chronic wound model to assess wound closure quantitatively through a standard scale and qualitatively through histological analysis, evaluating epithelialization, angiogenesis, inflammation, and hair follicle formation during the healing process. The findings indicate that GGPH at all concentrations exhibited self-adhesive and self-healing properties. The 3% concentration showed better injectability and was selected for further *in vitro* and *in vivo* analyses. SAPE and GGPH demonstrated cytocompatibility, with a cell survival rate of up to 95% after 72 hours under the ISO19033 guidelines of MTT assay. In diabetic animals, SAPE along with GGPH achieved complete wound closure within the 15th day of treatment, with histological analysis showing the promotion of epithelialization, angiogenesis, hair follicle formation, and reduced inflammation. In conclusion, the study suggests that GGPH and SAPE have the potential to promote wound healing using cell viability, proliferation, and migration, as well as reduce tissue damage through their antioxidant and anti-inflammatory properties. Therefore, SAPE and GGPH may serve as promising alternative treatments for DFU.

KEYWORDS - Diabetic foot ulcers (DFUs), Sodium alginate-based hydrogels, Polyherbal (JAS-01) plant extract, Guar gum-based hydrogel (GGPH), Cytocompatibility, Wound healing

Assessment of the Efficacy of Polyherbal Extract-Infused Hydrogels for Diabetic Wound Healing: A Preclinical Investigation

Olyvia Thokchom, Dr. Yogesh B. Dalvi, Dr. Nebu George Thomas

ABSTRACT

Wound healing is a complex physiological process that repairs the skin's integrity and function after an injury. In this aspect, hydrogels have become increasingly popular for wound dressing due to their advantageous properties such as biocompatibility, moisture control, high water content, and biodegradability. Guar gum and Sodium alginate are two widely studied and utilized polysaccharides in the biomedical field. Guar gum, also known as Guaran, is a galactomannan polysaccharide extracted from guar beans. Alginate, on the other hand, is a natural edible polysaccharide found in Phaeophyceae and several bacteria. This study aimed to investigate the properties of Guar gum hydrogels and Sodium alginate hydrogels containing a polyherbal (GLY-01) extract derived from traditional medicine. The Guar gum hydrogels, prepared in different concentrations by cross-linking reaction using Borax solution, were tested for self-healing and injectability. Along with Guar gum hydrogels, the Sodium alginate hydrogels prepared by cross-linking reaction using ZnCl₂ solution were used to evaluate their efficacy in wound healing. The hydrogels were assessed for in vitro cytocompatibility with the help of the MTT assay using the L-929 cell line. Results showed that 5% Guar gum with Plant extract (GGPH) and 5% Sodium Alginate with Plant extract (SAPE) have relatively better cell viability. The in vivo study was conducted on Streptozotocin diabetes-induced Sprague Dawley rats under positive control, negative control, blank and test conditions for 20 days. The results of the study showed that the hydrogels were effective in achieving >80% wound closure by the 15th day and 100% wound closure between the 18th and 20th day of treatment, compared to the negative control. The histopathology test with H&E staining revealed that the hydrogels facilitated higher angiogenesis, epithelialization, and hair follicle growth while reducing inflammation. Therefore, it can be concluded that hydrogels loaded with the polyherbal extract have the potential as a biomaterial for acute and chronic diabetic wound healing.

KEYWORDS - Wound healing, Guar gum hydrogel, Sodium alginate hydrogel, Polyherbal extract (GLY-01), MTT assay, Diabetic wound healing

GALLERY



Meeting with Pushpagiri Research Centre & HLL Life Care (14.07.2023)



Prof. Nebu George Thomas receiving accolades upon successful completion of Ph.D. from VIT, Vellore (19.07.2023)



Dr. G. Meenu and Dr. Betsy Thomas postgraduate students from department of periodontology got selected as District level winners as part of Young Innovation Programme 4.0 received cash prize of 25,000 /-felicitated by honourable finance minister Sri.K.N.Balagopal (21.07.2023)



Pushpagiri Research Centre Purchase new lyophiliser equipment in Tissue Engineering Lab (25.07.2023)



Animal House IAEC Meeting in Pushpagiri Research Centre (29.07.2023)



MATA GUJRI MAHILA MAHAVIDYALAYA (AUTONOMOUS), JABALPUR

Reaccredited 'A+' Grade by NAAC

FIVE DAYS VIRTUAL FACULTY DEVELOPMENT PROGRAMME

ON

*ENVIRONMENTAL QUALITY IMPROVEMENTS
THROUGH SUSTAINABLE APPROACHES*



DATE:- 24th - 28th July 2023
Time: - 11:00 A.M. to 5:00 P.M.

ORGANIZED BY

IQAC, MGMM (AUTO.), JABALPUR IN ASSOCIATION WITH
DEPARTMENT OF- *BOTANY, ZOOLOGY, BIOTECHNOLOGY,*
MICROBIOLOGY & BIOCHEMISTRY .

Day- 4th

Resource Persons



Dr. Uttam Puri Goswami

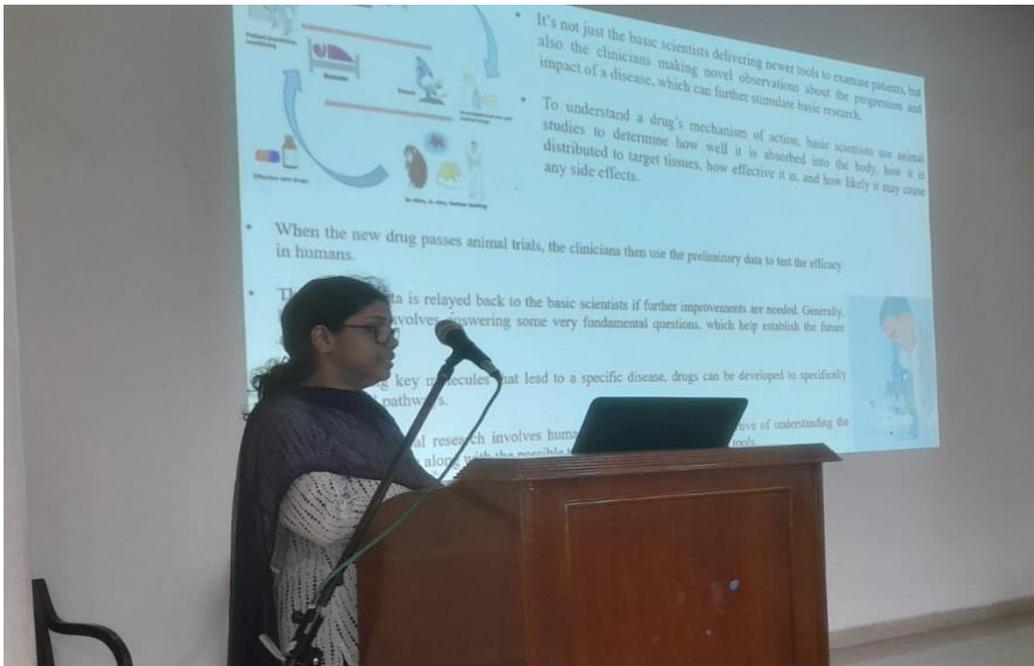
Postdoctoral Researcher
University of Northern British
Columbia, Prince George, Canada



Dr. JAYACHANDRAN V. P.

