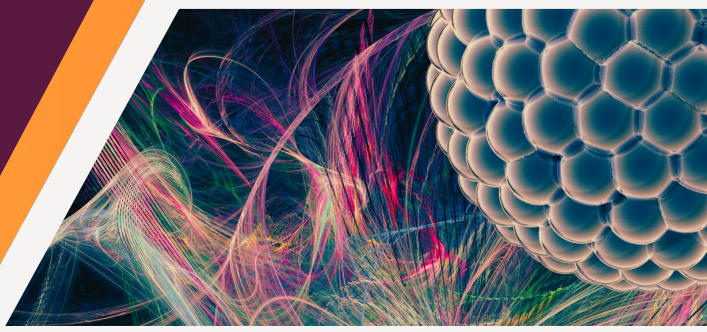
LJ University
University with a Difference

21ST & 22ND FEBRUARY, 2025

ICMSN 2025

3RD INTERNATIONAL CONFERENCE ON MACROMOLECULES, SUPRAMOLECULES AND NANOTECHNOLOGY

ABSTRACT PROCEEDINGS



ORGANIZED BY:

CENTRE OF EXCELLENCE IN MACROMOLECULES AND NANOTECHNOLOGY
LJ SCHOOL OF APPLIED SCIENCES, LJ UNIVERSITY, AHMEDABAD.

SPONSORED BY:

GSBTM
TRANSCRIPTING BRIGHTER BIO FUTURE

DST
Department of Science & Technology
Government of Gujarat

GUJARAT COUNCIL ON SCIENCE AND TECHNOLOGY
GOVERNMENT OF GUJARAT

CSIR-INDIA
CSIR
The Innovation Engine of India

About LJ University

LJU is intended to be University with a difference with the following agenda:

- Skilling local youth as per cutting edge needs of local and global industries
- 1 % of our graduates to be job creators or self employed
- Access to higher education to around 1 lakh youth in next decade
- Benefit to nearby community through community engagement program
- Collaboration with local industries to work on their challenges
- Capacity building of human resources of local MSMEs and large industries
- Attracting global academic communities through international collaborations for syllabus designing, delivery and evaluation.
- Nurturing graduates to be job ready and also make them entrepreneurial

Established
1980

Institutes
32

Qualified Faculties
1,000+

Students
22,000+

B.Sc. Alumni
2,500+

LJ Alumni
60,000+

Teaching Pedagogy

- Industry and skill based Practical syllabus
- Conceptual Theory syllabus
- Special Electives and Certificate Courses
- Hands On trainings and Workshops
- Seminars and Panel discussion
- Industrial visits and Internship
- Encourage students for Post Graduation and Research
- Prepare students for Competitive Exams
- Funding for Startup and Innovation
- Bioincubator

Facilities at LJ Campus

- Qualified and Experienced Faculties
-  15 acres lush green campus
- Ventilated Classrooms and well equipped Labs
- Library with Books, Magazines and Research Journals
- Seminar Hall, Auditorium and Open Air Theatre
- Sports Grounds and Courts
- Hygienic Canteen and Café
- Transportation
- Accommodation Outside Campus
- Dedicated Placement Cell

International Conference on Macromolecules, Supramolecules and Nanotechnology

MESSAGE FROM THE VICE CHANCELLOR

Prof. Dinesh Awasthi
Ph.D. (Econ.)
Vice Chancellor
L J University, Ahmedabad

I am happy to learn that the Centre of Excellence in Macromolecules and Nanotechnology at L J School of Applied Sciences, LJ University, Ahmedabad, is organizing its 3rd edition of the International Conference on Macromolecules, Supramolecules and Nanotechnology (ICMSN – 2025) on 21st and 22nd February 2025. This conference has now established itself as a prominent academic event and is highly sought after by both academia and industry.
The impressive line-up of renowned experts in the field is a testimony to the fact that this Conference has emerged as a great learning platform for young, aspiring scientists.

In today's rapidly evolving technological landscape, it is crucial to stay updated with the latest advancements. By participating in such conferences, individuals can engage in fruitful discussions, exchange ideas, and expand their knowledge horizons. The conference, in this direction, offers a great opportunity. I am confident that the young, aspiring scientists, our colleagues, and students will benefit a great deal from interacting with esteemed international scholars like Prof. DM Guldi, Prof. Israel Schechter, Prof. P S Mukerjee, Prof. Shobhan Sen, Prof. V Chandrasekhar, Prof. N Nagesh, besides Prof. G D Yadav, among others.
I extend my sincere congratulations to Prof. Y K Agrawal (Chairman of the Centre and Convener ICMSN-2025), the committee members, and the students for organizing this exceptionally learning event. I would also like to acknowledge the hard work and dedication of the Organizing Committee members, under the capable leadership of Prof. Agrawal.

I wish the conference a resounding success.

Prof. Dinesh Awasthi

MESSAGE FROM THE CHIEF GUEST

Professor Ganapati D. Yadav, Padma Shree

NAE (US), FNAI (US), FTWAS, FNA, FASc, FNASc, FNAE, FISTE, FRSC (UK), ChE, FIChemE (UK), FIIChE, FICS FMASc, FIIChE

National Science Chair (SERB/DST/GOI)

Emeritus Professor of Eminence, Former Vice Chancellor, Institute of Chemical Technology, Mumbai

gd.yadav@ictmumbai.edu.in

Message for ICMSN 2025

I am delighted to note that the Centre of Excellence in Macromolecules and Nanotechnology, L J School of Applied Sciences, L J University, Ahmedabad, is organizing the International Conference on Macromolecules, Supramolecules, Nanotechnology, and Nanobiotechnology (ICMSN 2025) during February 21–22, 2025. This conference will serve as a vibrant platform where science meets innovation, uniting diverse ideas to tackle global challenges. ICMSN 2025 is set to bring together leading minds from academia, industry, and research institutions worldwide. The conference topics—encompassing macromolecular sciences, supramolecular chemistry, cutting-edge nanotechnology, and transformative nanobiotechnology— represent the vanguard of scientific advancement. These fields hold immense promise to revolutionize critical sectors such as healthcare, energy, materials, and agriculture. Located in Gujarat, a hub of industries related to these domains, the conference thoughtfully integrates the interests of diverse stakeholders.

The applications of these disciplines are profound and far-reaching. They are transforming pharmaceuticals through innovative drug delivery systems and novel therapeutics, enhancing agrochemicals for sustainable agriculture, advancing renewable energy technologies, developing lightweight and sustainable materials in polymer science, and enabling breakthroughs in diagnostics and personalized medicine through nanobiotechnology.

I am confident that delegates will actively engage with the sessions, share valuable insights, and foster interdisciplinary collaborations. This event offers a unique opportunity to redefine boundaries, address pressing global issues, and chart a path toward a more sustainable future through the synergy of science and technology.

I wish the conference every success and am certain it will serve as a beacon of knowledge, collaboration, and inspiration, sparking innovative ideas, fostering partnerships, and driving the transformative advancements our world so urgently needs.

MESSAGE FROM THE CONVENOR

Prof. Y K Agrawal

Emeritus Professor,

Convenor, ICMSN 2025

Chairman, Centre of Excellence in Macromolecules and Nanotechnology

L J University, Ahmedabad

Dear distinguished guests, esteemed authorities of LJ University, respected colleagues, fellow researchers, and students,

It is my great pleasure to welcome you to this year's International Conference on Macromolecules, Supramolecules, and Nanotechnology. This prestigious gathering provides an excellent platform for leading scientists, researchers, industry experts, and students to exchange ideas, share knowledge, and celebrate scientific advancements.

With rapid developments in technology and innovation, new opportunities and challenges continue to emerge. This conference reflects the current state of science, both nationally and globally, highlighting the ever-evolving landscape of Macromolecules, Supramolecules, and Nanotechnology.

I encourage you all to engage actively in discussions, network with fellow participants, and contribute to the exchange of cutting-edge research and ideas. This event brings together over 500 attendees, including eminent speakers from India and abroad, making it a truly enriching experience.

I extend my sincere gratitude to LJ University, the advisory committee, our distinguished speakers, scientists, and the dedicated organizing committee for their relentless efforts in making this conference a grand success.

On behalf of the organizing team, I warmly welcome you all and wish you an insightful, collaborative, and productive experience at this international conference.

Best regards

Prof. Y K Agrawal

MESSAGE FROM THE DIRECTOR

Dr. Niketan Deshmukh

Director,

LJ School of Applied Sciences

L J University, Ahmedabad

*It is my pleasure to invite you to the **International Conference on Macromolecules, Supramolecules, and Nanotechnology (ICMSN) 2025**, organized by the Centre of Excellence in Macromolecules and Nanotechnology at LJ School of Applied Sciences, LJ University. This conference is a testament to our commitment to advancing scientific research and technological innovation in the rapidly evolving fields of macromolecular science and nanotechnology.*

At LJ School of Applied Sciences, we are driven by a vision to encourage curiosity, interdisciplinary learning, and practical application of scientific knowledge. This event brings together a diverse group of leading Scientists, Researchers, Academicians and Industry professionals from around the world, offering a unique platform for collaboration, knowledge exchange, and the exploration of cutting-edge research.

This conference will showcase the latest advancements in these areas, emphasizing their transformative potential across various industries, from healthcare to environmental science. The insights shared here are bound to influence the future of our fields and inspire new breakthroughs.

I encourage all participants to engage deeply, exchange ideas, and explore the infinite opportunities for collaboration. Together, we can contribute to creating solutions that address some of the most pressing global challenges through scientific innovation.

Warm regards,

Dr. Niketan Deshmukh

CENTRE OF EXCELLENCE MACROMOLECULES AND NANOTECHNOLOGY

Macromolecules give rise to entangled materials with unique properties. They are part of our daily life and sometime in the realm asked, based on their broad applications. Today macromolecular chemistry is a subject of worldwide importance in education and research in universities, high-school and research institutes and is an extremely important economic factor in different areas of industry. Scientifically and practically, macromolecular chemistry overlaps the disciplines of bio-sciences, physics, engineering science and material science.

Super and supra-molecular arrangements of protein polymers and the metal parts are essential for biologically important reactions such as gas transport, catalysis and photo-catalysis. The reactivity of biological reactions and synthesis are of fundamental importance for the construction and optimization of artificial systems. It is very important to realize that activity and selectivity only arise from the combination of specific metals in a specific ligand surrounding a specific natural macromolecule.

Nanotechnology is one of the newest and fastest-growing areas of science and engineering. The subjects arise from the convergence of electronics, physics, chemistry and biology and material science to create a new functional system of Nano scale dimensions. Nano assembly consists of macromolecules which play increasingly important roles ranging from the design of extraction agents for environmentally toxic species to the development of new pharmaceuticals. Macromolecular assemblies, constructed using single electro- or photo-active molecules as building blocks, offer a string way to create material whose organized architecture makes them suitable for developing molecular electron devices.

THEME AND PRIMARY OBJECTIVES OF THE CONFERENCE

The International conference brings together leading scientists, researchers, students and technology developers to exchange information on their latest research progress and innovation. Experts and academicians from the top international and national organizations of different disciplines are going to participate. It is an excellent event for researchers and students to meet and discuss with leading scientists. The conference provides an unprecedented opportunity to discover innovation in the area of macromolecules, supramolecules and nanotechnology and allied discipline.

The conference includes plenary lectures, keynote lectures and invited talks by eminent personalities from and India and around the world in addition to contribute papers, both oral and poster presentations.

The scientific program of the conference provides a unique opportunity in the new emerging area of Macromolecules, Supramolecules and Nanotechnology.

The scientific program of conference provides a unique opportunity in the new emerging area of Macromolecules, Supramolecules and Nanotechnology.

- Macromolecules, Polymers and applications.
- Fullerenes, Nanotubes, Graphene and their applications.
- Supramolecules: Crown ethers, Calixarenes, Calix crown, Calixresorcerenes, Rotaxanes, Catenanes, Cryptands, MOF and their applications.
- Coordination chemistry, Molecular recognition.
- Drug design, Nano drug delivery, Molecular docking and Forensic pharmacy.
- Solvent extraction and separation techniques, Analytical and Industrial potentialities.
- Nanobiotechnology, Food and Microbial biotechnology, Environmental biotechnology.
- Nanotechnology: Nanoparticles, Nanochips, Nanowires, Photonics, Nanofluidic, Nano fertilizers.
- Green Chemistry, Waste management, non-conventional energy management.

ICMSN - 2025
LOCAL ORGANISING COMMITTEES

Registration Committee

- **Dr. Viral Shukla**
- Dr. Anita Sharma
- Dr. Vibha Kunji
- Ms. Falguni Dalicha
- Ms. Zeel Hirakani
- Ms. Nazia Mullik
- Ms. Tanya Jha

Printing Committee

- **Dr. Nirav Pandya**
- Mr. Maaz Kureshi
- Dr. Haresh Patel
- Mr. Sizar Suvera
- Mr. Raju Thakor

Finance Committee

- **Dr. Nirav Pandya**
- Ms. Meghana Vaishnav
- Mr. Apurva Patel

Volunteers Committee

- **Mr. Bignesh Thakur**
- Ms. Aarti Chauhan
- Ms. Alfinabanu Pathan

Scientific Committee

- **Dr. Nirmal Sahay**
- Dr. Niketan Deshmukh
- Dr. Haresh Patel

Poster Presentation Committee

- **Mr. Maaz Kureshi**
- Mr. Kaushal Mehta
- Mr. Chintan Oza
- Ms. Ami Varia
- Mr. Maruf Chauhan
- Mr. Raju Thakor

Food and Hospitality Committee

- **Mr. Bignesh Thakur**
- Dr. Haresh Patel
- Dr. Sneha Nair
- Mr. Aakash Patel
- Mr. Maruf Chauhan

Stage Committee

- **Dr. Vamangi Goswami**
- Ms. Namrata Pania
- Mr. Sizar Suvera
- Ms. Hadisha Khatoon
- Ms. Zarana Majithiya
- Mr. Jignesh Analkat

INTERNATIONAL CONFERENCE ON MACROMOLECULES, SUPRAMOLECULES & NANOTECHNOLOGY

21st & 22nd February 2025

TECHNICAL PROGRAM

21st February 2025

Venue: LJ Engineering Auditorium, LJ University

08:30 to 09:50	**Registration with Breakfast**
10:00 to 11:00	**Inauguration** **Prof. G. D. Yadav, *Padma Shree,*** *National Science Chair (SERB/DST/GoI), Emeritus Professor of Eminence and Former Vice Chancellor, ICT Mumbai*
11:00 to 11:30	**Tea**

TECHNICAL SESSION I

Chairman: Prof. V Chandrasekhar

11:30 to 12:00	**Prof. Israel Schechter** (IIT, Haifa, Israel) *"Development Super Synchronous Fluorescent Spectroscopy And Analytical Application"*
12:00 to 12:30	**Prof. Gopal Das** (IIT, Guwahati) *"Exploring The Supramolecular Gelation Properties Of Typical LMWG And Their Application In Sensing And Ion Exchange"*
12:30 to 13:00	**Dr. R. V. Jasra**, (VP, R&D, Reliance, Vadodara) *"Zeolite As Magical Porous Material"*
13:00 to 14:00	**Lunch**

TECHNICAL SESSION II

Chairman: Prof. Gopal Das

14:00 to 14:30	**Prof. N. Nagesh** (CCMB, Hyderabad) *"Nature Of Interaction Of Small Molecules With G-Quadruplex DNA, Its Role In Anti-Cancer Activity"*

14:30 to 15:00	**Prof. V. Chandrasekhar** (TIFR, Hyderabad) *"Main Group Metal Catalysis For Suitable Polymers"*
15:00 to 15:30	**Prof. S. K. Das** (Central University, Hyderabad) *"Homogeneous Electrocatalysis Mediated By A Versatile Polyoxomets Hydrogen Evolution And Oxygen Reduction Reaction"*
15:30 to 16:00	**Prof. D. M. Guldi** (Friedrcih-Alexander University, Germany) *"Adaptive Light Capture Conversion And Storage"*
16:00 to 18:00	**Tea and Poster Presentation**

22nd February 2025

09:00 to 10:00	**Breakfast**

TECHNICAL SESSION III

Chairman: Prof. S K Das

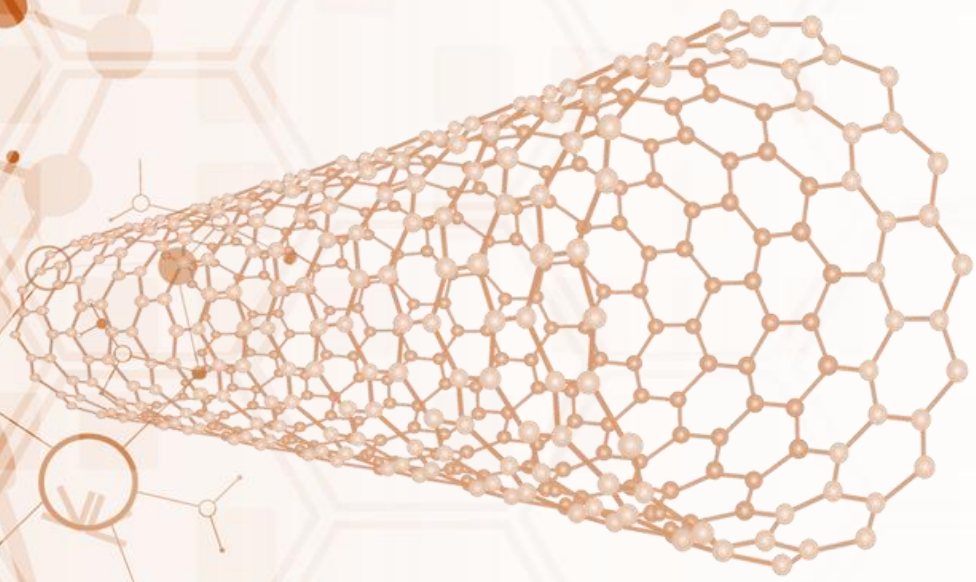
10:00 to 10:30	**Prof. P. S. Mukherjee**, (IISc, Bangalore) *"Molecular Vessel"*
10:30 to 11:00	**Dr. C. S. Gopinath** (NCL, Pune) *"Carbon Negative Green Hydrogen Along With Carbon Recycling Possibly Lucrative And Fast Ways Towards Net Zero Target"*
11:00 to 11:30	**Tea**

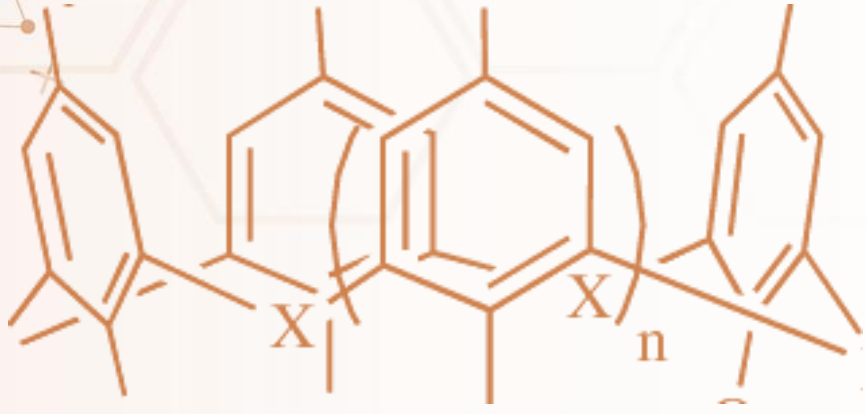
TECHNICAL SESSION IV

Chairman: Prof. Israel Schechter

11:30 to 12:00	**Prof. A. Srivastava** (IISER, Bhopal) *"Enzymatic Crosslinking Of Molecules Into Nanoparticles And Hydrogels"*
12:00 to 12:30	**Prof. Sobhan Sen** (JNU, Delhi) *"Fluorescence Spectroscopy For The Study Of Biomolecular Dynamics"*
12:30 to 13:00	**Oral Presentation by winners of Poster Session**
13:00 Onward	**Valedictory** followed by **Lunch**

PLENARY LECTURES





PLENARY LECTURE - 1

Prof. Israel Schechter

Professor Emeritus

Israel Institute of Technology

Technion City, Haifa, Israel

israel@technion.ac.il

Israel Schechter is a Chair Professor of analytical chemistry at the Technion – Israel Institute of Technology. He did his Ph.D. at the Hebrew University of Jerusalem (1987) and joined the Technion in 1993. His current research interest includes development of new analytical chemistry technologies, laser spectroscopy, and analysis and generation of particulate matter. He has developed the Multiphoton Electron Extraction Spectroscopy (MEES), which is a new analytical spectroscopic method. He has supervised ca. 40 M.Sc. and Ph.D. students and 25 post-doctoral and researchers. He published over 150 scientific papers and edited 6 books. He serves as the President of the Israel Analytical Chemistry Society and as the head of the chemistry department at Guangdong Technion University (GTIIT). He is the Editor-in-Chief of the journal Rev. Anal. Chem. and on the editorial board of 5 journals. He is the former head of Israel Laboratory Accreditation Authority. Among his awards are: The Fritz Haber Prize for excellence in research (1988), The Hershel Rich Innovation Award (1994, 1999, 2015), The Gutwirth Award for Excellent Research (1995), The Mitchell Entrepreneurial Award (1995, 2000), The Muriel and David Jacknow Award for Excellence in Teaching (2009) and The Israel Chemical Society Prize for Technological Innovation (2014).