Lecturer, Applied Biology Section,
Applied Sciences Department,
University of Technology and Applied Sciences,
Muscat, Sultanate of Oman,

Dr. Jayachandran (Adjunct Faculty) served as the Resource Person for the five days virtual Faculty development programme (28.07.2023)



Dr. Soumya R.S Clinical Club Presentation (09.08.2023)



Rev. Dr. Mathew Mazhavancheril (Director & Head) and Prof. Dr. Nebu George Thomas met with Dr. Anil Kumar (04.08.2023)

Best Outgoing Masters Students from Medical Biotechnology and Computational Drug Designing Laboratory

Topic of Research: Efficacy of phytochemicals extracted from *Coriandrum sativum* in synergism with the susceptible antibiotics against nosocomial *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*



Name: Amina Haris
Department: Biotechnology
College: SB College, Changanassery
Rank: 1st (4th Semester), 2nd (Overall)



Topic of Research: Phytochemical evaluation and antimicrobial efficacy of *Piper betle* against carbapenem resistant *Escherichia coli*: Evidence from *in-vitro* and *in-silico* experimentations



Name: Elizabeth Annie George
Department: Microbiology
College: SB College, Changanassery
Rank: 3rd (4th Semester), 3rd (Overall)





Fruitful discussion with Dr. Sreeraj Gopi, Co-founder and Director of MOLECULES FOOD SOLUTIONS PRIVATE LIMITED. We will be entering into Academia-Industrial collaboration (16.08.2023)



Meeting with Research Centre Faculty & Nandhakumar sir. This is a collaborative work of Tissue engineering lab of Pushpagiri Research Centre and Central institute of fisheries technology (11.08.2023)



Prof. Dr. Nebu George Thomas guided by Prof. Dr. Anand Anbarasu receiving his Ph.D. degree from the Vice Chancellor Dr. G. Viswanathan at 38th Convocation in Vellore Institute of Technology, Vellore (18.08.2023)



Rev. Dr. Mathew Mazhavancheril (Director & Head) and Prof. Dr. Nebu George Thomas met with Prof. Dr. Anand Anbarasu ONAM – 2023 celebration at PRC (18.08.2023)









Congratulations Dr. Jayachandran for informative talk on Biofilm at International and Interuniversity Centre for Nanoscience, MG University (23.08.2023)



Review Meeting regarding collaborative project between PRC and central institute of Fisheries Technology was held today at PRC. Rev Dr. Mathew Mazhavancheril and Dr. Binci Senior scientist CIFT evaluated progress of project on development of tissue engineering scaffolds from Marine Sources. Delegates from commercial partner of CIFT named Blooming boon were also present during meeting



എം അമിത് കുമാർ, അബ്ദുൾ റാജ്, പി എസ് ആശ്വതി, അർജുൻ ജെ നായർ, ട്രീസ റെജി, ജെ എസ് അശ്വതി, വി ശ്രീലക്ഷ്മി, നിഖിൽ ചെറിയാൻ ജേക്കബ്



കെ എസ് ശ്രീലക്ഷ്മി, ശ്രീലക്ഷ്മി ജയറാം, തേജ രാജേഷ്, സന്ദേഹ ജയറാം, എം വി പാർവതി, അയ്യർ രാജു, ആനിറ്റ് മരിയ ജോസഫ്

■ നാനോ ടെക്നോളജി

എംജി സർവകലാശാലയ്ക്ക് വിണ്ടും ഫെലോഷിപ്പ് തിരയ്ക്കും

കോട്ടയം

എംജി സർവകലാശാലയുടെ ന്യൂസ് ഓഫീസ് നാനോ സയൻസ് ആൻഡ് നാനോ ടെക്നോളജിയിലെ 14 വിദ്യാർത്ഥികൾ വിദേശ രാജ്യങ്ങളിലെ മികച്ച സർവകലാശാലകളിൽ ഫെലോഷിപ്പിന് തിരയ്ക്കുന്നതിനായി കോഴിക്കോട്, അമേരിക്ക, പോളണ്ട്, ജർമ്മനി, ഓസ്ട്രേലിയ, തായ് വാൻ എന്നീ രാജ്യങ്ങളിൽ ഫെലോഷിപ്പ് ലഭിച്ചു. എംഎസ്സി വിദ്യാർത്ഥികളിൽ ഒരാൾ പുറമെയുള്ള നാഷണൽ കെമിക്കൽ ലാബോറട്ടറിയിൽ ഗവേഷണം നടത്തും.

- 14 വിദ്യാർത്ഥികൾ വിദേശ സർവകലാശാലകളിലേക്ക്
- ഒരാൾ നാഷണൽ കെമിക്കൽ ലാബോറട്ടറിയിൽ

ടിസ എം റെജി (ഡ്രെസ്സസ് സർവകലാശാല അമേരിക്ക), ജെ എസ് അശ്വതി, വി ശ്രീലക്ഷ്മി (ഫ്രീഡ്സ് അലക്സാണ്ടർ സർവകലാശാല അമേരിക്ക), അർജുൻ ജെ നായർ, പി എസ് ആശ്വതി (ട്രാസ്റ്റിയ സർവകലാശാല ഓസ്ട്രേലിയ), കെ എം അമിത്, അബ്ദുൽ റാജ് (സ്പ്രിംഗ്ഫീൽഡ് സർവകലാശാല പോളണ്ട്) എന്നിവരാണ് ഫെലോഷിപ്പിന് അർഹരായ എംടെക് വിദ്യാർത്ഥികൾ. എംഎസ്സി വിദ്യാർത്ഥി

കളായ നിഖിൽ ചെറിയാൻ ജേക്കബ്, ശ്രീലക്ഷ്മി ജയറാം, കെ എസ് ശ്രീലക്ഷ്മി, തേജ രാജേഷ് എന്നിവർ തായ് വാൻിലെ നാഷണൽ സയൻസൺ യൂണിവേഴ്സിറ്റിയിലും എം വി പാർവതി, സ്റ്റേഫ് ജെയിംസ് എന്നിവർ ഓസ്ട്രേലിയയിലെ ക്വിൻസ്ലാൻഡ് സർവകലാശാലയിലും അയ്യർ രാജു നാഷണൽ തായ് വാൻ സർവകലാശാലയിലും പഠനം നടത്തും. ആനിറ്റ് മരിയ ജോസഫ്

എം നാഷണൽ കെമിക്കൽ ലാബോറട്ടറിയിൽ ഇന്റേൺഷിപ്പിന് തിരയ്ക്കുന്നതിനായി.

ഗസ്റ്റ് അധ്യാപക ഒഴിവ്
തിരുവനന്തപുരം
 തിരുവനന്തപുരം ഗവ. വനിതാ കോളേജിൽ ഹോം സയൻസിൽ ഗസ്റ്റ് അധ്യാപക ഒഴിവുണ്ട്.

Postgraduate students from department of Periodontology and Prosthodontics of Pushpagiri college of dental sciences are involved in this project



GPS Map Camera



Google

Pune, Maharashtra, India
Aamlewadi Road, Maharashtra 412115, India
Lat 18.534795°
Long 73.654117°
23/09/23 02:59 PM GMT +05:30



GPS Map Camera



Google

Pune, Maharashtra, India
Fergusson college campus road, GRCQ+R7W, Shivajinagar, Pune, Maharashtra 411004,
India
Lat 18.522047°
Long 73.83811°
23/09/23 02:20 PM GMT +05:30



Dr. Yogesh Bharat Dalvi gave lecture at Ferguson College Pune for M.Sc. student on the topic "Unlocking Natures Healing Potential: Phytoceuticals In Tissue Engineering" (23.09.2023)



Dr. Aniket Naha successfully defended his Ph.D. viva voce on 25th September, 2024 under the guidance of Prof. Dr. Sudha Ramaiah, supervised by Prof. Dr. Anand Anbarasu and external examiner Prof. Kumar K.M at Vellore Institute of Technology, Vellore (25.09.2023)



Pg Induction meeting at dental college (04.10.2023)



PUSHPAGIRI RESEARCH CENTRE

PRESENTATION ON GUIDELINES FOR ESTABLISHING STEM CELL LAB AT PUSHPAGIRI RESEARCH CENTER

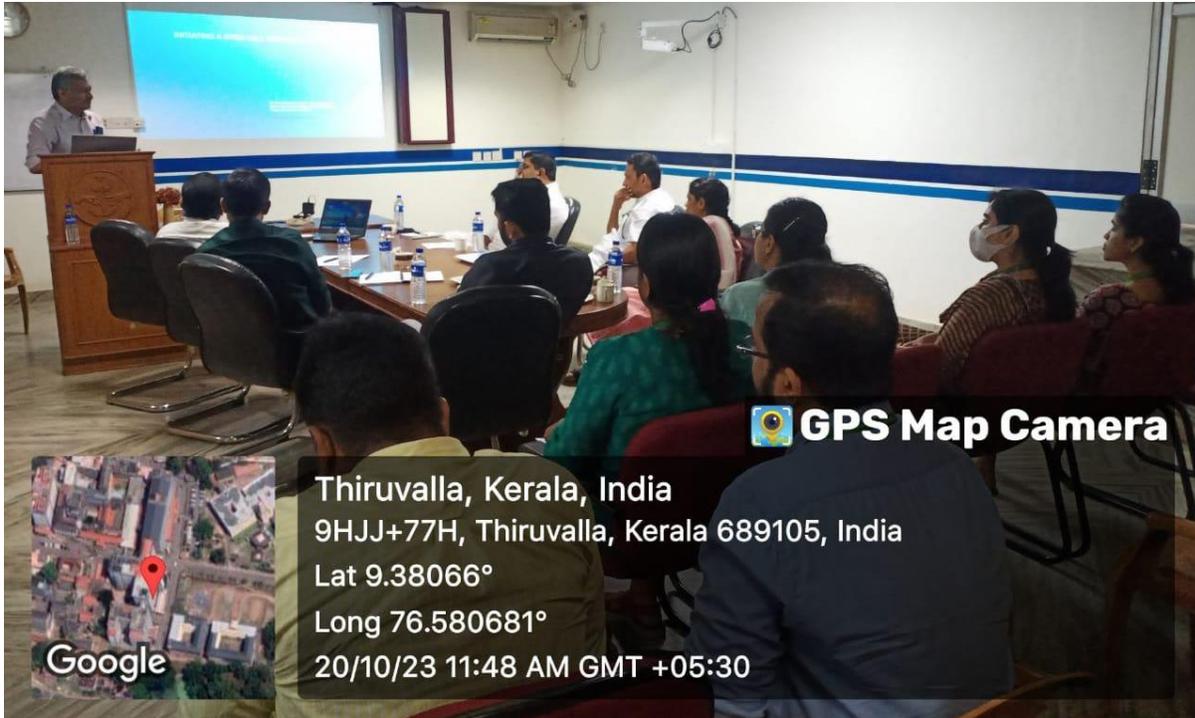
DR.ROJIN ABRAHAM

Head of Department,
Neurosurgery, Believers
Church Medical College
Hospital, Thiruvalla. Former
Faculty at CMC Vellore and
NIMHANS, Bangalore.

Former Research Scholar
at Stem Cell Institute, KU
Leuven, Belgium.