Abstract

Development of Super-Synchronous Fluorescence Spectroscopy and is Analytical Applications

Fluorescence spectroscopy is one of the most sensitive analytical methods in spectroscopy. However, in condensed phases and at room temperature, fluorescence peaks tend to be broad, leading to poor selectivity and difficulty in resolving mixtures. Synchronous fluorescence has been shown to offer narrower spectral peaks and better resolution. In this method, fluorescence is measured by simultaneously scanning the excitation and emission wavelengths, maintaining a constant difference between them. While this scanning technique is well established, it has never been proven to be optimal. In this study, we sought to identify the optimal variation of excitation and emission wavelengths to enhance the analytical potential of fluorescence measurements. Our findings indicate that traditional synchronous fluorescence falls short of optimal performance. We propose an alternative wavelength scanning approach, which we call Super-Synchronous Fluorescence Spectroscopy, that yields improved results. This technique has been investigated and tested across various applications and compared to traditional fluorescence and synchronous spectroscopies. Applications include the analysis of mixtures of polycyclic aromatic compounds, mixtures of fluorescent amino acids, the analytical characterization of parchments, fast label-free identification of bacteria, and rapid virus detection.

PLENARY LECTURE - 2

Prof. Gopal Das
Senior Professor
Department of Chemistry
Indian Institute of Technology Guwahati, Assam
gdas@iitg.ac.in

Dr. Gopal Das is a distinguished Senior Professor in the Department of Chemistry at the Indian Institute of Technology Guwahati, India. Renowned for his extensive research contributions, his work primarily explores the broad domain of supramolecular chemistry. His research interests include developing optical sensors for biologically and environmentally significant analytes, coordination chemistry of cations and anions, and trans-disciplinary areas such as the chemistry and biology of tailor-made amphiphiles, biomineralization, biomimetic material chemistry, and environmental chemistry with a focus on water research.

Dr. Das has made a significant impact in his field, with 271 publications in peer-reviewed international journals, over 7,700 citations, an h-index of 45, and an i10-index of 186 as of October 2024. He has authored five book chapters and holds a patent. Some of his noteworthy achievements include his work on metal ion adsorption on bionanocomposites, recognized by Nature India for its environmental relevance, and his research on bactericidal materials and phosphate anion encapsulation, both highlighted by prestigious journals for their importance.

He is a committed mentor, having supervised 23 undergraduate, 63 master's (52 MSc and 11 MTech), and 29 Ph.D. students, with 11 doctoral students currently under his guidance. Beyond research, Dr. Das has served in key administrative roles at IIT Guwahati, including as Head of the Chemistry Department, Dean of Research and Development, and Head of the Centre for the Environment. Additionally, he has been a member of the Board of Governors at NIT Mizoram since 2018 and has played pivotal roles in organizing academic initiatives such as GATE-2010.

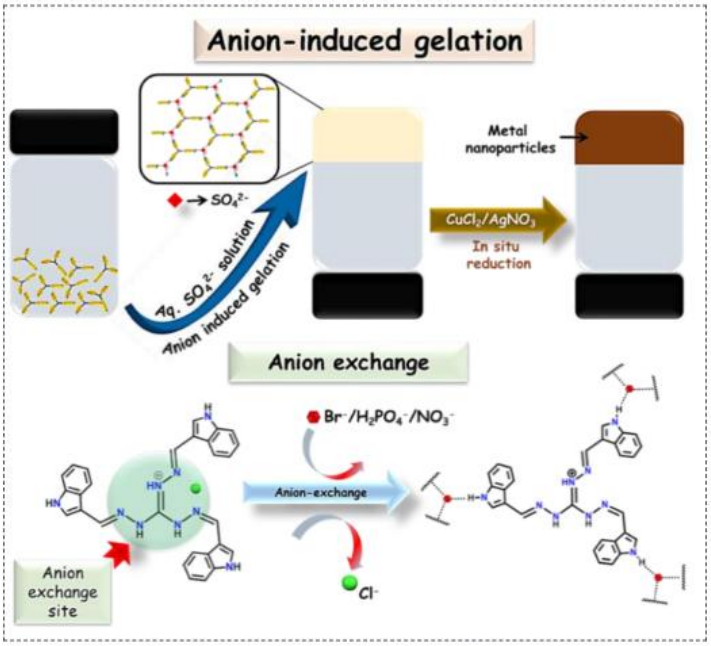
Dr. Das's accolades include a fellowship from the Swiss National Science Foundation and recognition by the American Chemical Society for authoring one of the "Most Requested Journal Articles" in 2004. He also contributes as an editorial board member for several international journals, including Scientific Journals International and The Open Crystallography Journal, further underscoring his influence in the scientific community.

Abstract

Exploring The Supramolecular Gelation Properties of Typical LMWG And Their Application In Sensing And Ion Exchange

C3-symmetric receptors were synthesized with different peripheral substituents. The probe containing a quinoline moiety in the periphery displayed a selective turn-on response. Furthermore,

the gelator could encapsulate small molecules like methyl orange and bromophenol blue, making the probe a multifunctional smart material. Guanidium-indole based Low Molecular Weight Gelator (LMWG) exhibit selective anion coordination driven supramolecular gel formation. It also has been exploited for solid-state anion exchange study.



PLENARY LECTURE - 3

Dr. Raksh Vir Jasra

R&D Centre, Reliance Industries Ltd.

Vadodara Manufacturing Division, Vadodara

rakshvir.jasra@ril.com

Dr. Raksh Vir Jasra, PhD from Indian Institute of Delhi (IIT), Delhi (1976-1981) and postgraduate from Delhi University (1971-1976) was a Post-Doctoral Fellow at Imperial College of Science, Technology and Medicine at London (1989-1990). He has worked at R&D, Indian Petrochemicals Limited, Vadodara (1982-1997), CSIR-CSMCRI, Bhavnagar (1997-2008) in different leadership positions for 27 years before joining Reliance Industries Limited in 2008. He has been selected in top 2% Scientist in the field of physical chemistry in the World list as per Stanford University, USA research in 2021 & 2022. He has published more than 325 Research articles, and 10 Chapters in books published in National and International journals. He has total 290 Granted Patents including 68 US patents, 134 Indian patents and 900 confidential technical reports at RIL.

He has also Guided 27 Ph.D. Students & 15 Postgraduate students and won many national and international awards. He has delivered nearly 182 invited talks in National and International forums and has Google Scholar Citation Index = 12270; h- index =58; i10-index = 205

He is serving as **President of Catalysis Society of India** and Honorary Professor of IAR University, Gandhinagar & IIT Guwahati and had been adjunct professor at RMIT, Melbourne, Australia.

Under his leadership, Reliance received Six National Award for Technology Innovation in Petrochemicals and Downstream Plastic Processing Industry from Ministry of Chemicals and Fertilizers, in the year 2013, 2014, 2015, 2016, 2019, 2021 for developing innovative technologies in the area of polymers and Elastomers. RIL also received Best Catalyst Technology, Hydrocarbon Processing 2022, international recognition for development of RE-ORCAT technology under the leadership of Dr. Jasra.

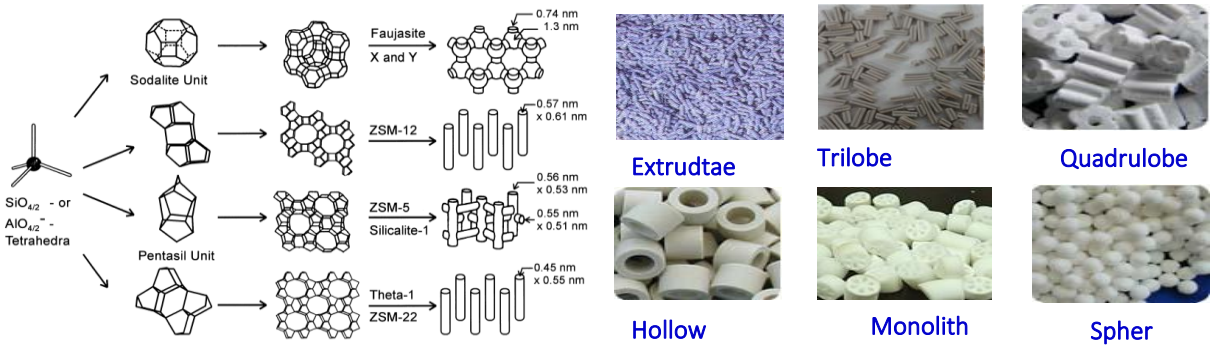
Dr. Jasra is a member of many academic committees of CSIR institutes and Department of Science and Technology, India and Ministry of Human Resource Development, Government of India.

Abstract

Zeolites as Magical Nano Porous Materials

Zeolites are a class of inorganic crystalline materials typically built form TO4 tetrahedra (where T is Al, SI, or P). which are connected by sharing oxygen vertices resulting into 3-D dimensional porous frameworks with an ordered distribution of molecular dimensional pores. Zeolites due to their high crystallinity, varied surface functionalities, molecular sized pore dimensions and high thermal and

hydrothermal stability and low production cost provide a very strong portfolio of heterogenous industrial catalysts for chemical industry. The spatial confinement of molecules in zeolite cavities make zeolites as unique shape selective catalysts. Zeolites have conventionally been used as catalysts in a wide variety of industrial processes, especially in oil refining and petrochemistry. Its application has extended to fine chemicals and even in biomass conversion to value added products in recent times.



Present talk will briefly discuss industrial catalytic application of zeolites. Talk will discuss in detail about pore engineered zeolite-based catalysts as well as recently developed REL-ORCAT technology developed and commercialized at Reliance Industries Limited.

PLENARY LECTURE - 4

Prof. Narayana Nagesh
FRSC
Chief Scientist,
Centre for Cellular and Molecular Biology (CCMB), Hyderabad.
nagesh@ccmb.res.in

Prof. Narayana Nagesh is a prominent Chief Scientist at the Centre for Cellular and Molecular Biology (CCMB) in Hyderabad, India. With expertise spanning biophysics, biochemistry, medicinal chemistry, and chemical biology, his research focuses on G-quadruplex DNA interactions, synthesis of novel organic and inorganic complexes with anticancer properties, and development of small molecules for targeting disease-specific amino acids. His contributions to vaccine development, such as mRNA platforms, underscore his commitment to addressing global health challenges.

He has an impressive academic background, including a Ph.D. on G-quadruplex DNA interactions and postdoctoral research in the USA. He has guided 29 students across various levels and published 93 research articles in reputed journals, earning 2,968 citations, an h-index of 35, and an i10-index of 72. He also holds multiple patents for innovations in anticancer agents, diagnostic tools, and biofouling-resistant materials.

An elected Fellow of the Royal Society of Chemistry (FRSC) and the Telangana Academy of Sciences, He has also served as an executive member of India's National Biodiversity Authority. His leadership in national COVID-19 testing efforts and vaccine research reflects his dedication to societal welfare through science.

Abstract

Nature of the interaction of small molecules with G-quadruplex DNA. Its role in anti-cancer activity.

-quadruplex DNA was known to have its role in cancer cure. Research in this direction is in progress for the past 3 decades. Several biochemical and biophysical studies are in progress to understand the interaction of G-quadruplex DNA with macromolecules/small synthetic molecules. At CCMB, we have established the formation of G-quadruplex DNA with G rich DNA strands and shown its stabilization with a non-metallic cations. Further, studies in our lab have established the role of G-quadruplexes in cancer cure (using in vitro and in vivo experiments). The role of various small synthetic molecules in stabilizing the G-quadruplex DNA and inhibition of cancer cell growth was documented using biochemical assays, biophysical methods (like UV, Fluorescence, CD and Viscosity) as well as with cell biology techniques. Our studies indicate that G-quadruplex DNA structure formation by the promoter regions of oncogenes and improving its stability will bring down the cancer cell growth. These studies have its applications in Oncology, Structural Biology and Pharmacology. Studies are in progress to develop aptamers and DNAzymes with G-quadruplex structures.

PLENARY LECTURE - 5

Prof. Vadapalli Chandrasekhar
Centre Director
Tata Institute of Fundamental Research, Hyderabad
Gopanpally, Hyderabad
vc@tifrh.res.in

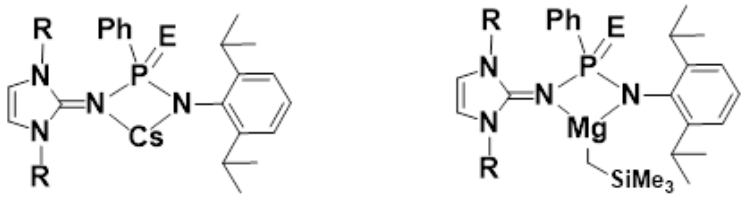
Prof Vadapalli Chandrasekhar obtained his PhD degree in 1982 from the Indian Institute of Science, Bangalore and postdoctoral work at the University of Massachusetts, Amherst, Massachusetts, USA. After briefly working at the Research and Development section of the Indian Petrochemicals Corporation at Vadodara, as a Senior Research Officer, he joined the Department of Chemistry at the Indian Institute of Technology Kanpur in 1987 where he has been a full professor since 1995. He served as the Head of the Department of Chemistry, IIT Kanpur (2008–10), and as the Dean of Faculty Affairs, IIT Kanpur (2011–12). He also worked at the Tata Institute of Fundamental Research, Centre for Interdisciplinary Sciences, Hyderabad, as a Senior Professor/Dean (2012–14) and Director (2014–17), National Institute of Science Education and Research (NISER), Bhubaneswar, India. Currently he is at the Tata Institute of Fundamental Research, Hyderabad. His research interests are in molecular materials, inorganic rings and polymers, main-group organometallic chemistry and polynuclear metal assemblies. He has been a recipient of the S. S. Bhatnagar Award of the Council and Scientific Industrial Research, India, and the Friedrich-Wilhelm-Bessel Research Award of the Alexander von Humboldt Foundation, Germany (With Prof. H. W. Roesky at Goettingen 2003 Dec-2004 June).

He is an elected Fellow of the Indian Academy of Sciences, Bangalore, the National Academy of Sciences, Allahabad, the Indian National Science Academy, New Delhi and the World Academy of Sciences, Trieste, Italy. He has been on the editorial board of several journals including, Organometallics. Currently he is on the editorial board of Dalton Transactions. His research work is documented in 430+ publications.

Abstract

Main-group metal catalysts for sustainable polymers

In this talk we will describe our efforts to use main-group metal complexes (Al(III); In(III), Mg(II); Cs(I)) for various catalytic applications. Specifically, the utility of Cs(I) and Mg(II) catalysts (Figure) will be highlighted for the homopolymerization of lactide and caprolactone and for the copolymerization of these two monomers. Interestingly, such a copolymerization afforded block copolymers.



PLENARY LECTURE – 6

Prof. Samar Kumar Das

FNA, FASc., FNASc.

School of Chemistry, University of Hyderabad

skdas@uohyd.ac.in

Professor S. K. Das earned his Ph.D. from IIT Kanpur and pursued postdoctoral research at Ohio State University, USA, and the University of Bielefeld, Germany. He held positions as a lecturer, reader, and professor at the University of Hyderabad from 2000 to 2022. Since 2022, he has been serving as a Senior Professor at the University of Hyderabad.

Honors and Awards:

Professor Das has received several prestigious accolades, including the Alexander von Humboldt Fellowship (Germany, 2004), a Fellowship of the Indian Academy of Sciences (FASc, 2010), the Bronze Medal from the Chemical Research Society of India (CRSI, 2010), and the AP Academy Fellowship (2013). He was also elected as a Fellow of the National Academy of Sciences (FNASc, 2018) and the Indian National Science Academy (FNA, 2023). Additionally, he received the UGC-BSR Mid-career Award in 2019. He serves as an editorial advisory board (EAB) member for the Journal of Chemical Sciences (since 2019) and Inorganic Chemistry (since 2021).

Research Contributions:

Professor Das has published 201 research papers, with an h-index of 43 and over 5,700 citations (Scopus). His i10-index is 131 (Google Scholar). He has supervised 24 Ph.D. dissertations, with 7 students currently under his guidance, and has mentored 47 postgraduate projects.