20TH
OCTOBER
2023



Dr. Rojin Abraham Presentation (20.10.2023)



Presentation by Dr. Rosin George Varghese on Clinical trials- The basics, Rules, Roles and responsibilities (20.10.2023)



Postgraduate students Dr. Vimal and Dr. Rakhi department of Periodontology presenting biomaterials developed for periodontal regeneration by Tissue engineering lab of PRC at Keraleeyam 2023 held at Trivandrum (04.11.2023)



Dr. Betsy A Jose, Assistant Professor, Department of Community Medicine secured best paper award in the 2nd World Congress on Non-Communicable Diseases, an international Conference held on 29th October 2023 at JN Tata Auditorium, Indian Institute of Science, Bengaluru (29.10.2023)



MoU signed with CSIR - National Institute for Interdisciplinary Science and Technology (NIIST), Trivandrum (27.10.2023)



PRC signs MoU with NIIST, Trivandrum (27.10.2023)



Jointly
Organized
By

Department of Community
Medicine
&
Pushpagiri Research
Centre

TOPIC:

***Evidence Based Public Health -
Generating Evidence***



GUEST
LECTURE

Dr. Saritha Susan Varghese

Associate Professor,
Believers Church Medical College Hospital



09th December, 2023
11:00 am – 12:30 pm



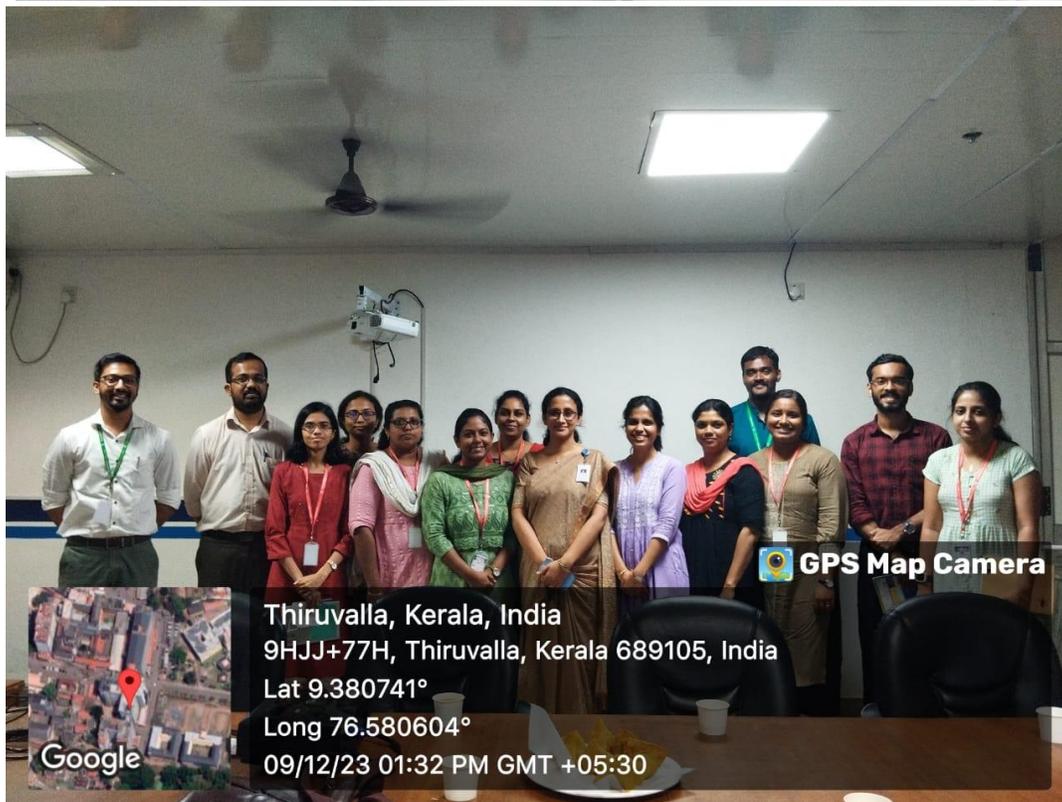
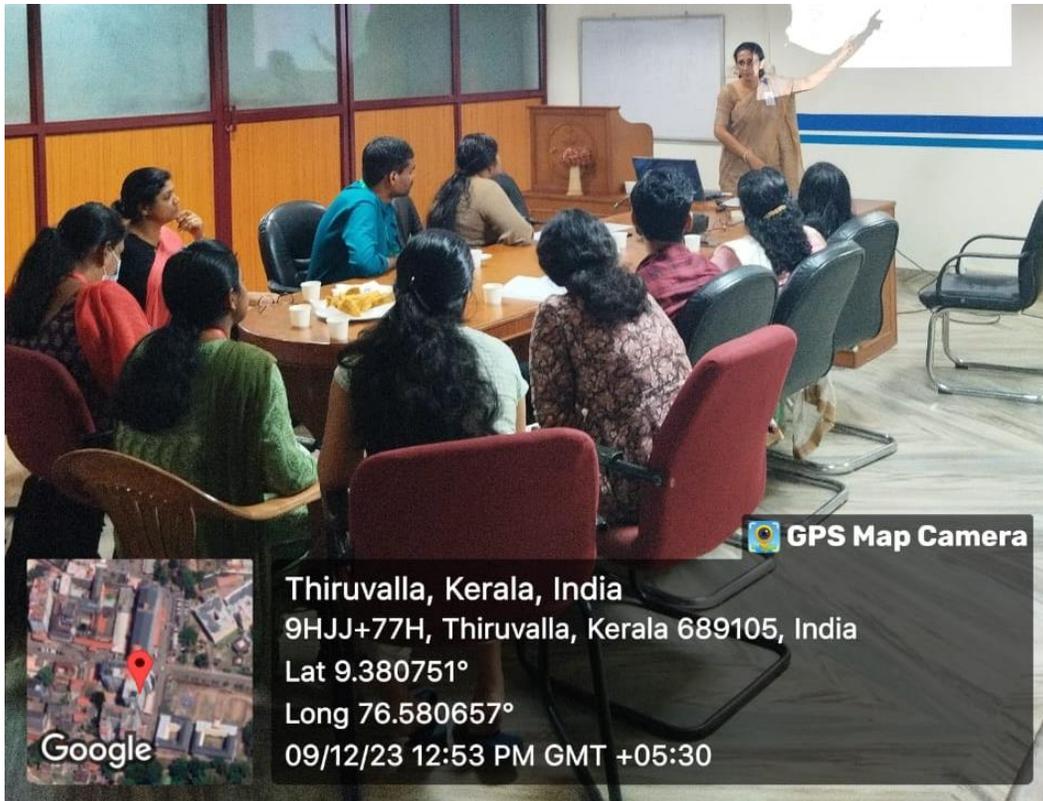
Conference Hall
Pushpagiri Research Centre

<http://prc.pushpagiri.in/>



PUSHPAGIRI

We care God cures



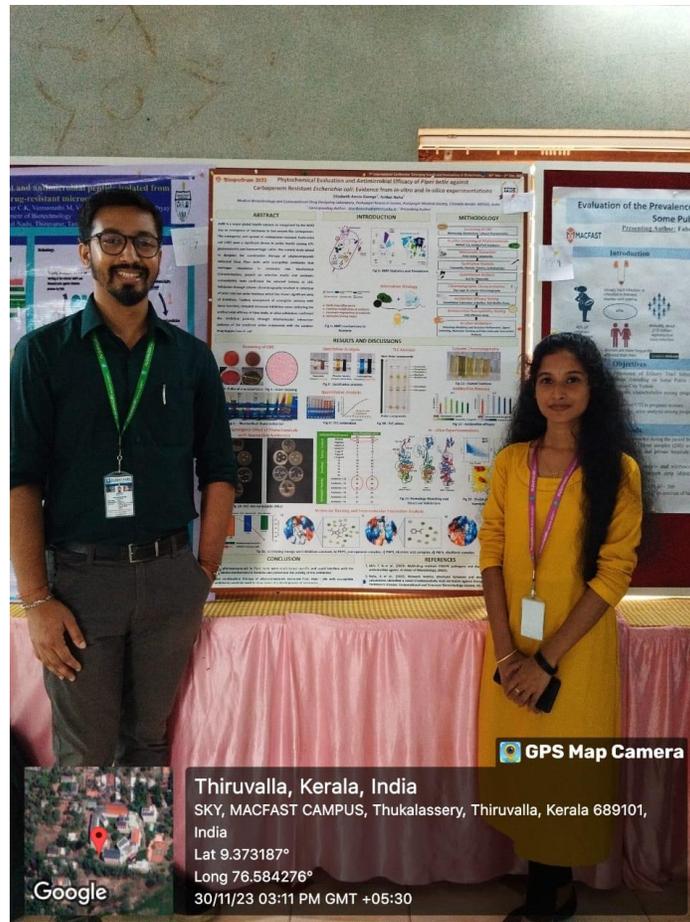
Dr. Saritha Susan Varghese, Professor, Department of Community Medicine, Believers Church Medical College and Hospital taking a 1-day Guest Lecture on 'Systematic Reviews and Meta Analysis' at PRC Conference Hall (09.12.2023)



Research Director addressing the gathering of 7th International conference Biospectrum 2023 at MACFAST (12.01.2023)



PRC team in MACFAST (12.01.2023)



Ms. Elizabeth Annie George, Research Trainee under the guidance of Dr. Aniket Naha presented a poster in Biospectrum 2023 International Conference at MACFAST (30.11.2023)



Dr. Aniket Naha presented his research works in the 4th International Conference ICCAR – 2023 (17.11.2023)



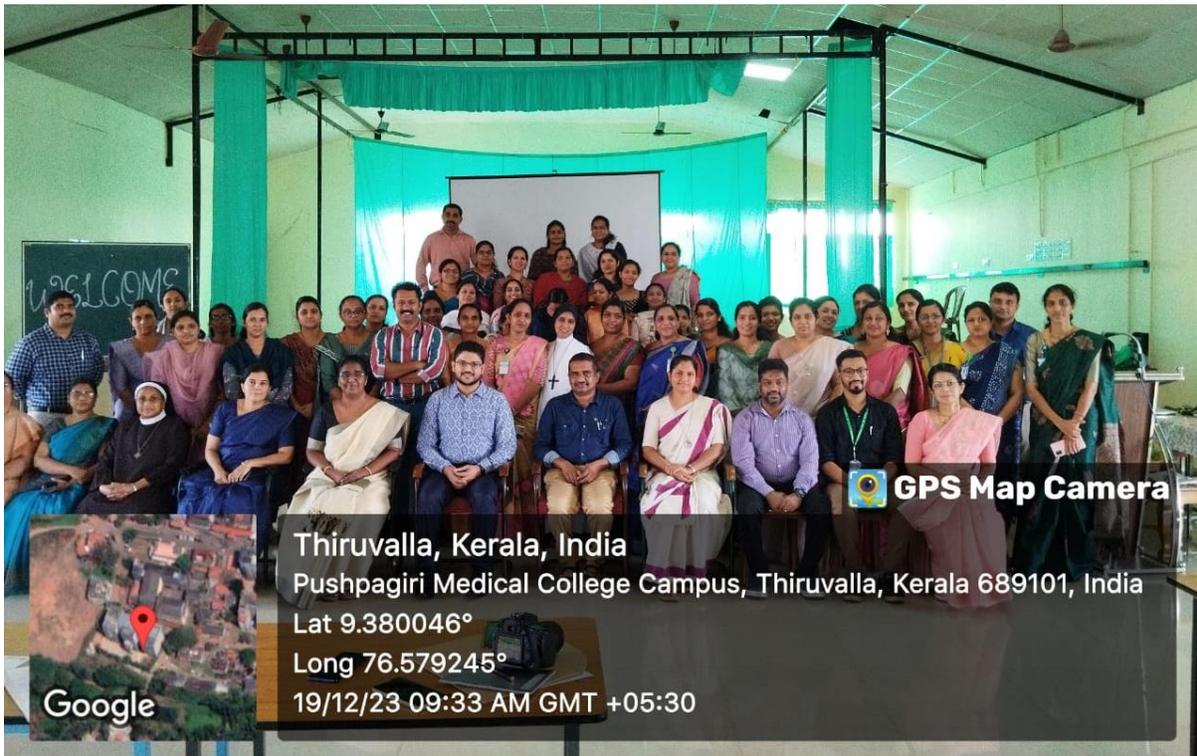
Pushpagiri Research Centre hosted a successful short hands-on training session for standardizing protocols with the Martin Christ Lyophilizer (12.12.2023)