Research Interests:

His research focuses on functional inorganic materials for sustainable energy, healthcare, and environmental solutions. His group specializes in polyoxometalates (POMs), basic metal carboxylates, metal-organic frameworks (MOFs), metal-dithiolene coordination complexes, and donor-acceptor chromophores for photophysics and photochemistry. Recently, the group has advanced the use of functional materials as electrocatalysts and photocatalysts for oxygen and hydrogen evolution reactions (OER and HER). Additionally, they are developing cost-effective metal-oxide-based proton-conductive materials for fuel cells to promote renewable energy.

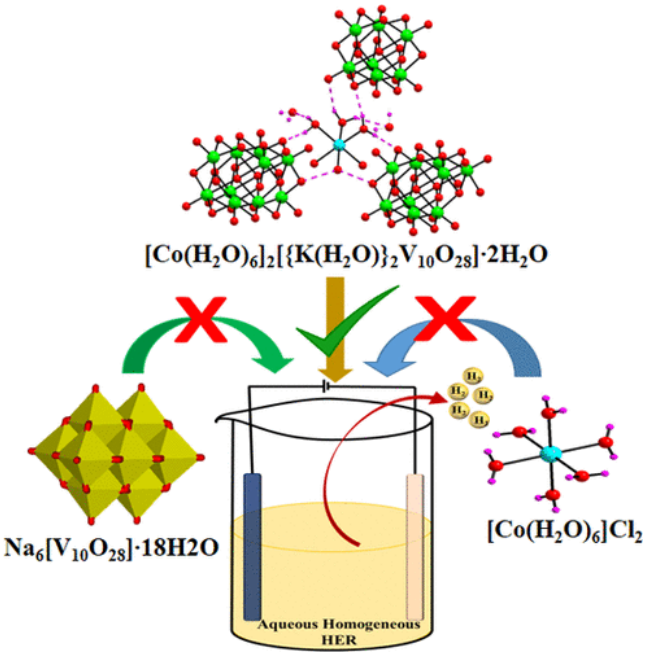
Abstract

Homogeneous Electrocatalysis Mediated by a Versatile Polyoxometalate: Hydrogen Evaluation- and Oxygen Reduction-Reaction.

$[V_{10}O_{28}]^{6-}$, decavanadate, a versatile polyoxometalate finds enormous applications in modern chemical sciences. In the first part of this talk, I will speak about a polyoxometalate (POM)-based inexpensive

and easily synthesizable system $[Ni(H2O)_6]_2[\{K(H_2O)\}_2V_{10}O_{28}]\cdot 2H_2O$ (**1**) / $[Co(H_2O)_6]_2[\{K(H_2O)\}_2V_{10}O_{28}]\cdot 2H_2O$ (**2**), which exhibits homogeneous electrocatalytic hydrogen evolution reaction (HER) in its aqueous solution without its decomposition (or electrodeposition). Even though, compounds **1** and **2**, that are composed of $[Ni(H_2O)_6]^{2+}$ / $[Co(H_2O)_6]^{2+}$ cationic species and $[\{K(H_2O)\}_2V_{10}O_{28}]^{4-}$ anionic species held together by Coulombic attraction including H-bonding interactions, exhibits homogeneous aqueous HER, the aqueous solutions of their individual constituents' solution, that is, the individual homogeneous solutions of $\{V_{10}O_{28}\}^{4-}$ (source: $Na_6[V_{10}O_{28}]\cdot 18H_2O$) and of $[Ni(H_2O)_6]^{2+}$ / $[Co(H_2O)_6]^{2+}$ (source: $NiCl_2\cdot 6H_2O$ / $CoCl_2\cdot 6H_2O$) do not show any electrocatalytic HER activity. We have thus established that the synergy of $\{V_{10}O_{28}\}^{4-}$ with $[Ni(H_2O)_6]^{2+}$ / $[Co(H_2O)_6]^{2+}$ in the respective crystal matrices as well as in their respective aqueous solutions makes the system a stable and highly active electrocatalyst for homogeneous HER in an aqueous solution.

The second part of my talk includes the same decavanadate (compound $Na_6V_{10}O_{28}\cdot 18H_2O$ (**3**)), which can function as a homogeneous electrocatalyst for the electrocatalytic oxygen reduction reaction (ORR). Compound **3** exhibits remarkable stability in solution, remaining intact without decomposition/electrodeposition during electrolysis for ORR. The use of rotating ring-disc electrode (RRDE) and spectrophotometry techniques have confirmed the electrochemical generation of H_2O_2.



PLENARY LECTURE – 7

Prof. Dirk Michael Guldi

Friedrich-Alexander-Universität Erlangen-Nürnberg

Department of Chemistry and Pharmacy

Erlangen, Germany

dirk.guldi@fau.de

Dirk M. Guldi completed both his undergraduate studies (1988) and PhD (1990) at the University of Cologne (Germany). Following postdoctoral appointments at the National Institute of Standards and Technology (USA), the Hahn-Meitner Institute Berlin (1992), and Syracuse University, he joined the faculty of the Notre Dame Radiation Laboratory in 1995. He was promoted a year later from assistant to associate professional specialist, and remained affiliated to Notre Dame until 2004. Since 2004, he is Full Professor in the Department of Chemistry and Pharmacy at the Friedrich-Alexander University in Erlangen. Since 2018, Dirk M. Guldi is Co-Editor in Chief of Nanoscale and Nanoscale Horizons and he has been named among the world's Highly Cited Researchers by Thomson Reuters.

The Guldi group and its network belong to the cutting edge of worldwide research in solar-energy conversion with expertise not only in advanced photon- and charge-management without losing sight of the ultimate objective of developing integrated solar energy-to-chemical fuel conversion systems, which in the future can be utilized in real devices. Impressive documentations of their accomplishments are more than 700 peer-reviewed publications, far more than 50,000 citations, and an h-index of 109. At the heart is always a multifaceted and interdisciplinary research program, where his group designs, conceptually devises, synthesizes, tests, and characterizes novel nanometer scale materials with the objective of using them in solar energy conversion schemes.

A broad range of spectroscopic (i.e. time-resolved and steady-state measurements with spectrophotometric detection covering a time range from femtoseconds to minutes) and microscopic techniques (i.e. scanning probe microscopy, electron microscopy) are routinely employed to address aspects that correspond to the optimization and fine-tuning of dynamics and/or efficiencies of charge separation, charge transport, charge shift, and charge recombination processes.

Abstract

Adaptive Light Capture, Conversion, and Storage

The sun is an abundant and sustainable source of energy that is vital for the on-going energy transition. For photons with energies well-above the bandgap of the absorbing material, excess energy is lost predominantly by thermalization in the form of heat. In contrast, photons with energies below the optical bandgap are not absorbed at all. Even at peak efficiencies, both thermalization and sub-bandgap losses account for over 50% of incident solar power. Therefore, single-junction solar cells are limited to a maximum performance of 33%, which is known as the detailed balance limit. It is

therefore imperative to find strategies to reduce thermalization and sub-bandgap losses to achieve efficiencies beyond the detailed balance limit. Here, down- and up-conversion processes could, theoretically, increase solar-energy conversion efficiencies beyond current limitations by reaching 39% and 49%, respectively. Additionally, the integration of down- and up-shifters with the aforementioned elements will aid in controlling light throughout the solar radiation spectrum, spanning from the ultraviolet up to the infrared.

The spectral conversion enables modifying the incident solar spectrum such that a better match is obtained with the wavelength-dependent conversion efficiency of, for example, the photoactive layer of photovoltaics. We thereby demonstrate to harness down- and/or up-converting or down- and/or up-shifting of the spectrum, meaning that the energy of photons is modified at demand to either lower or higher energy. Hereby, we systematically vary the electronic coupling in molecular dimers and oligomers to tune the dynamics of all relevant down- and up-conversion steps and, in turn, deciphering not only the full mechanisms of singlet-fission (SF) and triplet-triplet-annihilation up-conversion (TTA-UC), but also all bottlenecks enroute towards the conversion targets of 200% down-converted triplets at minimum driving forces and 50% up-converted singlets at maximum anti Stokes shifts. All of our down- and up-converters will be combined with complementary absorbers to round off the optimal spectral overlap across the solar spectrum by either down- or up-shifting of the spectrum. Crucially, we achieve this not only in solution, but also in the solid state with optimized arrangement and panchromatic absorption from 300 to 1000 nm.

PLENARY LECTURE - 8

Prof. Partha Sarathi Mukherjee

Department of Inorganic and Physical Chemistry

Indian Institute of Science, Bangalore

psm@iisc.ac.in

Partha Sarathi Mukherjee worked under the supervision of Prof. N. Ray Chaudhuri at IACS (Kolkata) on Cu(II)-coordination polymers including their magnetic studies for his Ph.D. He was a postdoctoral fellow in the group of Prof. Peter Stang at the University of Utah and worked as an Alexander von Humboldt fellow at the University of Göttingen with Prof. Herbert Roesky before joining the Indian Institute of Science (IISc) as a faculty in 2005. Partha is currently a professor of chemistry at IISc (Bangalore). He works on self-assembled discrete organic and coordination molecular architectures including their use in catalysis, sensing, and light-harvesting. He has extensively used water-soluble barrel shaped molecular architectures as molecular vessels for photo-isomerization of organic compounds, separation of isomers, and chiral recognition. Prof. Mukherjee is a J. C. Bose National fellow. He is a recipient of NASI-SCOPUS young scientist award, INSA-Medal, S. S. Bhatnagar prize, TWAS young affiliateship and Swarnajayanti fellowship of the Govt. of India. He is an elected fellow of The World Academy of Sciences (TWAS) and the Indian Academy of Sciences. Partha is/was in the editorial advisory boards of Inorganic Chemistry, Inorganica Chimica Acta, Inorganic Chemistry Frontiers, The Chemical Records, Aggregate, and Scientific Reports. He is currently serving as an Associate Editor of Inorganic Chemistry. He has published over 225 papers in peer-reviewed journals with a current h-index of 69.

Abstract

Molecular Vessels

Due to the restricted degree of freedom of chemical entities in confined nanospace their physical and chemical properties are expected to be different from their conventional properties in the bulk medium. Metal ligand dynamic coordination bonds have been extensively used to design discrete metallosupramolecular architectures. My lecture will focus on the design of a few water-soluble Pd(II) discrete molecular architectures that have hydrophobic confined nano-pockets. Unusual photo-isomerization reactions of hydrophobic photochromic compounds in the confined space of aqueous molecular architectures will be presented. My lecture will also focus on our recent observation on the role of the shape of reaction vessels on the fate of a chemical reaction (Figure 1). By changing the shape of Pd6 aqueous molecular cages the oxidation of anthrone in presence of water gave different products under the identical reaction conditions. Introduction of flexibility/functionality into the ligands to design unusual functional architectures for selective photocatalytic oxidation and

separation of isomeric polyaromatic hydrocarbons by aqueous extraction will also be presented in my lecture.

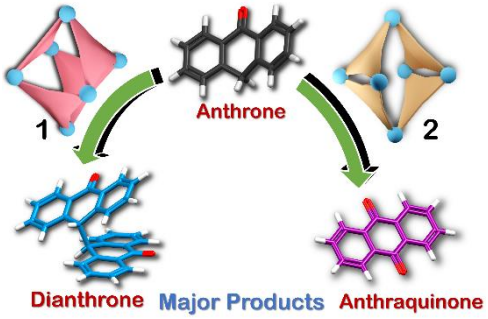


Figure 1. Cavity-shape dependent divergent synthesis.

PLENARY LECTURE - 9

Prof. Chinnakonda S. Gopinath, FASc

Ex-Outstanding Scientist and Deputy Director
Catalysis and Inorganic Chemistry Division,
Professor, Academy of Scientific and Innovative Research (AcSIR)
CSIR - National Chemical Laboratory, Pune
csgopinath@ncl.res.in

Dr. Chinnakonda Gopinath (Gopi) was working as Outstanding Scientist at the National Chemical Laboratory (NCL), Pune, till June 2024. He is also Professor of Chemical Sciences, Academy of Scientific and Innovative Research (AcSIR), New Delhi, India from 2011 onwards.

His research interests include surface science, heterogeneous catalysis, solar to chemical energy conversion, new catalytic materials by simple methodology and nanomaterials. He has published more than 245 research articles and twelve (12) patents with special emphasis on catalytic and solar energy to chemical energy conversion aspects. He is a pioneer in establishing near-ambient pressure XPS spectrometer in India at NCL, which is unique in several ways and published many papers on understanding gas-solid/catalysis phenomenon. Twenty-three (23) students completed PhD from his group and they are spread across the globe; currently five students are writing thesis and expected to submit thesis between 1-6 months.

His research group is also focused on understanding the fundamentals of surface catalytic reactions on the real-world complex catalytic materials at molecular level, and to suggest the ways to control the surface catalytic reactions based on the molecular level understanding. This has led to the development of highly active and selective catalysts, which might help to solve the critical issues of highly selective chemical processes in different catalytic reactions.

Lately, Gopi is actively engaged in hydrogen economy aspects, and leading the hydrogen technology (H2T) program of CSIR. Fifteen different CSIR laboratories are participating in H2T program across the entire value chain of hydrogen. His group actively works in the area of water splitting and artificial photosynthesis in direct sunlight by photocatalysis. He wishes to take this technology to higher TRL levels and eventually to commercial level with relevant industry partner(s).

Abstract

Carbon-Negative Green Hydrogen along with Carbon Recycling – Possibly Lucrative and Fast Ways toward Net-Zero Target.

A single factor that determines the implementation of green hydrogen is its cost. Currently practiced electrolysis methods are expensive in terms of Capex (Capital expenditure) and Opex (operating expenditure). A single factor that determines the Opex is the input energy, which is around ~55 kWh/kg H2, is due to high voltage required for oxygen evolution reaction (OER). How the oxidation

can be handled suitably, so that running expenses (Opex) could be brought down to the lowest level. Simultaneously, if oxidation of organic molecules to value added product(s) can be achieved, instead of OER, it is very likely to bring down the overall cost of hydrogen production. Since hydrogen is generated, while converting a waste biomass component to value added product(s), no net CO2 is emitted; rather a significant amount of value-added products make the hydrogen to be carbon-negative. If those organic molecules could come from a waste/bio-waste, it would lead to carbon-negative hydrogen at possibly the lowest cost. In this talk, fundamentals of water electrolysis, the problems involved in it, what is the way out and possible solutions to be discussed. Emphasis to be given to the recently published works from our group.

PLENARY LECTURE - 10

Prof. Aasheesh Srivastava

Department of Chemistry

Indian Institute of Science Education and Research,

Bhopal (IISER Bhopal)

asrivastava@iiserb.ac.in

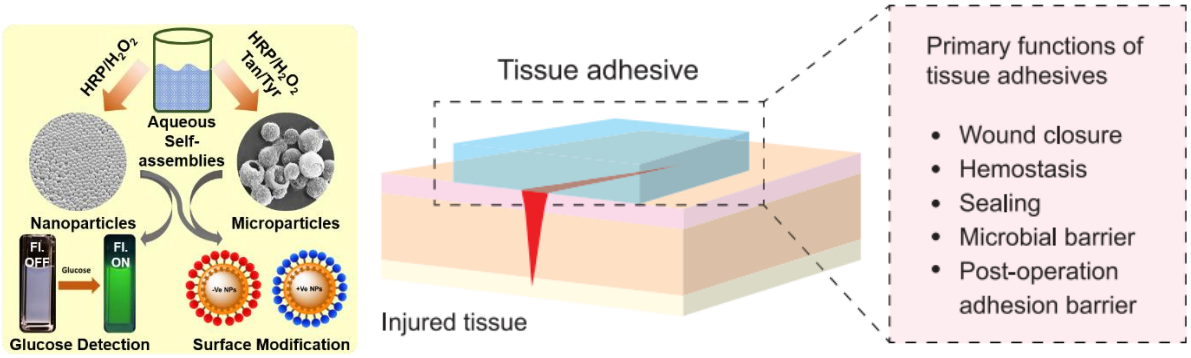
Dr. Aasheesh Srivastava is a Professor in the Department of Chemistry at the Indian Institute of Science Education and Research (IISER) Bhopal, Madhya Pradesh, India. With expertise in molecular self-assembly, stimuli-responsive materials, and biodegradable polymers, his research spans underwater adhesives for biomedical applications, antimycobacterial polyelectrolytes, amphiphilic biodegradable polyelectrolytes for drug and gene delivery, therapeutic hydrogels, and helical molecular scaffolds for various applications like anion sensing, proton conduction, and transport. He has completed his Ph.D. in 2006 from the Indian Institute of Science (IISc), Bangalore, under the mentorship of Prof. S. Bhattacharya. He holds an M.Sc. in Chemistry from IIT Kanpur (1999) and a B.Sc. (Hons.) in Chemistry from Motilal Nehru College, University of Delhi (1997). His professional journey includes a postdoctoral tenure at the University of California, Santa Barbara (2006–2009), before joining IISER Bhopal as an Assistant Professor in 2009. He progressed through the ranks, becoming an Associate Professor in 2015 and a Professor in 2021.

Dr. Srivastava has also held significant administrative roles, including Head of the Department of Chemistry (2017–2019) and Dean of Strategy, Planning, and Development at IISER Bhopal (2021–2022, 2024–present). Additionally, he has been a member of the Editorial Advisory Board for Biomaterials Science, published by the Royal Society of Chemistry, since 2019.His contributions to research and academic leadership highlight his dedication to advancing science and education in India and beyond.

Abstract

Enzymatic Crosslinking of Molecules and Macromolecules into Nanoparticles and Hydrogels

Enzymes are biocatalysts that catalyze a variety of reactions under mild conditions in aqueous medium. Many enzymes are known for their high reaction rates as well. Horseradish Peroxidase (HRP) is one such enzyme that catalyzes C-C and C-O bond formations between phenolic residues in presence of hydrogen peroxide (H_2O_2). HRP-H_2O_2 combination is utilized in many biosensing applications as well. We designed self-assembling molecules and biodegradable polymers endowed with HRP-responsive phenolic residues. These systems allowed preparing uniform nanoparticles for biosensing and drug-delivery applications[1] as well as hydrogels[2] and tissue adhesives[3] for wound healing applications. In my talk, I will showcase these exciting results and our future efforts in this direction.


HRP/H2O2
HRP/H2O2 Tan/Tyr
Aqueous Self-assemblies
Nanoparticles
Microparticles
Fl. OFF
Glucose
Fl. ON
-Ve NPs
+Ve NPs
Glucose Detection
Surface Modification
Tissue adhesive
Injured tissue
Primary functions of tissue adhesives
Wound closure
Hemostasis
Sealing
Microbial barrier
Post-operation adhesion barrier

PLENARY LECTURE - 11

Prof. Sobhan Sen

Professor

School of Physical Sciences

Jawaharlal Nehru University, New Delhi

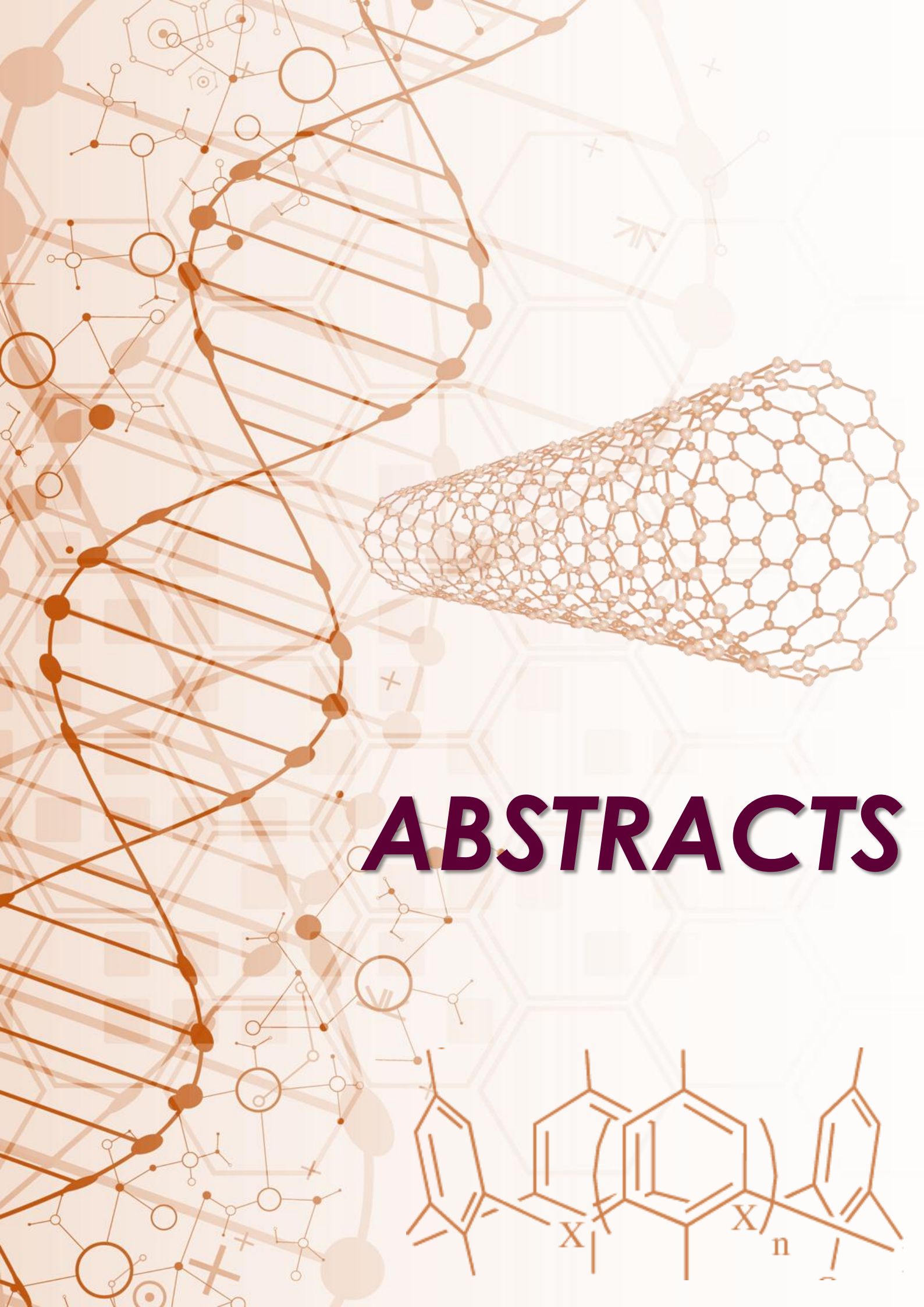
sens@mail.jnu.ac.in

Sobhan Sen is the Professor in the School of Physical Sciences at Jawaharlal Nehru University (JNU), New Delhi (2017–present), preceded by roles as Associate Professor (2014–2017) and Assistant Professor (2007–2014) in the same department. He previously worked as a JSPS Postdoctoral Fellow at the Molecular Spectroscopy Laboratory, RIKEN, Wako, Saitama, Japan (2005–2007), and as a Postdoctoral Fellow in the Department of Chemistry and Biochemistry at the University of South Carolina, USA (2003–2005). He has been honoured with several prestigious awards and recognitions throughout his career. In 2024, he received the Chemical Research Society of India (CRSI) Bronze Medal for his contributions to chemical research. He has been serving as an Editorial Board Member for the *Journal of Chemical Sciences* since 2022 and for *Chemical Physics Impact* since 2020. His work has been widely recognized through invitations to deliver prominent lectures, including an institute seminar at the S. N. Bose National Centre for Basic Sciences, Kolkata, in 2017, and a colloquium at the Tata Institute of Fundamental Research, Mumbai, in 2015. Earlier in his career, he was awarded the Asian and Oceanian Photochemistry Association (APA) Young Scientist Award in 2012 and the prestigious Japanese Society for the Promotion of Science (JSPS) Fellowship in 2005. His research focuses on exploring ultrafast solvation dynamics in DNA and lipid bilayers using experimental and simulation methods. He also investigates molecular diffusion and interactions through single-molecule spectroscopy and molecular dynamics (MD) simulations.

Abstract

Fluorescence Spectroscopy For The Study Of Biomolecular Dynamics

Interaction of electromagnetic radiation with matter is the key to survival of life on earth. Such interactions stimulate molecules to undergo transitions between different quantum states – be it electronic or vibrational or rotational. These transitions initiate various important natural processes inside molecules that control the properties of these macular systems to perform unique physico-chemical and biological functions. Similarly, molecular structures, on the other hand, also influence transitions between quantum states. Utilizing these properties of molecules and their transitions between states due to electromagnetic excitation, it is now possible to probe complex phenomena in various physico-chemical systems, biological cells and tissues through cutting-edge spectroscopic/microscopic techniques. This talk will combine a brief overview of all these in order to showcase how fluorescence spectroscopy can be utilized to develop cutting-edge techniques to track the dynamics of biomolecular systems.



ABSTRACTS

Table of Contents

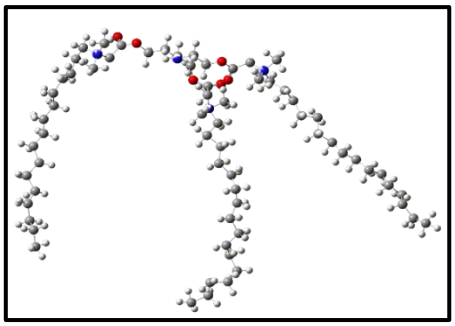
P001- Synthesis and Computational Studies of Dendritic Oligomeric Surfactants

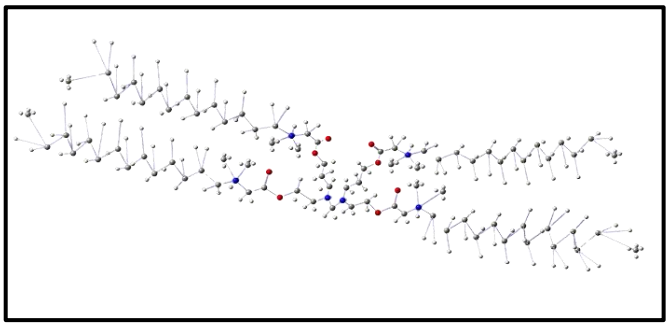
Abhinav Santhosha, Jay Patel[b] and Kushan Parikh*

Department of Chemical Science, Faculty of Applied Sciences, Parul University, Vadodara – 391 760, India

kamser2057@gmail.com

Abstract: Dendritic oligomeric surfactant provides a possible route to minimize gap between conventional to geminis to polymeric surfactants and leads to bridge many profound improvements in the properties of surfactants in aqueous solution at different interfaces. Dendritic oligomeric surfactants (trimeric, tetrameric and hexameric) have been synthesized and characterized (NMR, FT-IR, elemental analysis and ESI-Mass) by using different dendritic spacer and hydrocarbon tail length (m =12). Micellization behaviour of synthesized novel surfactants have been evaluated by conductivity and tensiometer, respectively. Computation studies (quantum mechanics method (DFT)) was also examined to calculate molecular properties, electron cloud, EPT and their energy levels. This study will be useful to understand the monomeric arrangements and their multiple use in biological applications.





Keywords: Surfactant, Dendritic oligomeric surfactant, DFT

P002- Green Synthesis and characterization of silver nanoparticles using *Tephrosia purpurea* Linn. leaves and its biopotentials

Vaja Prakruti Mukeshbhai[1], Dr. Kartik D. Ladva[2], Dr. Girin A. Baxi[3]

[1]*Department of Chemistry, Saurashtra University, Rajkot, India*

[2] *Shri M & N. Virani Science College, Saurashtra University, Rajkot, India*

[3] *Department of Chemistry, K.S.K.V. Kachchh University, Bhuj, India.*

vajaprakruti10@gmail.com

Abstract: Synthetic Nanoparticles (NPs) being toxic, the safer pathways are being introduced to replace the such NPs by the green synthesis of metal NPs fabricated from the plant extracts which are embodied by the various bioactive secondary metabolites and has diverse therapeutic actions and applications in nanomedicines. Amongst the various NPs, Silver NPs (AgNPs) have extensive use in nanomedicines due to their physicochemical properties and interactions with biomolecules. Tephrosia purpurea Linn., also known as Sarpankha in Gujarati, is a perennial herb which is widely used in traditional and Ayurvedic medicine as antiviral, antibacterial, antiulcer and for various other ailments. AgNPs from T. purpurea (TP – AgNPs) were synthesized by using the water extracts of leaves and characterized by different

techniques. The TP – AgNPs shows various pharmacological activities such as antioxidant and antibacterial activities. Thus, the plant mediated synthesis of TP - AgNPs is rapid, cost effective, greener approach and can be a potent nanomedicine applied against various diseases.

Keywords: Green synthesis, Silver Nanoparticles (AgNPs), Tephrosia purpurea Linn., nanomedicine

P003- Flexible Bimetallic MOF-Graphene Sponge Composites with Metal Sulfides: Advanced Electrode Materials for High-Performance Supercapacitors

Ayushi Srivastava[1] and Abhishek Dadhania*[1]

[1*]*Department of Chemical Sciences, P. D. Patel Institute of Applied Science, Charotar University of Science and Technology (CHARUSAT), CHANGA, GUJARAT-388421*

abhishekdadhania.bt@charusat.ac.in

Abstract: Metal-organic frameworks (MOFs) have gained attention for energy storage due to their porous structures, tunable properties, and excellent electrochemical characteristics. Here we discuss the lightweight, flexible 3D graphene sponge (GS) based composites modified with MOFs to enhance supercapacitor performance. Researchers have designed bimetallic MOFs such as ZnCo-MOF, MnCo-MOF, and FeNi-MOF integrated onto GO and subsequently impregnated into appropriate solution to form MOF/GS composites for exceptional electrochemical performance[1]. These MOF/GS composites provide high energy and power densities, robust cycling stability, mechanical flexibility and improved pseudocapacitive properties[2]. The materials structural integrity and flexibility ensure durability under mechanical deformation making it ideal for wearable and portable electronics. To overcome the inherent limitations of MOFs, such as their moderate conductivity and limited charge storage capacity we are exploring incorporation of transition metal sulphides (TMS) such as molybdenum disulfide (MoS_2) into these MOF/GS composites to further enhance their electrochemical activity. TMS high electrical conductivity and abundant active sites can significantly amplify the overall performance of the composites and could synergize with the existing structure, improving ion transport and redox behaviour. To characterize these MOF/GS composites, various techniques were employed such as SEM, EDS, XRD, XPS and electrochemical activity was measured by CV, EIS and GCD. Their simple synthesis and scalability make them commercially viable, offering a promising path for flexible, sustainable energy storage. This study highlights TMS@MOF-modified graphene sponges as innovative electrodes for next-generation supercapacitors, addressing modern energy demands.

Keywords: Metal Organic Frameworks, Graphene sponge, Transition metal sulphides, Supercapacitor.

References:

[1] E. Erçarlkcl, K. Dağcl Klranşan, and E. Topçu, "Three-Dimensional ZnCo-MOF Modified Graphene Sponge: Flexible Electrode Material for Symmetric Supercapacitor," *Energy and Fuels*, vol. 36, no. 3, pp. 1735–1745, 2022, doi: 10.1021/acs.energyfuels.1c04183.

[2] E. Erçarıkcı, E. Topçu, and K. Dağcı Kıranşan, "Design and synthesis of a MnCo-MOF modified flexible 3D graphene sponge electrode for an asymmetric supercapacitor with high power and energy density," *J. Mater. Chem. C*, vol. 11, no. 28, pp. 9593–9601, 2023, doi: 10.1039/d3tc00970j.

P004- Overcoming the Dual Challenges of Antibiotic-Resistant Pathogens in goat milk and Biofilm Formation in Dairy Production Using Nanotechnology

Anuja Ezhava and Viral Shukla

Department of Microbiology, LJ School of Applied Sciences, LJ University, Ahmedabad–382210, Gujarat, India

viral3007@gmail.com

Abstract: Goat milk, known for its rich nutritional profile and digestibility, is widely used in producing high-value dairy products such as cheese, yogurt, and specialty items, particularly in niche markets. However, microbial contamination in goat milk poses a persistent challenge, compromising cattle health, reducing product quality, and increasing economic losses.

In this study, 20 pathogenic strains were isolated from raw disease milk samples of goats and identified through MALDI-TOF analysis. The findings underscore the need for innovative solutions to tackle such persistent pathogens effectively.

The growing threat of antibiotic resistance among dairy-associated pathogens necessitates alternative strategies to maintain animal health and product safety. This research explored the antimicrobial and biofilm-inhibiting potential of herbal nanoparticles synthesized from Neem (*Azadirachta indica*) and Ashwagandha (*Withania somnifera*), along with metal nanoparticles from Zinc oxide (ZnO) and Selenium dioxide (SeO_2).

This study addresses the dual challenges of antibiotic resistance and dairy hygiene by replacing conventional antibiotics with nanotechnology-based solutions. The findings contribute to improved cattle health by mitigating microbial threats and enhancing dairy industry hygiene by targeting biofilms that compromise equipment cleanliness and product quality.

Keywords: Goat milk, Nanotechnology, Antibiotic resistance, Biofilm inhibition, Dairy hygiene.

P005- Synthesis, Characterization and Liquid Crystalline Properties of Resorcin[4]arene derivatives

Hitesh M. Parekh[a]*, Suryajit L. Rathod[b]

[a]*:Department of Chemistry, Sardar Patel University, Vallabh Vidhyanagar, Gujarat, India.*

[b]*:Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad, India.*

hitesh_parekh@spuvvn.edu

Abstract: In present era, researchers have been focused to design and develop an efficient synthesis of functional supramolecular compounds that stabilize mesogenic properties with self-assembly natures are of great technological interest.1 They become useful in the fabrication of various devices like OLED, organic photovoltaic cells, organic field-effect transistors, gas sensors, and organic solar cell applications. Mesogens consisting of a rigid core and flexible substitution on peripheral side to form columnar type liquid crystalline compounds.2,3 Further, these types of compounds enable to form self-assembly behavior. A newly lower rim functionalized resorcin[4]arene based supramolecular compounds with variable alkoxy side chain have been synthesized by simple two step procedure method. These functionalized supramolecular compounds were investigated for their liquid crystalline properties and molecular self-assembly type behavior. The lower alkyl arm substituted supramolecules shows SmC type mesogenic properties while higher alkyl arm substituted compounds display columnar hexagonal type mesogenic properties. This research suggest that the calix[4]resorcinarene core is a good platform to construct supramolecular materials to achieve liquid crystalline properties with higher thermal stability.

References:

1. S.L.Rathod, V.S.Sharma, K.R.Patel, H.A.Mali, P.S.Shrivastav, H.M.Parekh, Jou. Mol. Stru., 2023, 1275, 134571.

2. M.K.Panchal, V.S.Sharma, H.A.Mali, S.L.Rathod, D.Suthar, M.Athar, P.S.Shrivastav, H.M.Parekh, Chem. Select, 2024, 9(18), e202303834.

3. Ronak S. Patel, Rubi J. Bhadoriya, Krunal M. Modi, Manoj A. Vora, Mohan N. Patel, Hitesh M. Parekh, Talanta, 2025, 285, 127322.

P006- Characterization of Probiotic Strains *Bacillus clausii* and *Lactobacillus rhamnosus* GG and their Interaction with Nano-Curcumin: Insights for Optimizing Probiotic Formulations.

Dr. Maulesh Gadani[1]; Dr. Kedar Ahire[2]; Dr. Viral Shukla[1].

1 LJ Institute of Applied Sciences, Lok Jagruti Kendra University, Ahmedabad, Gujarat.

2 Department of Zoology, Savitribai Phule Pune University, Pune, Maharashtra.

drmauleshgadani@gmail.com

Abstract: Probiotics are essential for promoting gastrointestinal health and supporting immune system function. This study focuses on the detailed characterization of two probiotic strains, *Bacillus clausii* and *Lactobacillus rhamnosus GG (LGG)*, and their interaction with nano-curcumin, a bioactive phytochemical with antimicrobial and growth-modulating properties. Morphological and biochemical assays identified *Bacillus clausii* as a motile, spore-forming, Gram-positive bacterium, while *L. rhamnosus GG* was non-motile and Gram-positive. Growth kinetics revealed differential adaptability; *Bacillus clausii* thrived in LB broth under aerobic conditions, whereas *L. rhamnosus GG* exhibited optimal growth in MRS broth under anaerobic conditions.

Antibiotic susceptibility profiling highlighted strain-specific resistance patterns. *Bacillus clausii* showed resistance to Penicillin-G, Cephalothin, and Clindamycin, while *L. rhamnosus GG* showed resistance to Gentamicin, Co-Trimoxazole, and Vancomycin. Nano-curcumin assays revealed contrasting effects: it inhibited the growth of *Bacillus clausii* while enhancing the growth of *L. rhamnosus GG*. Simulated gastric fluid tolerance tests further demonstrated the challenges both strains face in acidic environments (pH 1.2), underscoring the need for protective strategies to maintain probiotic viability during gastrointestinal transit. These findings emphasise the importance of understanding probiotic strain-specific responses to environmental factors and nano-formulations for optimizing their probiotic efficacy.