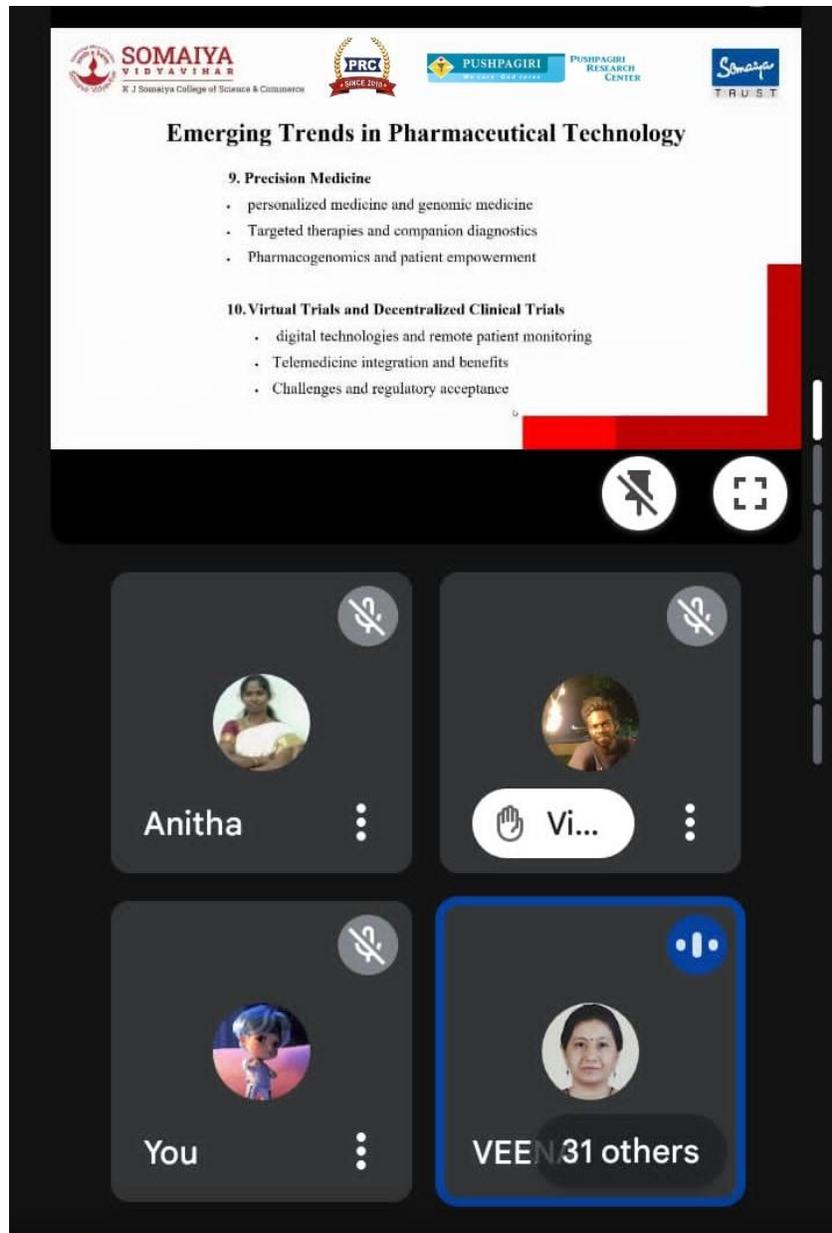
Dr. Aniket Naha delivering lecture on Fraternities and Facilities of PRC (12.12.2023)



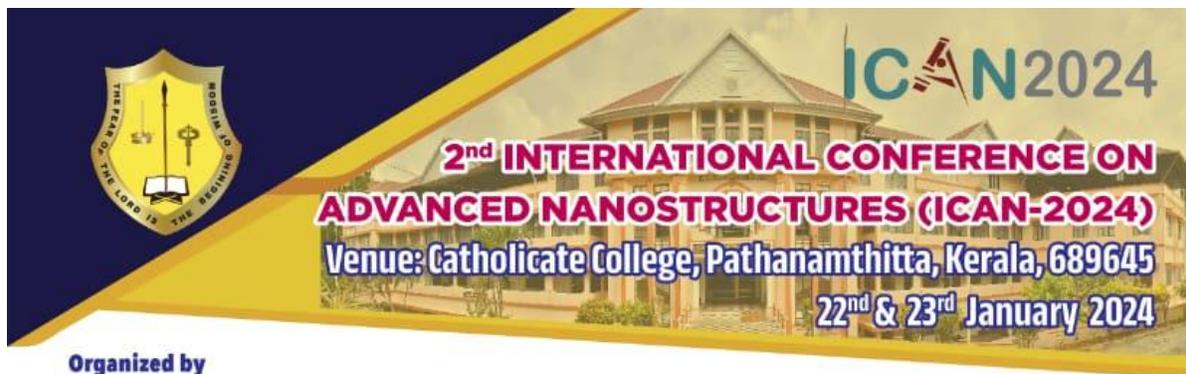
Dr. Rosin George Varghese, Department of Community Medicine delivering lectures on Clinical Trails - Rules and Regulations in the Clinical Club Session (12.12.2023)



Dr. Nebu George Thomas is delivering the inaugural message for the international conference on Mixed Methods Research (19.12.2023)



Many Congratulations to Dr. Nebu George Thomas Scientist, PRC for showcasing his research works on the topic 'Applications of Tissue Engineering Scaffolds in Regenerative Medicine' and served as a Resource Person in the National Seminar - SITBioTALK' 23 on Recent Developments in Molecular Diagnostics and Regenerative Medicine organized by Sethu Institute of Technology, Tamil Nadu on 21st December, 2023.



Organized by

Post Graduate and Research Department of Physics, Catholicate College, Pathanamthitta, Kerala, 689645

In Association with

IQAC, Catholicate College, Pathanamthitta, Kerala, 689645

Topics

Advanced Nanomaterials Synthesis and Design || Nanostructured Surfaces and Interfaces || Functional Nanodevices and Nanosystems
Emerging Nanofabrication Techniques || Nanostructures for Energy Harvesting and Storage
Quantum Nanostructures and Their Applications || Nanomechanics and Nanoengineering || Multifunctional Nanocomposites
Nanoscale Electronics and Photonics || Nanostructures for Sensing and Detection || Bioinspired and Biomimetic Nanostructures

About the Conference:

Nanotechnology has emerged as a transformative field with vast potential for innovation and breakthroughs in various scientific and technological domains. Following the success of the first International Conference on Advanced Nanostructures (ICAN2018), our scientific community recognizes the need for a platform to further explore and exchange the latest advancements in nanomaterials, nanodevices, and nanoengineering. 2nd International Conference on Advanced Nanostructures (ICAN-2024), scheduled to take place at Catholicate College in Pathanamthitta on January 22-23, 2024. This conference aims to bring together experts, researchers, and enthusiasts from around the globe to explore and exchange cutting-edge developments in the field of nanotechnology.