Keywords: Probiotics, Nanocurcumin, Gastro-intestinal health, Immune function, *Bacillus clausii, Lactobacillus rhamosus GG*

P007- Maximizing Catalytic Efficiency: Nano-Palladium Integration with Hetero Calixarenes for Future Solutions

Keyur D. Bhatt

Department of Chemistry, Faculty of Science, Ganpat University, Kherva-384012, Mehsana, Gujarat, India

Keyur Bhatt (drkdbhatt@outlook.com/kdb01@guni.ac.in) +919825591630

Abstract: This study explores the innovative integration of mesomodified hydroxycalix[4]pyrrole derivatives (OHCP) with palladium nanoparticles (PdNPs) to develop a highly efficient nanocatalyst for future catalytic solutions. The OHCP-PdNPs demonstrated exceptional performance in C–C coupling reactions, with stability and pH effects playing a pivotal role in optimizing their catalytic efficiency. The electron-rich hydrazide functional group and the unique four-pyrrole unit structure of the OHCP ligand enabled effective reduction and encapsulation of metal ions, surpassing the capabilities of conventional hydrazine. This led to a robust web-like coating effect around the PdNPs, enhancing their stability in water and air. The encapsulation process significantly improved the activity and selectivity of the PdNPs, facilitating cost-effective production of stable and versatile nanocatalysts. Our findings underline the transformative potential of OHCP-encapsulated PdNPs in advancing efficient catalytic processes, offering sustainable and scalable solutions for future applications in nanotechnology and green chemistry.

Keywords: Coupling reactions, Macrocyclic Chemistry, Supramolecules, Catalyst, Nanomaterial, Nano-catalyst

P008- Delivering Natural Bioactive Compounds using Nanostructured Lipid Carriers

Vidhi A. Modh[1], Dr. Rajesh K. Patel[2*]

Pharmaceutics, Gujarat Technological University school of pharmacy, Gandhinagar, Gujarat, India

**rajeshpatel@gtu.edu.in*

Abstract: Bioactive substances included in natural products are created organically through semisynthetic or synthetic methods. These bioactive substances have important biological functions, particularly in defence mechanisms against infections and growth. The pharmacological actions of bioactive chemicals found in natural products, including their anti-oxidative, anti-microbial, anti-inflammatory, anticancer, and wound-healing effects, have been the subject of much research in recent decades. However, their low bioavailability and instability with changes in pH, temperature, and light exposure have always limited their pharmacological importance. By improving therapeutic efficacy, nanotechnology opens the door. Nanotechnology paves the way for developing drug delivery systems by enhancing therapeutic efficacy. Nanostructured lipid carriers, a lipid-based drug delivery system, are recently being studied to improve the biocompatibility, biodegradability, bioavailability, solubility, permeability, and shelf life of bioactive compounds in the pharmaceutical industry. The ideal component and preparation method for bioactive compounds in nanostructured lipid carrier development is necessary for their physicochemical properties and therapeutic efficiency. Therefore, this review highlights recent developments, preparation, and application of nanostructured lipid carriers as carriers for natural bioactive compounds in improving their therapeutic potential in drug delivery systems.

Keywords: bioactive substances, lipid carriers with nanostructures, creation, manufacturing, physicochemical characteristics.

P009- An Overview of Green Chemistry

Adidravid Kartik Radhakrishnan

MG Science Institute, Ahmedabad

Abstract: This work provides an overview on importance and economical development of green chemistry. Green Chemistry is a process that reduces/eliminate the use or generation of hazardous substances which is involved in an particular chemical reaction. The generation of those hazardous substances leads to pollution and generates waste. The idea of Green Chemistry was developed as response to Pollution Prevention Act of 1990. Under this act several fundamental principles were introduced which minimize the pollution and waste. The methods are – that 12 fundamental principles, by using green solvent in reaction (like SCF,SCW,SC-CO2), by solventless reactions (like aldol condensation) , or by green approach to several organic reaction (like friedel craft reaction, knoevenagel reaction). By above those methods the aim of green chemistry can be achieved and pollution can be minimized. Green Chemistry is not a solution to all environment problem but a fundamental approach to prevent pollution.

P010- Forensic Pharmacy

Aditi Tiwari, Hetal Gorana

Bio sciences, LJ Institute of Applied Sciences, LJ Campus Nr Sanand Cross Road S G Road, Ahmedabad, India

0722tiwariaditi@gmail.com

Abstract: With the training in the forensic pharmacy, they have an knowledge as well as the working experience in the subjects of therapeutics, pharmacokinetics, and toxicology along with the exposure to subjects such as forensic medicine during the medical education. All these knowledge domains can be applied and act as an interface to the forensic situations. The skills and expertise of a forensic pharmacist can be useful in a large and diverse number of legal cases. A forensic pharmacist can be valuable resource in legal cases related to malpractice, adverse drug reactions, drunk and drugged driving, and other numerous types of civil and criminal cases. With an ever increasing incidence of criminal and civil cases in India, the development and inclusion of forensic pharmacist in the judicial system of India are the need of the hour.

The research in this has witnessed great technology advancement that allows it to expand its scope beyond the domain of therapeutics, thus enabling Indian pharmacist to explore the niche area of Forensic Pharmacy. Different pharmacokinetics and pharmacodynamics of drugs in living and dead, drug interactions, abuse of drugs, personal injury or death due to drug exposure leading to medico-legal issues, environmental exposure to chemical, and doping and forensic pharmacovigilance are the diverse aspects of Forensic Pharmacy.

Keywords: Doping; Drug abuse; Medico-legal; Toxicology.

P011- Nanomaterial-enhanced membrane bioreactors for advanced wastewater treatment

Amerah Malik, Niyati Patel, Chanak Gavande

M.Sc. Biotechnology, L.J. School of Applied Science, L.J. campus, L.J. college road, Near Sarkhej- Sanand circle, off. S.G. highway, Ahmedabad, India

patelniya1030@gmail.com

Abstract: An inventive and sustainable method of improving the effectiveness and dependability of wastewater treatment procedures is the integration of nanomaterial membranes (NMs) into membrane bioreactors (MBRs). Recent developments in the design, production, and use of NM-incorporated membranes in MBRs (NMs-MBRs) are summarized in this poster. Nanoparticles, nanofibers, and nanosheets are among the different kinds of nanomaterials that are categorized according to their structural characteristics. We go over important facets of each type's physicochemical properties, performance enhancements, and production methods. greater antifouling qualities, longer operational longevity, and greater pollution removal efficiency are noteworthy developments. The ability of NMs-MBR systems to eliminate typical pollutants such organic matter, nitrogen compounds, and heavy metals is the main focus of a comprehensive evaluation of their performance. Furthermore, the importance of this method in reducing membrane fouling—a significant operational difficulty—is emphasized. NMs-MBRs' economic viability and sustainability are also examined, highlighting the possibility of their broad use in wastewater treatment applications. Modern nanotechnology combined with traditional MBRs to create NMs-MBR systems is a viable method to address the world's water problems more effectively and with less of an adverse environmental effect.

Keywords: Nanomaterial; Membrane bioreactors; Wastewater treatment; Applications;

P012- Biophotonics for diagnostic detection of extracellular vesicles

Anurag panchal, Aum Vyas, Smit Parmar

Biotechnology Department, L J School of Applied Science, L J University, Sarkhej–Gandhinagar Highway Ahmedabad, India

aumvyas7@gmail.com

Abstract: Extracellular Vesicles (Evs) serve as adaptable transporters for biomarkers implicated in the aetiology of a variety of illnesses in humans. The use of Evs in diagnostics is gaining traction in both science and business, but conventional biomolecular techniques have limitations. These include the need for a constant sample volume, reliance on laborious, operator-dependent procedures, and incapacity to handle the nano-size range of Evs. The creation of novel platforms with exceptional sensitivity has resulted from the use of biophotonics, or light-based techniques, for the diagnostic detection of Evs. Within the scope of EV-related biomarker identification, we present an overview of the most exciting and cutting-edge technologies in this review. The disclosed biophotonic techniques have generally been successful in differentiating between pollutants and nanovesicles when evaluated on clinical samples. photonic techniques have generally been successful in differentiating between pollutants and nanovesicles when evaluated on clinical samples.

Keyword: biophotonics, biomarker, photonic techniques, nanovesicles

P013- Evaluation of Downstream Processing Methods for Bioplastic Extraction: A Comparative Analysis

Anindita Nair[1], Aakash Patel[2]

Department of Microbiology, LJ Institute of Applied Sciences, LJ University Ahmedabad, Gujarat, India – 382210

Abstract: Plastics have become indispensable in daily life due to their affordability, lightweight nature, and durability. However, the environmental impact of conventional plastics has driven the urgent need for sustainable alternatives that are biodegradable, biocompatible, and possess comparable physicochemical and mechanical properties. Polyhydroxyalkanoates (PHAs), a class of biodegradable polyesters produced by prokaryotic microorganisms, have emerged as a promising solution for applications in consumer goods and medical devices. Despite their potential, the commercial viability of PHAs is hindered by complex downstream recovery processes, often involving hazardous solvents such as chloroform.

Alternative recovery methods, including mechanical, enzymatic, and chemical approaches, have shown varying degrees of success but face challenges related to scalability, cost, and environmental impact. Enzymatic methods, while gentle on the polymer, are expensive and intricate. Surfactant-based and alkaline treatments require additional wastewater management and risk polymer degradation. Mechanical techniques are scalable but are often cost-prohibitive.

Natural deep eutectic solvents (NADESs) have emerged as sustainable alternatives due to their low toxicity, biodegradability, and versatility. These solvents, which are composed of naturally occurring compounds such as sugars, organic acids, and amino acids, have gained attention for their ability to dissolve various biomaterials while maintaining a low environmental impact. Among these, hydrophobic NADESs, particularly those incorporating methanol, show promise for extracting polyhydroxybutyrate (PHB) owing to their compatibility with hydrophobic polymers. Hydrophobic NADESs are highly adaptable, offering tunable properties that make them suitable for a wide range of recovery processes, including PHB extraction from microbial cells.

This study introduces an innovative PHB recovery process combining enzymatic pre-treatment, bio-based solvent extraction using ethyl acetate, and a hydrophobic NADES composed of L-menthol and organic acids. This integrated approach demonstrates a sustainable, efficient, and environmentally friendly method for PHB extraction and purification, addressing key limitations of traditional processes and advancing the commercial potential of PHAs.

Keywords: Polyhydroxyalkanoates (PHA); Sustainable; Downstream processing; Natural deep eutectic solvents (NADESs)

P014- Guanidine isothiocyanate doped Nitrogen-Rich Carbon Dots from monodispersed Ulvan: A Greener Approach for Hg^{2+} Sensing, Biofilm Suppression, and Anticancer Efficacy.

Ankeshkumar Yadav [a], Dushyantsingh Rajpurohit [a*], Pranav S Shrivastav [a*]

[a] *Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad, Gujarat-380009.*

Ankeshyadav0910@gmail.com

Abstract: Heteroatom-doped Carbon dots (CDs) possessing high fluorescent properties make them potential candidates for sensing toxic analytes and heavy metal ions, alongside broad biosensing and imaging applications. In the current work, we report a novel scheme for synthesizing Ulvan-derived CDs co-doped with guanidine isothiocyanate as a Nitrogen source with enhanced optical properties. Extraction of the sulfated Ulvan from dried seaweed biomass followed by Anion exchange chromatography to isolate fractions with low PDI (polydispersity index), when used as starting material and guanidine isothiocyanate as co-dopant led to efficient incorporation of -N within the equitized CDs possessing high fluorescence. Subsequent Bioactive properties of the CDs were inferred for their promising results in cytotoxicity assays, biofilm inhibition, and biological imaging. Later, the photophysical properties of the CDs were investigated for their selective sensing of Hg^{2+}cations conferred by a quenching mechanism evident from fluorescence spectroscopy, FTIR, and UV spectroscopy studies. Limit of detection (LOD) values and quenching constant values determined at 284 nm further concrete the existence of a static quenching mechanism via stable complex formation between CDs and Hg^{2+} cations. Furthermore, the recyclability and pH-dependent stability of CDs were investigated to prove their potential in real-world applications.

P015- Development of Smart Polymeric Nanoparticles for Targeted Drug Delivery

Aqsa Samma, Razina Chudiwala

Department of Chemistry, St. Xavier's College (Autonomous)Ahmedabad 380009

Abstract: The advancement of drug delivery systems has seen significant innovations, particularly with the emergence of smart polymeric nanoparticles. These nanoparticles are engineered to enhance the delivery and efficacy of therapeutic agents, thereby addressing the limitations of conventional drug delivery methods. The focus of this presentation is to delve into the development of these smart polymeric nanoparticles and their application in targeted drug delivery, highlighting their synthesis, characterization, and the mechanisms that enable precise targeting of diseased tissues.

One of the key features of smart polymeric nanoparticles is their ability to respond to specific stimuli for controlled drug release.

The smart polymeric nanoparticles have the potential to revolutionize drug delivery systems. They not only enhance the bioavailability of drugs but also enable the delivery of a wider range of therapeutic agents, including chemotherapeutics, proteins, and nucleic acids.

In conclusion, the development of smart polymeric nanoparticles represents a significant advancement in the field of targeted drug delivery. By addressing the limitations of conventional methods, these nanoparticles offer a promising approach to improve the efficacy and safety of therapeutic agents.

P016- Calixpyrrole-Based Supramolecular Biosensors: Integrating Metal Nanoparticles for Enhanced Environmental Monitoring

Archie Agarwal, Keyur Bhatt*

Department Of Chemistry, Faculty of Science, Ganpat University, Kherva-384012, Mehsana, Gujarat, India

**kdb01@ganpatuniversity.ac.in*

Abstract: Supramolecular chemistry has gained significant attention in the development of advanced biosensing materials for environmental monitoring. This review focuses on the innovative integration of supramolecules and metal nanoparticles in calixpyrrole-based biosensors. Calixpyrroles, known for their exceptional ability to encapsulate ions and small molecules, serve as key components in supramolecular assemblies when functionalized with metal nanoparticles. These hybrid materials enhance sensitivity, selectivity, and versatility, making them effective for detecting environmental pollutants, including heavy metals, organic compounds, and hazardous gases.

The integration of metal nanoparticles into calix(4)pyrrole supramolecules significantly enhances their electronic and optical properties, boosting electron transfer and improving sensing performance. Surface plasmon resonance and electrochemical interactions play key roles in understanding their functionality. Recent advancements in calixpyrrole-based supramolecular biosensors highlight their potential for real-time environmental monitoring. This review explores current progress, emphasizing the synergy between supramolecular architectures and metal nanoparticle incorporation. It also outlines future directions, showcasing the transformative impact of these innovations on environmental biosensing technologies. The discussion underscores their importance in developing efficient, sensitive tools for addressing critical environmental challenges.

Keywords: Supramolecular Chemistry, Metal Nanoparticles, Calixpyrrole, Biosensor

P017- Synthesis, Characterization, and Photocatalytic Dye Degradation Studies of Lanthanum, Cerium, Praseodymium, and Neodymium Complexes.

Attamohammad S khorajiya[1], Dr. G. R. Patel[2]

Abstract: The synthesis, characterization, and photocatalytic dye degradation properties of metal complexes of lanthanum (La), cerium (Ce), praseodymium (Pr), and neodymium (Nd) using a Schiff base ligand, 2,2'-[1,4-phenylenebis(azanediylmethylene)]diphenol (PBDP). Metal complexes were synthesized by reacting respective metal chlorides with the ligand in appropriate solvents under reflux conditions. The complexes were characterized using UV-Visible, FTIR, NMR, XRD, TGA, mass spectroscopy, elemental analysis, and molar conductivity measurements.

Photodegradation studies of methylene blue dye were conducted under visible light to evaluate the catalytic activity of these complexes. Results revealed that Ce and Nd complexes demonstrated significant photocatalytic degradation, whereas Pr and La complexes showed moderate activity. This indicates a potential application of Ce and Nd complexes in environmental remediation.

Keywords: Co-ordination Chemistry, Lanthanide metal complexes, Schiff base, photocatalysis, dye degradation, methylene blue, environmental remediation.

P018- Polymeric nanodrug delivery system of Metformin-loaded Alginate for diabetes therapy – An *in vitro* study

Bhakti Thakkar, Archana George, Pranav S. Shrivastav*

Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad-380009

bhaktithakkar1210@gmail.com, archanamarygeorge@gmail.com; pranav_shrivastav@yahoo.com;

Abstract: Current modalities utilized for the diagnosis and treatment of diabetes still exhibit several contraints such as erratic absorption, need of elevated dosage, lack of sensitivity or specificity, drug resistance, substantial morbidity and mortality, chronic complications, and patient-to-patient variability over the course of treatment. This study concentrated on the development of metformin encapsulated alginate nanoparticle as a carrier with extended drug release properties that optimize the period for the treatment. As a Biopharmaceutics Classification System (BCS) class III drug, metformin is characterized as hydrophilic in nature with exhibiting high solubility yet poor absorption profiles. To concurrently facilitate gastrointestinal absorption and intestinal permeability, metformin was incorporated into alginate nanocapsule prepared via an ionic gelation technology. The characterization of these metformin incapsulated alginate nanoparticles employed Fourier transform infrared (FTIR) spectroscopy, dynamic light scattering (DLS), zetasizer and transmission electron microscopy (TEM). Key parameters such as the concentration of calcium chloride and sodium alginate, homogenization rate and homogenization duration redounded to the achieving desired nanoparticle formation. The drug loading and encapsulation efficiency in metformin-loaded alginate nanoparticles were 3.12 mg (the amount of metformin added in 100 mg of nanoparticles) and 92 %, respectively. The results frim in vitro drug release studies exhibited enhanced efficiency and response of metformin loaded alginate nanoparticles relative to unmodified metformin.

Keywords: biodegradable polymers, nanoparticles, alginate, diabetes

P019- Applications of Inductively Coupled Plasma-mass Spectrometry (ICP-MS) In Determination of Inorganic Impurities in Drugs and Pharmaceuticals.

Dalal Sanjana[1], Patel Ravi[2]

[1]*Department of quality assurance, School of Pharmacy, Gujarat Technological University, Gandhinagar 382028, India.*

dalalsanjana1@gmail.com

Abstract: Older techniques such as atomic absorption and atomic emission are still in use by some laboratories, these has been slow shift toward ICP-MS, A Review has been done on Recent uses of Inductive coupled Plasma-mass spectrometry (ICP-MS) to identify trace level Inorganic impurities in drugs and pharmaceuticals. The Review covers the year 1988-2024, when the method was used for both the assay of different trace elements in pharmaceuticals and the identification of metallic impurities.

Keywords: ICP-MS, Trace elements, Heavy metals, Impurities, Drugs and pharmaceuticals.

P020- Calixarenes: Versatile Macrocycles for Molecular Recognition

Devit Limbachiya, Nihal Patel, Keyur Bhatt*

Department of Chemistry, Faculty of Science, Ganpat University, Kherva-384012, Mehsana, Gujarat, India

** kdb01@ganpatuniversity.ac.in*

Abstract: Calixarenes are unique macrocyclic compounds made up of phenolic units linked by ethylene bridges, resulting in a distinctive cyclic structure. Their cup-like or bowl-shaped cavities provide them exceptional molecular recognition skills. This makes them useful in a variety of chemistry disciplines, including analytical chemistry, materials science, and supramolecular chemistry. Calixarenes are excellent at selectively encapsulating metal ions, organic molecules, and anions. Their adaptability can be increased further by functionalising their structure, which allows for the inclusion of specialised groups both inside and outside the cavity. This versatility has enabled a wide range of applications, including medication delivery systems, sensors, catalysts, and environmental cleanup. They are very effective in removing pollutants and selectively binding to hazardous compounds. The unusual capacity of calixarenes to behave as hosts underlines their importance in supramolecular chemistry and beyond.