Objective: ICAN-2024 aims to be a catalyst for progress in the field of advanced nanostructures, contributing to the development of transformative technologies and solutions that will shape the future of science and technology.

Theme: Integrating Advanced Nanostructures for Sustainable Solutions.

Call for Papers:

We invite academics and researchers to submit abstracts for paper presentations at ICAN-2024. The submission deadline for the abstract is 16.01.2024 and notification of acceptance will be sent by 18.01.2024. The accepted papers will be featured in the conference proceedings with an ISBN number. Please note that abstract submission requires mandatory registration. Ensure you register before submitting the abstract. For further details and inquiries, please contact us at ican.nano2024@gmail.com

Invited Speakers



Prof. Didier Rouxel
(IJL, France)



Dr. Novica Paunovic
(IPB, Serbia)



Prof. Nandakumar Kalarikkal
(MGU, India)



Dr. Bojan Stojadinovic
(IPB, Serbia)



Dr. K. P. Surendran
(NIIST, India)



Prof. Nebu George Thomas
(PRC, India)



Prof. Soney C. George
(AJCE, India)



Dr. Arunkumar Chandrasekhar
(VIT, India)



Dr. Saju Joseph
(MGU, India)

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(Manager, MOC Colleges)

H.G. Dr. Abraham Mar Seraphim Metropolitan
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website : www.ican2024.com

Registration Fee :
Rs. 750/- (Student), 1000/- (Faculty)
Rs. 1500/- (Industry)

Deadline for Submission
of Abstract : 16 January 2024

Email id: ican.nano2024@gmail.com

Contact: 9074105353 | 9846415414

Dr. Raneesh B (Convenor)
Dr. George Thomas (Co-ordinator)

www.ican2024.com

Dr. Sindu Jones (Principal)
Dr. Dhanya I (HoD)



Pushpagiri Christmas Celebration 2024 (22.12.2023)



Collaborative discussions with Nandakumar Sir Senior professor MG University and Dr. Rojin Head of Neurosurgery Believers Church Medical College Tiruvalla Regarding Initiation of 3D Bioprinting Project at MG University (05.01.2024)



Dr. Aniket Naha delivered oral presentation showcasing your research at the National Conference on "NanoGenPro Triad: Exploring Future Science" organized by St. Berchmans College (Autonomous) Changanassery (10.01.2024)



Dr. Aniket Naha has been awarded with the 'Best Oral Presentation' award under Faculty category for showcasing his research work (10.01.2024)



Ms. Elizabeth Annie George, Research Trainee under the guidance of Dr. Aniket Naha delivered Oral presentation at the National Conference on "NanoGenPro Triad: Exploring Future Science" (10.01.2024)



Ms. Treesa Sani Research Trainee under the guidance of Dr. Soumya RS delivered an oral presentation at the National Conference on "NanoGenPro Triad: Exploring Future Science" (10.01.2024)



PUSHPAGIRI
COLLEGE OF DENTAL SCIENCES
MEDICITY CAMPUS, PERUMTHURUTHY



13th IKAP SESSION 2023 2024



Speaker: Dr. Aniket Naha, M.Sc, Ph.D
Scientist, Pushpagiri Research Centre

**Topic : 1. Research facilities & fraternities
of Pushpagiri Research Centre
2. Introduction to Research**

25/01/2024



Chief coordinator : Dr. Vinod Mathew
Mulamoottil

AUDITORIUM



Observer : Dr. Annie Kitty George

1.30 PM
- 3 PM



Intern coordinator :
Anjaly Lal





Meeting with Dr. Sabu Thomas sir at MG University, Kottayam (23.01.2024)



Dr. Nebu George Thomas presented his work in the 2nd International Conference on Advanced Nanostructures and received several accolades in Catholicate College, Pathanamthitta (23.01.2024)



Research orientation session for First MDS and Interns at Pushpagiri college of Dental Sciences by Dr. Aniket Naha (25.01.2024)



Research Orientation Session for Interns of Pushpagiri College of Dental Sciences by Rev Dr. Mathew Mazhavancheril, Research Director (02.02.2024)



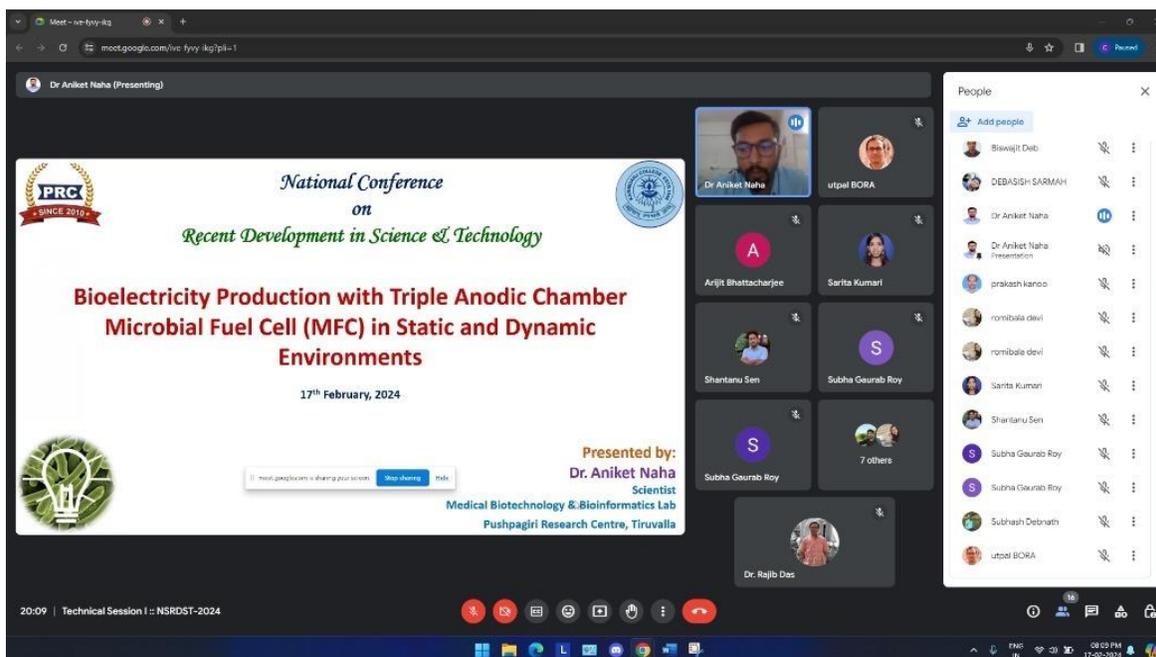
PRC faculty bidding farewell to the outgoing CEO, Rev. Fr. Jose Kallumalikal (02.02.2024)