Keywords: Calixarenes, Functionalization, Molecular Recognition, Sensing

P021- Nanoformulations of Alpha-Mangostin for Cancer Drug Delivery System

Dhruvati Jayswal

L J Institute of Applied Sciences, Nr. Sanand Cross road, S G Highway, Ahmedabad.

dhruvativjayswal@gmail.com

Abstract: Alpha-mangostin, a naturally occurring xanthone compound, has shown promising anticancer activity against various types of cancer cells. However, its poor solubility, limited bioavailability and non-specific distribution have hindered its clinical application. Nanoformulation of alpha-mangostin has emerged as a promising strategy to overcome these limitations and enhance its therapeutic efficacy. This review aimed to summarize and discuss the nanoparticle formulations of alpha-mangostin for cancer drug delivery systems. There are various types of alpha-mangostin nanoformulations to improve its anticancer efficacy by improving bioavailability, cellular uptake and localization to specific areas. These nanoformulations include nanofibers, lipid carrier nanostructures, solid lipidnanoparticles, polymericnanoparticles, nanomicelles, liposomes and goldnanoparticles. Notably polymeric nanoparticles and nanomicelles can increase the accumulation of alpha-mangostin into tumors and inhibit tumor growth in vivo. In addition, polymeric nanoparticles with the addition of target ligands can increase the cellular uptake of alpha-mangostin. In conclusion, nanoformulations of alpha-mangostin are a promising tool to enhance the cellular uptake, accumulation in cancer cells, and the efficacy of alpha-mangostin as a candidate for anticancer drug.

Keywords: Alpha-mangostin , Nanoformulation, Cancer drug delivery , Targeted therapy

P022- **Exploring Bio-Responsive Nitrogen Heterocycles as Potential Urinary Tract Infection Therapy**

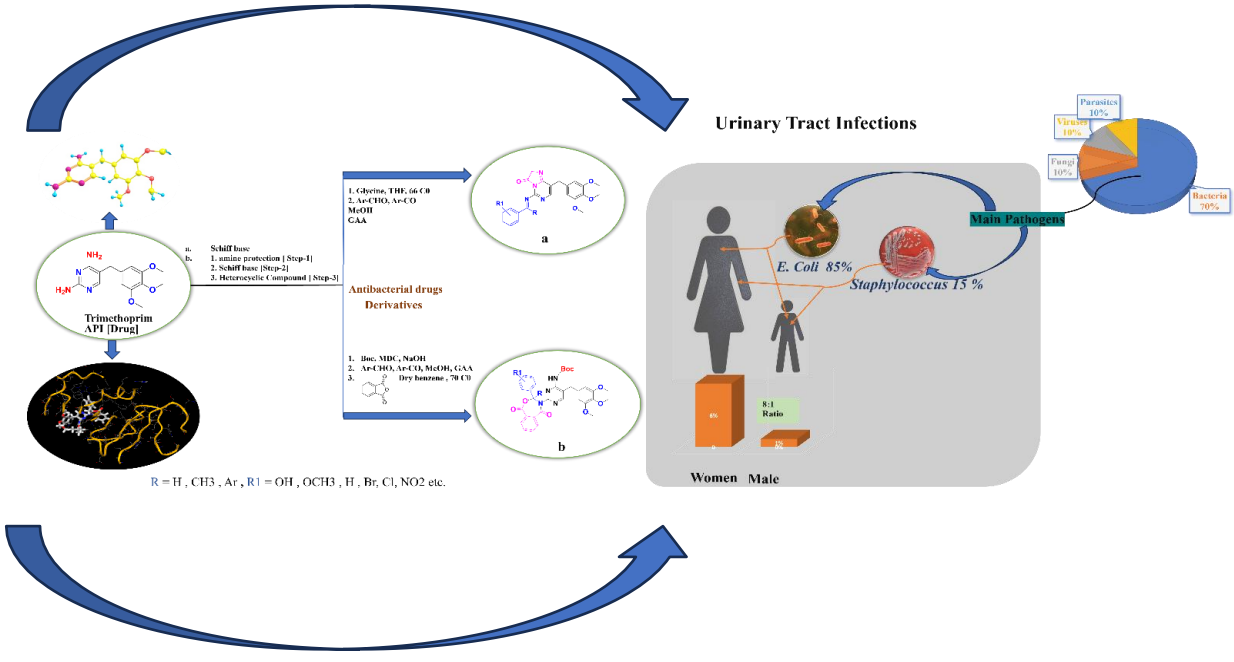
Dhara Vala[1], Dr. Mayank Pandya[1*]

Center for Research and Development, Dr. Subhash University, Junagadh (362001), Gujarat, India.

valadhara513@gmail.com

Abstract: The most prevalent bacterial infection is a Urinary Tract Infection (UTI), accounting for 150–250 million cases annually. UTIs are prevalent infections, more commonly in women than in men, with an 8:1 ratio and affecting different age groups. The primary common cause of UTIs is bacteria but also infected fungi, viruses and parasites. Clinically, UTIs are classified as lower or upper urinary tract infections and are either uncomplicated or complicated. which can involve the kidney [pyelonephritis], ureters, bladder [cystitis] and urethra and are caused by gram-negative bacteria followed by gram-positive bacteria. Escherichia coli makes up 80%– 85% of infection-causing bacterial species, while Staphylococcus species make up 10%–15%. UTIs are caused by uropathogenic E. coli (UPEC), which can be multidrug-resistant. this study investigates the synthesis and biological evaluation of bio-responsive nitrogen-containing heterocycles derived from trimethoprim (TMP) as potential therapeutic agents for UTI treatment. TMP, a well- known antibacterial agent, was chemically modified to incorporate nitrogen heterocycles, aiming to enhance its efficacy and selectivity against UTI-causing pathogens. The synthesized TMP derivatives were characterized using spectroscopic techniques and subjected to in vitro assays to assess their antimicrobial properties against common UTI pathogens. Several TMP-derived nitrogen heterocycles exhibited significant antibacterial activity, with minimum inhibitory concentrations (MICs) comparable to or better than standard UTI treatments. These results highlight the promise of TMP-derived as a novel class of UTI therapeutics. This research contributes to the development of targeted, responsive treatments for UTIs, providing a foundation for future advancements in infectious disease therapy.

Keywords: *E. coli*, UTI Treatment, Antibacterial Drugs, Structure-Activity Relationships (SARs), Multidrug Resistance (MDR).



P023- Multifunctional Macrocycles and its Bioimaging and Liquid Crystal Applications

Dhruvisha K. Patel[a] and Keshav Lalit Ameta[a*]

a Department of Applied Chemistry, School of Applied Material Sciences, Central University of Gujarat, Gandhinagar-382030, Gujarat, India.

klameta@cug.ac.in

Abstract: Supramolecular macrocycles, which utilize non-covalent interactions to achieve functional complexity, have emerged as versatile materials with diverse applications. In this study, we present the synthesis and characterization of a series of multifunctional macrocycles (E1–E4) based on pillar[5]arene-appended cinnamate ester linking groups. These macrocycles exhibit a stable columnar hexagonal mesophase across a wide temperature range, with enhanced thermal stability. The optical and thermal properties were investigated through polarized optical microscopy, differential scanning calorimetry, thermogravimetric analysis, and X-ray diffraction techniques. All four macrocycles display enantiotropic liquid crystalline behavior and self-assemble into a tubular structure, which remains stable below 50 °C. Furthermore, all macrocycles show blue fluorescence, enhancing their multifunctional properties. Macrocycle E4 was demonstrated as an effective staining agent for the human colorectal cancer cell line HCT116, indicating potential applications in bioimaging and cancer research. These pillar[5]arene-based supramolecular systems provide significant advantages in various fields, including materials science, bioimaging, and targeted therapeutics. This work highlights the broad potential applications of pillar[5]arene-based macrocycles in both advanced material design and biomedical fields.

P024- Phyto-Assisted Synthesis of Iron Nanoparticles using Acacia nilotica Pods and Seeds Extract: Characterization and Antimicrobial Activity

Disha khetani and Divya Gangal

Chemistry department, St. Xavier's College Ahmedabad (Autonomous)

Disha.khetani@sxca.edu.in

Abstract: Acacia seeds and pods, traditionally used in folk medicine, have garnered attention for their phytochemical richness and potential applications. This study explores the extraction of bioactive compounds from Acacia seeds and pods, followed by the synthesis of nanoparticles using these extracts. The resulting nanoparticles exhibit unique properties, making them suitable for various applications. The extracted compounds and synthesized nanoparticles demonstrate antimicrobial, and its phytochemical analysis highlighting their potential as natural alternatives in various industries. Currently, the majority of nanoscale metals are produced chemically, which might have unforeseen consequences like environmental contamination, high energy usage, and even health issues. Green synthesis, which employs plant extracts rather than synthetic chemical agents to lower metal ions, was created as a solution to these problems. Because green synthesis is less expensive, produces less pollution, and enhances the safety of the environment and human health, it is preferable to traditional chemical synthesis. An extract from the seeds and pods of Acacia nilotica was used to create iron nanoparticles (FeNP). Ultraviolet-Visible Spectroscopy and Phyto analysis and antimicrobial characterization was observed to see the FeNP. The synthesis of FeNP was confirmed by UV absorption in the 200-270 nm region. The antimicrobial activity of iron nanoparticles synthesized using Acacia nilotica seeds and pods extract was investigated, and the results showed significant efficacy against various bacterial strains, demonstrating the potential of these phyto-assisted synthesized nanoparticles as effective antimicrobial agents.

P025- Tetramethoxyresorcinearene-Based Supramolecular Probe for Sensitive and Selective Pb^{+2} Detection

Disha H. Patel[1], Hitesh M. Parekh[2]*

Department of Chemistry, Sardar Patel University, Vallabh Vidhyanagar, Gujarat, India.

Email: hitesh_parekh@spuvvn.edu

Abstract: Lead (Pb^{+2}) is a highly toxic metal ion that poses significant risks to the environment and human health, including neurotoxicity, developmental disorders, and bioaccumulation in ecosystems. Here, designed Tetramethoxy-resorcin-arene-based supramolecular derivatives TMT-AAP is a good sensor for selective Pb^{+2} detection. These materials were synthesized and further characterized by FT-IR,^{1}H-NMR,^{13}C-NMR, and ESI-MS techniques. The compound exhibits fluorescence enhancement upon selective binding with Pb^{2+} ions, demonstrating a limit of detection (LOD) of 114 nM, and a binding constant of 1.32×10^{7} M^{-1} was determined, indicating a strong affinity for Pb^{+2}. Comprehensive interference studies revealed minimal cross-reactivity with other metal ions, while pH studies confirmed the stability and efficacy of the probe under varying environmental conditions. This compound provides a sensitive and reliable tool for Pb^{+2} detection, addressing critical challenges in environmental monitoring.

Keywords: Tetramethoxy-resorcinarene, Fluorescence enhancement, Pb^{+2} Sensor

P026- Sustainable Food Production from Pineapple Waste: Microbial Biotechnology Approaches

Parihar Divan Singh, Archana George, Pranav S. Shrivastav*

**Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad-380009, India*

parihardivans@gmail.com; archanamarygeorge@gmail.com; pranav_shrivastav@yahoo.com

Abstract: Food sustainability is a major concern as most of the vegetable and fruit processing sectors generate a lot of waste. These discarded wastes, if processed through proper techniques like extraction of bioactive compounds followed by fermentation, is anticipated to have further industrial utility. Pineapple waste, a by-product of the fruit processing industry, has emerged as a promising resource for sustainable food production and industrial applications. With its abundance, ease of handling, and biodegradability, pineapple waste is being actively explored for the extraction of prebiotic oligosaccharides, bromelain enzymes, dietary fibre, and bioactive compounds such as phenolic antioxidants, while also investigating its potential for biogas production, organic acids, and ethanol. These value-added products offer numerous benefits across various industries, including food, pharmaceuticals, and bioenergy. It further caters to an economically viable solution to reduce agro-industrial waste and promote the circular economy. It offers a low-cost, renewable alternative to non-renewable resources, fostering both environmental sustainability and economic development. This work highlights the different valorisation techniques for pineapple waste, including fermentation and enzymatic extraction, and discusses the potential applications of the derived products. From a socio-economic perspective, the use of pineapple waste can replace costly raw materials in industrial processes, contributing to healthier food options and a more sustainable environment.

P027- Exploring the Potential of Lignans: A Comparative Study of lignan Extraction Techniques

Divjot Kaur Ahluwalia[1], Niketan Deshmukh[1*]

LJ School of Applied Sciences, LJ university, Ahmedabad, Gujarat, India, 382210

**deshmukhniketan@gmail.com*

Abstract: Lignans, a diverse group of plant-derived phenolic compounds, have gathered significant attention due to their promising health benefits, which include antioxidant, anti-inflammatory, antifungal, anti diabetic and potential anticancer properties. These compounds are found in various plant sources, notably flaxseed, sesame seeds, whole grains, and certain fruits and vegetables. Efficient extraction of lignans is crucial for both analytical purposes and the development of functional foods and nutraceuticals. This study compares several extraction techniques, including conventional solvent extraction (CSE), ultrasound-assisted extraction (UAE), microwave-assisted extraction (MAE), and supercritical fluid extraction (SCE), for their efficacy in recovering lignans from plant matrices. This study will discuss the principles behind each method, highlighting their advantages and limitations in terms of extraction yield, selectivity, solvent consumption, and processing time. Specifically, this study will explore how parameters such as solvent type, temperature, time, and pressure influence the extraction efficiency of each technique. Furthermore, this study will delve into the established and emerging health benefits associated with lignan consumption, discussing their mechanisms of action and potential therapeutic applications. By comparing these extraction methods and summarizing the health benefits, we aim to provide a comprehensive overview of lignans, empowering researchers and promoting the exploration of their therapeutic potential for human well-being.

Keywords: solvent extraction, ultrasound-assisted extraction, microwave-assisted extraction, supercritical fluid extraction.

P028- Recent Progress in Calix[4]pyrrole-Based Anion Receptors: Synthesis, Applications, and Innovations

Divya Telyani[1], Keyur Bhatt[1*]

[1] *Department of Chemistry, Faculty of Science, Ganpat University, Kherva-384012, Mehsana, Gujarat, India*

** kdb01@ganpatuniversity.ac.in*

Abstract: Recent developments in calix[4]pyrrole-based anion-receptor chemistry have demonstrated outstanding potential in a number of domains, including medicine, environmental remediation, and chemical sensing. The most recent developments in the synthesis and enhancement of calix[4]pyrrole compounds—known for their capacity to interact with anions—are discussed in this study. Important advancements include creating more effective and selective new receptors, learning more about how these receptors function, and coming up with novel uses for them in real-world situations. These developments not only improve our understanding of the chemistry of anion receptors but also create new avenues for the application of calix[4]pyrroles to significant scientific and industrial issues.

Keywords: Calix[4]pyrrole, Anion receptors, Chemical sensing, Environmental remediation.

P029- Exploring Aromatic Counterion-Induced Micellization in Morpholinium-Based Surface Active Ionic Liquids

Divya M. Shah[1], Ravi A. Viradiya[1], Sanjay H. Panjabi[1*]

[1]*Chemical Sciences Department, P D Patel Institute of Applied Sciences, Charotar University of Science and Technology, Changa, Gujarat, India -388421*

sanjaypanjabi_27@yahoo.co.in

Abstract: In this study, we synthesized two novel morpholinium-based surface-active ionic liquids (SAILs) with aromatic counterions: n-dodecyl-n-methylmorpholinium salicylate ([C_{12}mmor][Sal]) and n-dodecyl-n-methylmorpholinium 3-hydroxy-2-naphthoate ([C_{12}mmor][3-H-2-n]). We systematically explored their aggregation behavior in aqueous solutions using various analytical techniques, including electrical conductivity, small-angle neutron scattering (SANS), surface tension measurements, and UV-Vis spectroscopy. Our findings revealed that incorporating aromatic counterions enhances the micellization properties compared to conventional halogenated SAILs such as [C_{12}mmor][Br]. SANS analysis showed a structural transformation from prolate ellipsoidal micelles to large unilamellar vesicles when the counterion was changed from salicylate to 3-hydroxy-2-naphthoate. Thermogravimetric analysis (TGA) was employed to assess the thermal stability of the synthesized SAILs. The TGA results indicated high thermal stability for both [C12mmor][Sal] and [C12mmor][3-h-2-n], which is crucial for their potential applications in various high-temperature processes. Additionally, we observed that increasing the concentration of [C_{12}mmor][Sal] resulted in a lower aggregation number. We present comprehensive thermodynamic, micellar, and interfacial parameters, including the degree of counterion binding (β), critical micelle concentration (CMC), minimum area per molecule (A_{min}), surface excess concentration (Γ_{max}), standard Gibbs free energy of adsorption ($\Delta G_{ad}°$), aggregation number (Nagg), standard Gibbs free energy of micellization ($\Delta G_m°$), standard enthalpy of micelle formation ($\Delta H_m°$), and standard entropy of micellization ($\Delta S_m°$).

This study underscores the potential of aromatic counterions in morpholinium-based SAILs to improve micellization properties, offering new insights into the design of efficient and environmentally friendly surfactants. The results have significant implications for various applications, including catalysis, drug delivery, and materials science.

Keywords: Surface-active ionic liquids, Aromatic counterions, Micellization, Small-angle neutron scattering

P030- Efficient & Environmentally friendly Synthesis of Thiazole Derivatives and its characterisation

Mr. Haresh Dabhi, Dr. K. D. Ladva

Department of chemistry, Saurashtra university, Rajkot (360005), India h.dabhi@outlook.com

Abstract: A library of novel biological active thiazole derivatives has been synthesis by conventional method using green solvents like ethanol, 2 methyl THF. Thiazole is a good pharmacophore nucleus due to its various pharmaceutical applications. Its derivatives have a wide range of biological activities such as antioxidant, analgesic, and antimicrobial including antibacterial, antifungal, antimalarial, anticancer, antiallergic, antihypertensive, anti-inflammatory, and antipsychotic. Indeed, the thiazole is contained in more than 18 FDA-approved drugs as well as in numerous experimental drugs.

Keywords: Thiazole; conventional; biological active.

P031- Milk clotting assay for preliminary screening of Nattokinase from *Bacillus subtilis*

Grini Jain [1], Kaushal Mehta[2]*

Department of Biotechnology, LJ School of Applied Sciences, Ahmedabad, India.

kaushalmehta.ljias@ljinstitutes.edu.in

Abstract: This study explores the enzymatic activity of nattokinase, obtained from Japanese fermented food "natto" (Soybeans fermented with *Bacillus subtilis*) produced using the traditional method involving fermentation of cooked soybeans in rice straw.

Fibrin plate assay and holmstrom method are conventionally used but they have some drawbacks like high cost of performance and biosafety issues being the significant ones. Milk Clotting Assay (MCA) can be performed as an alternative to the fibrin plate method and Holmstrom method, for the characterization of the enzyme activity of nattokinase. Hence, MCA can also be used to determine the activity of nattokinase.

To identify the bacteria several preliminary tests like Gram's staining, colony characterisation and other biochemical tests. From the results *Bacillus subtilis* is identified. After which to confirm the bacteria, genetic analysis is also performed. The DNA isolation was done using boiling lysis method and PCR amplification was done to amplify 16S rRNA sequence for phylogenetic analysis.

Keywords: milk clotting assay, nattokinase, DNA isolation.

P032- Targeting Antifungal Resistance in Candidiasis: The Potential Role of Antimalarial and Anthelmintic Drugs

Ishita Mirchandani, Mandar Dilip Kulkarni*

Department of Biological Sciences, P D Patel Institute of Applied Sciences, Charotar University of Science and Technology (CHARUSAT), CHARUSAT Campus, Changa, 388421, Anand, Gujarat, India.

mirchandaniishitaa@gmail.com, mdkulkarni2601@gmail.com

Abstract: Candidiasis, caused by *Candida albicans*, presents significant challenges due to increasing antifungal resistance. This study explores the potential of repurposing FDA-approved antimalarial and anthelmintic drugs to target key fungal enzymes, Secreted Aspartic Protease (SAP) and β-1,3-Glucan Synthase (GS), pivotal in the pathogenesis of the infection. Using *in silico* docking and simulations, 18 drugs were screened, leading to the shortlisting of six drugs with high binding affinities: mefloquine, benzimidazole, artesunate, doxylamine succinate, diclofenac sodium, and miconazole nitrate. Miconazole, a known antifungal, served as a control. Subsequent in vitro assays were conducted on the most promising candidates, revealing that mefloquine exhibited significant antifungal activity, with a minimum inhibitory concentration (MIC) of 6.25 µg/ml and was effective at 3.125 µg/ml in MTT assays. These findings not only highlight mefloquine's potential as an antifungal agent but also underscore the promise of drug repurposing to expand antifungal treatment options, playing a crucial role in combating fungal infections.

Keywords: *Candida albicans*, glucan synthase, repurposing, secreted aspartic protease

P033- Synthesis of non-heavy metal zinc sulfide quantum dots by the simple chemical method: Dynamic light scattering and Photoluminescence spectroscopy studies

Divyeshbhai Y. Chaudhari[a*], Sahajkumar A. Gandhi[a], Ritu K. Shah[a], Pinkesh G. Sutariya[b], Krushna A. Baraiya[b]

[a*] *Department of Physics, Bhartiya Vidya Bhavans Shri Ishvarlal L. P. Arts-Sci. & J. Shah Comm. College, Dakor 388 225, Gujarat, India*

[b] *Department of Chemistry, Sardar Patel University, Vallabh Vidyanagar 388 120, Gujarat, India*

**Corresponding Author E-mail: divyeshchaudhari25@gmail.com*

Abstract: A simple chemical synthesis of water-soluble non-heavy metal Zinc Sulfide quantum dots (ZnS QDs) was synthesized by reacting Zinc(II) acetate dihydrate, sodium sulfide, and the thioglycolic acid used as a stabilizer. The synthesized ZnS QDs were dispersed in water, and the dynamic light scattering method was used to examine the particle size distribution, polydispersity index, conductivity, mobility, and zeta potential at room temperature. High zeta potential (106.2 mV), Low polydispersity index, and small hydrodynamic diameter indicated that ZnS QDs were well dispersed and non-aggregated in water. The optical properties of synthesized ZnS QDs were analyzed by UV–visible spectrophotometer and the Photoluminescence spectrometer. The optical band gap of ZnS QDs was 4.12 eV calculated by the Tauc plot method which is higher than bulk ZnS (3.66 eV). The Photoluminescence spectra show a visible emission of ZnS QDs upon ultraviolet excitation. The photoemissions wavelength was observed at excitation values 290 nm,300 nm, and 320 nm. The obtained emission spectra were different FWHM (Full width at half maximum) values due to surface defect states in these ZnS QDs. The Fourier-transformed infrared spectroscopy (FTIR) spectra of water-dispersed ZnS QDs confirmed the well-capping and presence of a stabilizer. Thus, these functionalized, highly stable, water-dispersed ZnS QDs are potential and favorable applicants for photoluminescent and bioimaging applications.

Keywords: ZnS QDs, Dynamic light scattering, Optical band gap, FWHM of emission spectra

P034- Exploring Catenanes: Mechanically Interlocked Molecules for Innovative Applications

Haval Chauhan, Amankumar Kansagara, Ajaysinh Vaghela, Vishakha Maheshwari

Department of Chemistry, St. Xavier's college, Navrangpura, Ahmedabad, India.

havalchauhan1@gmail.com

Abstract: Catenanes are a remarkable class of mechanically interlocked molecules (MIMs) characterized by two or more interlocked rings, resembling links in a chain. Their unique topology allows them to exhibit distinct physical and chemical properties, which have garnered significant attention in supramolecular chemistry and materials science. The synthesis of catenanes has evolved dramatically over the past fifty years, transitioning from a concept viewed with skepticism to a vibrant field of study.

Advances in synthetic techniques, particularly template-assisted methods, have enabled the efficient construction of various catenane architectures, including complex structures such as Solomon links and Borromean rings. The mechanical bond formed in catenanes provides a combination of stability and dynamic behavior that is not found in traditional covalent or supramolecular assemblies. This unique characteristic allows for reversible conformational changes under external stimuli, making catenanes promising candidates for applications in molecular machines, drug delivery systems, and responsive

materials. Furthermore, their incorporation into polymer matrices and metal-organic frameworks (MOFs) enhances their functionality, enabling the development of stimuli-responsive systems with potential uses in sensors and energy storage devices.

Despite the progress made in catenane synthesis and application, challenges remain in achieving higher complexity and yield in their production. Ongoing research aims to address these issues while exploring new avenues for utilizing catenanes in various scientific disciplines, from biology to nanotechnology. As the field continues to advance, catenanes are poised to play a pivotal role in the development of next-generation molecular devices and materials, highlighting the importance of mechanical bonding in modern chemistry.

Keywords: Catenanes, Mechanically Interlocked Molecules (MIMs), Molecular Machines, Stimuli-Responsive Materials

P035- In vitro and In vivo Antioxidant Activity of Hydro Alcoholic Extract From *Moringa oliefera, Ipomoea aquatica* and *Amaranthus viridis*

Isha Kar[1] and Niketan Deshmukh[1*]

L J School of Applied Sciences, L J University, Ahmedabad, India.

Abstract: This study investigates the antioxidant properties of three plant extracts—*Moringa oleifera, Ipomoea aquatica,* and *Amaranthus viridis*—extracted using Soxhlet and maceration methods. Soxhlet extraction method is known for its efficiency in extracting bioactive compounds and maceration is simpler method of extraction were compared for their efficacy in yielding antioxidant-rich extracts with ethanol as solvent. The in vitro antioxidant activity was assessed using the DPPH (2,2-diphenyl-1-picrylhydrazyl) assay with ascorbic acid as standard, while the in vivo activity was evaluated using *Caenorhabditis elegans* as a model organism. The ethanolic extraction of *Amranthus viridis* by soxhlet showed lesser value of IC50 among all the samples that is IC50 =37.08µg. Furthermore, all of the extracts showed dose dependent reducing power activity. In the in vivo assays, *Caenorhabditis elegans* will be exposed to these plant extracts and the lifespan, mobility and oxidative stress levels of the worms are to be assessed to evaluate the antioxidant effects. Further, in vivo studies allow for the observation of absorption, distribution, metabolism, and excretion processes, as well as interactions with complex biological systems.

Keywords: Antioxidant; DPPH; Reducing power; *Caenorhabditis elegans*

P036- Nanoparticle-Based Drug Delivery System for Cancer Therapy

Jani Amishaben Pushkarbhai

Department of Chemistry School of science, Gujarat University, Ahmedabad, India

janiamisha2001@gmail.com

Abstract: Cancer remains a leading cause of death worldwide, and conventional chemotherapy often suffers from limited efficacy and severe side effects. Nanoparticle-based drug delivery systems have emerged as a promising strategy to overcome these challenges. This abstract presents a novel nanoparticle-based drug delivery system for cancer therapy.

Our system utilizes polymeric nanoparticles loaded with the anticancer drug, doxorubicin. The nanoparticles were functionalized with targeting ligands to enhance their accumulation in cancer cells. In vitro studies demonstrated that the nanoparticles exhibited improved cellular uptake and cytotoxicity

against cancer cells compared to free doxorubicin. In vivo studies using a xenograft tumor model showed that the nanoparticles significantly inhibited tumor growth and reduced systemic toxicity. The nanoparticles also exhibited enhanced penetration into the tumor tissue, leading to improved therapeutic efficacy.

This study highlights the potential of nanoparticle-based drug delivery systems for cancer therapy. The developed system offers a promising approach for improving the efficacy and reducing the toxicity of anticancer drugs.

Keywords: Nanoparticle-based drug delivery, cancer therapy, doxorubicin, targeted therapy.

P037- Synthesis and Physico-chemical Properties of Cholesterol based Cationic Conventional Surfactants

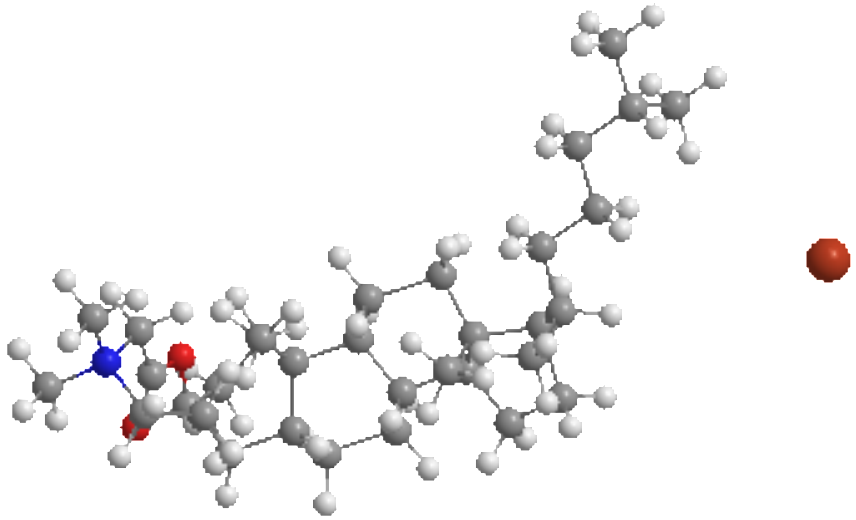
Jay Patel, Abhinav Santosh and Kushan Parikh*

Department of Chemical Science, Faculty of Applied Sciences, Parul University, Vadodara – 391 760, India

kamser2057@gmail.com

Abstract: Novel cholesterol based conventional cationic surfactants (denoted as Chol-DMG, Chol-DMPA, Chol-DMBA and Chol-DMABA) have been synthesized, via multiple steps, by using cholesterol and amino acids. The synthesized surfactants were characterized with a variety of analytical techniques, including Fourier-transform infrared spectroscopy (FTIR), Nuclear magnetic resonance (NMR) spectroscopy, ESI-Mass and Elemental Analysis. Physico-chemical properties (micellization, surface parameters, aggregation number, *etc*.) have been examined by surface tension, conductivity and fluorescence measurement. The study revealed that cholesterol-based surfactants shown better micelle formation, improved surface arrangements with comparative aggregation numbers, respectively. The work offers important new information for the use of biocompatible and environmentally friendly surfactants from natural resources to biomedical applications.

Keywords: Cholesterol, Surfactant, Micellization



P038- Nitrogen Incorporated Pitch: A Suitable Raw Material for Carbon Composite with Improved Properties

Jignesh Valand* and Nikhil Vekariya

Department of Materials Science, Sardar Patel University, Vallabh Vidyanagar, Gujarat.

jignesh2017@spuvvn.edu

Abstract: Carbon matrix composites are class of advanced composites materials known their expectational properties. Carbon matrix composites are mainly used in aerospace, nuclear, defence and space related applications due to its outstanding properties. Present study represents fabrication and characterization of carbon composites made from melamine modified pitch derived semi-coke and nitric acid modified binder pitch. Semi-coke was prepared by thermal treatment of melamine modified pitch at 700°C. Meanwhile, the binder pitch was given nitric acid treatment to enhance the char yield and promoting adhesion with semi-coke. Composites were fabricated by combining semi-coke and binder pitch in appropriate ratio through hot-press followed by carbonization (1000°C) and sintering (1400°C). Semi-coke, binder pitch and composites were characterized various techniques. FTIR revealed presence of reactive functional groups in semi-coke and binder pitch which was responsible for better bonding. SEM images have shown better wetting of semi-coke particles by binder pitch, such strong interaction was responsible to sustain the load and it correlates with compressive strength results. Sintered composites have more graphitic structure due to initialization of alignment of graphitic layers. XRD and Raman spectra of sintered composites indicated better crystallite size (La, Lc) and presence of 2D band. Composites have exhibited good thermal stability in open atmosphere and minimum dimensional change i.e. coefficient of thermal expansion. Fabricated composites have coefficients of friction in the range of 0.13-0.3 with improved wear resistance. Overall, results of composites shown enhancement in mechanical strength, thermal stability and tribological performance.

Keywords: Melamine, Interfacial bonding, Semi-coke, Sintering, Carbon composites

P039- Nanoadsorbents: A New Frontier in Environmental Remediation

Krina Patel, Purv Jethva, Twincy Raval

LJ Institute of applied sciences, Ahmedabad, Gujarat, India

krina.patel6204@gmail.com

Abstract: Nanoadsorbents are materials engineered at the nanoscale that exhibit enhanced adsorption properties due to their large surface area, high porosity, and the ability to interact with a wide range of substances. These materials are increasingly being utilized for the removal of pollutants from water, air, and industrial effluents, including heavy metals, organic contaminants, and gases. The unique properties of nanoadsorbents, such as their tunable surface chemistry and structure, allow for efficient and selective adsorption, making them ideal candidates for environmental remediation and resource recovery. This abstract explores the various types of nanoadsorbents, their synthesis methods, and the mechanisms behind their adsorption processes, as well as their potential applications and challenges in real-world scenarios.

Keywords: Nanoadsorbents, selective adsorption, environmental remediation

P040- Assessment of Plant Growth-Promoting Traits in Endophytes Isolated from Lemongrass Root

Kaushik Chandani[1], Mulani Rinkal[2], Panigrahi Jitendriya*

Department of Biotechnology, Shri Alpesh N. Patel Post Graduate Institute of Science & Research, Anand, Gujarat

Jitenp2001@gmail.com

Abstract: Endophytes are microorganisms that live within the tissues of plants, such as leaves, stems, and roots, without harming the host. These microorganisms form various types of relationships with the plants, including symbiotic, mutualistic, and sometimes partially pathogenic interactions. It is estimated that there are around one million endophytic species in the plant kingdom. These organisms play a crucial role in enhancing the growth and health of their host plants, often improving both the quality and quantity of plant development. Endophytes can include a wide range of microorganisms, such as bacteria, fungi, mycoplasma, and actinomycetes. In our study, a total of 10 isolates were obtained from the roots of lemongrass, including 5 fungal strains (coded CKF, CKG, CKH, CKI, and CKJ) and 5 bacterial strains (coded CKA, CKB, CKC, CKD, and CKE). These isolates were identified based on their morphological and biochemical characteristics. Among the fungal isolates, CKF was identified as Aspergillus, CKG as Rhizopus, and CKJ as Penicillium. The remaining fungal isolates could not be identified based on morphology alone. As for the bacterial isolates, CKD was identified as actinomycetes, CKC as Bacillus, and CKE as Rhizobium, based on morphological features and Gram staining. The identification of the remaining fungal and bacterial isolates will be confirmed through molecular analysis. Additionally, we will be analysing the plant growth-promoting rhizobacteria (PGPR) traits of these isolates, including their ability to solubilize phosphate, siderophore, and synthesize indole-3-acetic acid (IAA), which will enhance the plant physiology and production work as biofertilizer and biocontrol agent.

Keywords: Biofertilizer, Endophytes, Lemongrass, Plant Growth-Promoting Traits

P041- Exploring the Intersection of MOFs and Biomedical Science

Modi Kinjal

Abstract: Metal-organic frameworks (MOFs) are an interesting and useful class of coordination polymers constructed from metal ion/cluster nodes and functional organic ligands through coordination bonds. They have attracted extensive research interest during the past decades. Due to the unique features of diverse compositions, facile synthesis, easy surface functionalization, high surface areas, adjustable porosity, and tunable biocompatibility, MOFs have been widely used in hydrogen/methane storage, catalysis, biological imaging and sensing, drug delivery, desalination, gas separation, magnetic and electronic devices, nonlinear optics, water vapor capture, etc. Notably, with the rapid development of synthetic methods and surface functionalization strategies, smart MOF-based composites with advanced bio-related properties have been designed and fabricated to meet the growing demands of MOF materials for biomedical applications. This work outlines MOFs' prospects and challenges in MOF-based biomedical materials.