MoU signed with Christ University, Bangalore (10.02.2024)



Dr. Aniket Naha conducted One-day workshop cum Hands-on-Training on topic 'Introduction to Bioinformatics and Sequence Alignment' at Pushpagiri Research Centre (09.02.2024)



Dr. Aniket Naha, presented a paper on the innovative topic "Bioelectricity production from selected bacterial strains" at the National conference held at Karimganj College, Assam University (17.02.2024)



MoU signed with SMO Connect for Clinical Trials (08.03.2024)



MoU with Vinayaka Mission Homeopathic Medical College, Salem, TN (11.03.2024)



PUSHPAGIRI
COLLEGE OF DENTAL SCIENCES

RESEARCH DAY 2024
CELEBRATION 22-03-24 9.30 am onwards

Chief Guest
Prof. Dr. Aravind Kumar
Vice Chancellor, MG University

Keynote Address:
Prof. Dr. Nandakumar Kalarikkal
Senior Professor, School of Pure and Applied Physics
MG University

Invited Speaker:
Prof. Dr. Rojin Abraham
HOD, Dept of Neuro Surgery
Believers Church Medical College

Rev. Fr. Dr. Biju Varghese
CEO, Pushpagiri Group of Institutions

Rev. Fr. Dr. Mathew Mazhavancheril
Director, Pushpagiri Research Centre

Rev. Fr. Aby Vadakkumthala
Director, Institutions

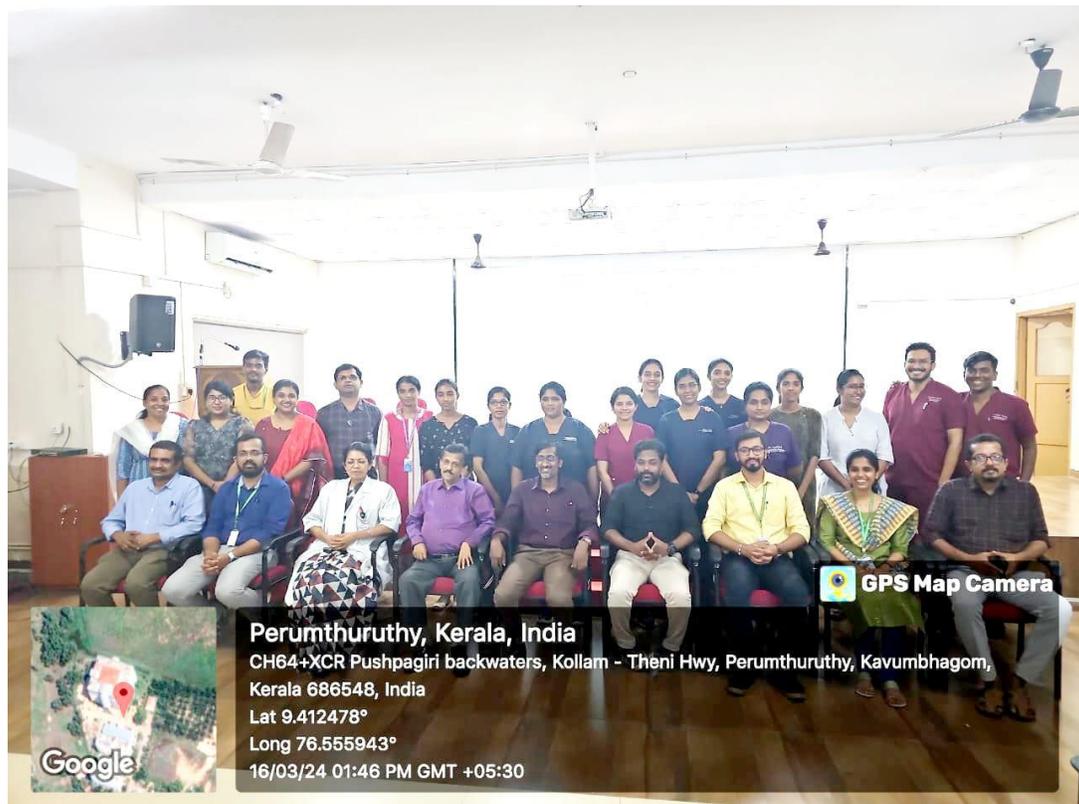
Dr. Aby Mathew T
Principal, PCDS



Research Day Celebration at Pushpagiri College of Dental Sciences (22.03.2024)



Rev. Dr. Mathew Mazhavancheril was honoured by Principal, PCDS (22.03.2024)



Research Methodology Workshop at PCDS (16.03.2024)



Meeting and discussions with Stellar Biosol Company representatives (Dr. Dominique from France & Mr Benny from Gujarat) went on well. Thank you for all participants from PRC family. And special thanks to Jacob for the arrangements. We have decided to start the case study and move on to a formal clinical trial of their product. Dr. Cyril (Professor & HoD of Plastic Surgery Dept), Dr. Chintu (Associate Professor of Plastic Surgery), Dr. Robinson (Professor of Gen Surgery) and Dr. Vikram Gowda (VP & Professor of Physiology) were our special invitees (16.03.2024)



Dr. Soumya RS gave an invited talk on Mitochondria – Fascinating Therapeutic Target at SN College for Women, Kollam (21.03.2024)

Annual Report of Pushpagiri Research Centre

Publisher	:	Pushpagiri Research Centre
Director & Head	:	Rev. Dr. Mathew Mazhavancheril
Chief Editor	:	Dr. Aniket Naha
Coordinator	:	Mr. George Varghese
Cover Design & Illustration	:	Dr. Aniket Naha



Edited By

Rev. Dr. Mathew Mazhavancheril
Dr. Aniket Naha

Scientific Support

Mr. George Varghese
Dr. Nebu George Thomas
Dr. Yogesh Bharat Dalvi
Dr. Soumya R.S.
Dr. Leya Elizabeth Babu
Dr. Betsy A Jose
Dr. Rosin George Varghese

Technical Support

Mr. Jacob P. Ouseph

Correspondence: Rev. Dr. Mathew Mazhavancheril, Director & Head, PRC

Email: researchdirector@pushpagiri.in; prc@pushpagiri.in

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