P042- **Application of Fe_3O_4@MCC Nanoparticles as a Heterogeneous Catalyst for Sustainable Multicomponent Synthesis of 2,3'-Biindoles**

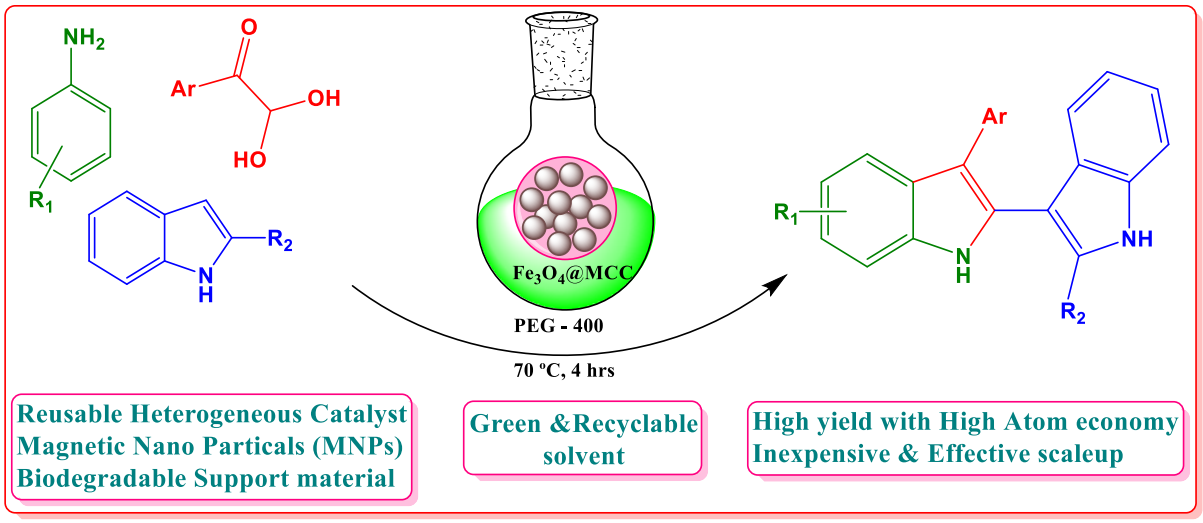
Khushbu Prajapati[a], Kinjal jani[a], Ajay U. Pandya[a], Pranav S. Shrivastav[a*]

[a]*Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad-380009, Gujarat, INDIA.*

pranavs@gujaratuniversity.ac.in

Abstract: Developing innovative methods for synthesizing unique 2,3'-biindole derivatives is crucial for the progression of drug and material discovery. The use of transition-metal-catalyzed coupling improves the efficiency and structural diversity in the synthesis of biindoles. Among these methods, heterogeneous catalysis, particularly using Fe_3O_4 nanocatalyst supported by microcrystalline cellulose (MCC), is promising for green chemistry applications. In the present work, sixteen 2,3'-biindole derivatives were prepared using Fe_3O_4@MCC nano catalyst demonstrated enhanced performance, cost-effectiveness, and reusability. Their magnetic properties allow for easy separation, simplifying purification processes and enhancing overall efficiency (78-93 %) of the reactions. This contributes to sustainable chemical practices and offers practical benefits in various industrial applications. This environmentally friendly method boasts several advantages and demonstrates excellent green chemistry metrics, including process mass intensity, environmental impact factor, atom economy, and reaction mass efficiency, atom economy, carbon efficiency, chemical yield and optimum efficiency.

Keywords: 2,3'-Biindole, Multicomponent reaction, Magnetic nano particles, Microcrystalline cellulose, PEG – 400, Green chemistry metrics.



P043- From Farm to Polymer: Sustainable Biopolymer Development from Agricultural Byproducts

Komal Parmar; Shailesh Vanshiya; Dilip V. Vasava*

Department Of Chemistry, School of Sciences, Gujarat University, Ahmedabad, India-380009

dvvasava@gujaratuniversity.ac.in

Abstract: The depletion of natural resources and increasing environmental concerns have sparked a heightened interest in finding new methods to create eco-friendly materials. These wastes can be repurposed as secondary raw materials to create value-added products as agricultural waste is a primary source of starting materials used in producing bio-based plastics, plasticizers, and antioxidant additives. Utilizing natural agricultural wastes is essential for developing sustainable biopolymer-based composites for lightweight applications. A biopolymer is a naturally occurring polymer produced by living organisms, consisting of repeating units like proteins and polysaccharides, they are biodegradable and environmentally friendly. Biopolymers derived from food waste are biodegradable, bio-functional, stable, compatible with biological systems, and non-toxic. The recycled products would find applications in medicine, food industries, biosensors, agriculture, wound healing, biomedical applications, water treatment chemicals, cosmetics, pharmaceuticals, and even clothing fabrics.

Keywords: biopolymer, agricultural waste, cellulose, starch.

P044- Effective photocatalytic degradation of water pollutants by metal oxides

Kashish Lohiya, Megha Bharti, Namrata Maurya, Dr. Pranav Trivedi

Department of Chemistry, St. Xavier College (Autonomous) Ahmedabad 380009

Abstract: Nanoparticles are the fascinating area of study in chemistry and material science with a wide range of applications in medicine, water purification, pollution control, agriculture, etc. Especially in case of water pollution, textile wastewater contains a complex mix of chemicals and dyes, including carcinogenic and mutagenic disperse dyes, contributing 20% of global water pollution. Around 50,000 tons of dyes are discharged annually, causing significant environmental contamination. Advanced oxidation processes (AOPs), especially photocatalytic degradation (PD) using nanophotocatalysts, have emerged as effective alternatives to traditional methods like absorption, which merely transfer pollutants. Photolysis can degrade 50-80% of micropollutants, with 70-80% of studies focusing on ZnO/TiO_2 as photocatalysts for wastewater treatment. However, these photocatalysts show limited efficiency, emphasizing the need for improving ZnO nanoparticle (NP) synthesis to enhance dye degradation. Reviews highlight that photodegradation efficiency is highest at low dye concentrations, specific pH levels, and optimized parameters such as surface area, photocatalyst quantity, and appropriate photoirradiation. Plant-extract-synthesized ZnO NPs show promise for improved dye degradation under these conditions.

Zinc Oxide (ZnO) nanoparticle have attracted significant interest because of its high surface area, antibacterial and antifungal properties; it's biocompatibility and cost effectiveness. Future direction of ZnO nanoparticle: - designing ZnO based nanocarriers for targeted drug delivery, exploration of novel biological agents and waste material for zinc oxide synthesis. Use of doped ZnO has shown tremendous increase in efficiency of photocatalytic degradation.

P045- Nature-Inspired Polymers: Sustainable Solutions for Eco-friendly Applications and Advanced Characterization

Mahera Mitesh; Rutvik Patel; Dilip V Vasava*

Department of Chemistry, School of Science, Gujarat University, Ahmedabad-380009, Gujarat, India

dvvasava@gujaratuniversity.ac.in

Abstract: Natural polymers, derived from renewable biological sources like plants, animals, and microorganisms, include materials such as cellulose, starch, chitin, and proteins. These polymers possess unique properties, such as biodegradability, biocompatibility, and low toxicity, making them attractive alternatives to synthetic polymers. Unlike petroleum-based synthetic plastics, which contribute significantly to environmental pollution, natural polymers are eco-friendly and sustainable. Their abundance, ease of extraction, and ability to be modified make them ideal for various applications across industries. In food packaging, natural polymers like starch and cellulose are used to produce biodegradable films and containers, reducing plastic waste. In the biomedical field, proteins like collagen are employed in tissue engineering and drug delivery systems due to their biocompatibility. Moreover, these polymers are gaining traction in pharmaceuticals for controlled drug release and in agriculture for eco-friendly pesticides and fertilizers. Their biodegradability ensures that they naturally break down, unlike synthetic plastics, which persist for centuries and contribute to microplastic pollution. To optimize natural polymers for specific applications, various characterization techniques are employed. Fourier-transform infrared spectroscopy (FTIR) helps identify functional groups, nuclear magnetic resonance (NMR) provides insight into molecular structures, and scanning electron microscopy (SEM) reveals surface morphology and mechanical properties.

Keyword: Natural polymers, biodegradability, food packaging

P046- Transforming Agricultural Waste into Wealth: A Sustainable Approach

Maitri Shah[1]; Shailesh Vanshiya[2]*; Dilip V Vasava[3]*

Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad - 380009, Gujarat, India.

dvvasava@gujaratuniversity.ac.in

Abstract: The extensive use of synthetic petroleum-based products in food packaging has led to significant environmental pollution, causing ecological imbalances and health hazards. This has created a critical need to develop biodegradable polymers and polymer-based films that can maintain the stability of packaged materials while addressing the limitations of synthetic petroleum-based packaging systems. Bioplastic derived from plant-based agricultural waste residues and food processing by-products such as rice husk, wheat straw, pearl millet husk tomato pomace, and many more present a sustainable alternative. These materials rich in cellulose, pectin, and starch enable the production of bioplastics with properties comparable to synthetic plastics, such as transparency, mechanical strength, texture, and color. Moreover, bioplastics offer unique advantages, including biodegradability, biocompatibility, and non-toxicity, making them highly suitable for applications in food packaging, cosmetics, agriculture, and drug delivery systems. The transition to bioplastics not only addresses environmental concerns but also promotes the sustainable utilization of agricultural waste, paving the way for a greener future.

Keywords: Biodegradability, cellulose, agriculture waste residue, bioplastic, food packaging

P047- Targeting Antifungal Resistance in Candidiasis: The Potential Role of Antimalarial and Anthelmintic Drugs

Mandar Dilip Kulkarni*, Ishita Mirchandani

Department of Biological Sciences, P D Patel Institute of Applied Sciences, Charotar University of Science and Technology (CHARUSAT), CHARUSAT Campus, Changa, 388421, Anand, Gujarat, India.

mdkulkarni2601@gmail.com

Abstract: Candidiasis, caused by *Candida albicans*, presents significant challenges due to increasing antifungal resistance. This study explores the potential of repurposing FDA-approved antimalarial and anthelmintic drugs to target key fungal enzymes, Secreted Aspartic Protease (SAP) and β-1,3-Glucan Synthase (GS), pivotal in the pathogenesis of the infection. Using *in silico* docking and simulations, 18 drugs were screened, leading to the shortlisting of six drugs with high binding affinities: mefloquine, benzimidazole, artesunate, doxylamine succinate, diclofenac sodium, and miconazole nitrate. Miconazole, a known antifungal, served as a control. Subsequent in vitro assays were conducted on the most promising candidates, revealing that mefloquine exhibited significant antifungal activity, with a minimum inhibitory concentration (MIC) of 6.25 µg/ml and was effective at 3.125 µg/ml in MTT assays. These findings not only highlight mefloquine's potential as an antifungal agent but also underscore the promise of drug repurposing to expand antifungal treatment options, playing a crucial role in combating fungal infections.

Keywords: *Candida albicans*; glucan synthase; repurposing; secreted aspartic protease.

P048- Green Solvents: Alternatives to Conventional Solvents in Organic Reactions

Manish Pani[1], MahmadSakir Panja[2*] , Jaya Gangle[3*] , Neha Patil[4*]

Department of Chemistry, St. Xavier's College(Autonomous), Navrangpura, Ahmedabad, India

panimanish77@gmail.com

Abstract: Driven by legislation and evolving attitudes towards environmental issues, establishing green solvents for extractions, separations, formulations and reactions. Chemistry has become an increasingly important area of research. Solvents are important in most industrial and domestic applications. The impact of solvent losses and emissions drives efforts to minimise them or to avoid them completely. Since the 1990s, this has become a major focus of green chemistry, giving rise to the idea of the 'green' solvent. This concept has generated a substantial chemical literature and has led to the development of so-called neoteric solvents. A critical overview of published material establishes that few new materials have yet found widespread use as solvents. The search for less-impacting solvents is inefficient if carried out without due regard, even at the research stage, to the particular circumstances under which solvents are to be used on the industrial scale. Wider sustainability questions, particularly the use of non-fossil sources of organic carbon in solvent manufacture, are more important than intrinsic 'greenness'. While solvency is universal, a universal solvent, an alkahest, is an unattainable ideal.

Keywords: Green solvents, Sustainable chemistry, Environmental impact, Solvent selection

P049- Study of Antimicrobial Activity of Indian Species

Mauli Soni*, Priyansh Shah, Rishita Pathak

Biotechnology, LJ Institute of Applied Sciences, LJ College Road, Nr. Sanad-Sarkhej Road, Makarba, Sarkhej-Okaf, Ahmedabad, India

maulisoni371@gmail.com

Abstract: Antibiotic toxicity and multi drug resistant pathogens are the two greatest challenges being faced by today's medical world. In the present study, the antimicrobial activity of Indian spices has been investigated as an alternative to antibiotics in order to tackle these dangers. In search of bioactive compound, ethanol or methanol extract of 5 Indian spices were screened for antibacterial property. The choice of spices as an alternative firstly because plants are great source of antibiotic since ancient times and secondly, the increasing acceptance of herbal medicines by general population. Methanolic and acetone extract were used to determine antibacterial properties of the species. The antibacterial activity of six common Indian spices namely chilli powder, ajwain, turmeric, ginger powder, and pipramul against bacteria Pseudomonas using disc method. The ethanol extracts of spices is used because it has high antimicrobial activities on all test organisms giving range of inhibition from 6-16mm as compare to acetone extracts of spices in same concentration. These test were performed to check if Indian species can give resistance against microbial activity (antimicrobial resistance). Species contain high amount of secondary metabolites due to these they possess high antimicrobial activity and are used for medicinal purpose.

Keywords: Antimicrobial properties, spice extract, disc method, resistant pathogen.

Reference: Abhishek, S. 2011. Antimicrobial and phytochemical analysis of common Indian spices against food borne pathogens. Adv Bio Tech.11(5): 22-27.

P050- Cu-Ni-Pd nanoparticles encapsulated in PAMAM Dendrimer: A Potential Catalyst for Heck C-C Coupling Reaction

Meenu Joshi* Uma Sharma

School of Studies in Chemistry and Biochemistry, Vikram University, Ujjain – 456010, India

meenujoshi858@gmail.com

Abstract: PAMAM encapsulated Cu-Ni-Pd trimetallic nanoparticle catalyst synthesized by co-complexation method and characterized by XRD, SEM and EDX techniques. The PAMAM encapsulated Cu-Ni-Pd nanoparticles shows high catalytic efficiency in Heck carbon–carbon coupling reactions of aromatic iodides and chlorides with acrylonitrile and methyl acrylate. The highest catalytic activity was observed at MeOH/water ratio of 3:1 while using K_2CO_3 as a base. The conversion of Chlorobenzaldehyde into Methyl 3-(4-formylphenyl) acrylate has yield 98% for less than 10 minutes of reaction time. The catalyst shows high recyclability upto eight runs and easily separated from the reaction medium by filtration. PAMAM supported Cu-Ni-Pd nanoparticles catalysts were found to be promising, simple in preparation and stable for the Heck cross-coupling at mild temperature.

Keywords Heck; Trimetallic nanoparticles; Dendrimer; supported catalysts; C-C coupling.

P051- Exploring Quinoline-Based Hybrid Molecules for Enhanced Malaria Therapy: Challenges and Opportunities

Meet Bhavsar, Rutvik Patel, Dilip V Vasava*

Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad - 380009, Gujarat, India

dvvasava@gujaratuniversity.ac.in

Abstract: The treatment of malaria with quinoline-based compounds, such as chloroquine and quinine, has been significantly challenged by the emergence of drug resistance. This resistance has prompted the use of combination therapies, where quinolines are paired with other antimalarial agents, such as artemisinin, to enhance therapeutic outcomes. However, drug-drug interactions (DDIs) between these agents limit the effectiveness and safety of these combinations. To overcome these limitations, researchers have focused on the development of hybrid compounds, which are designed by chemically linking quinoline-based structures with other bioactive molecules. These hybrids aim to combine the therapeutic properties of both parent compounds into a single molecule, potentially enhancing antimalarial activity while reducing the risk of resistance and minimizing DDIs. Hybridization strategies include linking quinoline with artemisinin derivatives or other heterocyclic compounds, such as triazoles, to leverage complementary mechanisms of action. These hybrid compounds show promise in improving pharmacokinetics, prolonging drug activity, and reducing toxicity. This review explores the current advancements in quinoline-based hybrid compounds for malaria treatment, emphasizing their potential to overcome resistance and DDIs, and highlights ongoing challenges and future directions for their development.

Keywords: Malaria treatment, Drug resistance, Drug-drug interactions (DDIs), Drug efficacy

P052- Innovative Smart Polymers for the Futuristic Concept

Mehul Paramar, Rutvik Patel, Dilip V Vasava*

Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad - 380009, Gujarat, India

dvvasava@gujaratuniversity.ac.in

Abstract: Smart polymer, also known as intelligent polymer, respond to stimuli or other environments change and activating their specific functions accordingly. These stimuli may include pH levels, temperature variations, stress, electric and magnetic fields, among others. Smart polymeric glasses, smart polymer hydrogels, and other similar materials fall under this category. Smart polymers and materials can be processed through techniques such as polymerization, melt-compounding, solution mixing, and electrospinning. They exhibit extended lifespan, eco-friendliness, high durability, and sustainability. Another remarkable attribution is their capacity to remember their original shape. The Characterization can be achieved through methods including FTIR, NMR, DSC, SEM, AFM, and zeta potential measurement. Smart polymers, in particular constitute an exceptionally intriguing area for both scientific and industrial research overview because smart polymers find applications in fields such as 3D printing, medicine, military technology, drug delivery and many more.

Keywords: Smart polymer, Smart polymer Hydrogels, Electric and magnetic field , Eco -friendliness , Durability

P053- Cyclotriaguaicyclene as a Scaffold for Advanced Liquid Crystal and Self-Assembled Supramolecular Materials

Meet K. Panchal[1], Hitesh M. Parekh[2]*

Department of Chemistry, Sardar Patel University, Vallabh Vidhyanagar, Gujarat, India.

hitesh_parekh@spuvvn.edu

Abstract: Nowadays, Researchers are increasingly focusing on developing light-emitting liquid crystalline compounds derived from supramolecular materials. Significant research has been focused on the design of fluorescent columnar liquid crystalline compounds with a higher temperature range of mesophase, thermal stability, and optical properties. These properties are crucial for the fabrication of various electronic devices, including organic light-emitting diodes (OLEDs), light-emitting diodes (LEDs), and optical storage devices. One such advanced tri-substituted supramolecular material was synthesized by transforming cyclotriveratrylene into cyclotriguaiacyclene, followed by an esterification reaction incorporating fluorescein units with side arms. These materials were obtained in high yields and thoroughly characterized using FT-IR, ^{1}H-NMR, ^{13}C-NMR, and MALDI-TOF techniques. All four luminescent compounds demonstrated a columnar hexagonal mesophase under both heating and cooling conditions. Notably, materials containing hexadecyloxy and octadecyloxy tail groups exhibited liquid crystalline behavior at room temperature, confirming the presence of a mesophase even in ambient conditions. Thermal properties and optical textures were analyzed using DSC and POM studies, while the molecular packing arrangements in the mesophase state were investigated using high-temperature XRD. The CTG core, with its highly fluorescent nature and columnar hexagonal self-assembly, is ideal for device applications due to its superior thermal stability. The photophysical and computational study provides the importance of the optical and electronic nature of the compounds.

Keywords: Liquid crystal, Cyclotriguaiacyclene, Fluorescent, Self-assembly.

P054- Cellulose-based film as a replacement of aluminum foil-Sustainable and Renewable

Monika Patel; Rutvik Patel; Dilip V Vasava*

Department of Chemistry, School of Science, Gujarat University, Ahmedabad-380009, Gujarat, India

dvvasava@gujaratuniversity.ac.in

Abstract: Plastic was created in 1907 by Leo Baekeland. Previously, plastic was the most common material. Plastic is used most frequently in daily life. Because to its inexpensive manufacturing costs, ease of molding into a variety of shapes, lightweight, and corrosion resistance. The environmental buildup of plastic items and particles, which can be detrimental to ecosystems, wildlife and people. Biodegradable polymers were introduced by Maurice Lemoigne in 1980. Biodegradable polymers are substances made to break down naturally through biological processes. It is eco-friendly. Application of biodegradable polymers is biomedical, nanotechnology, packaging, agriculture, etc.

Keywords: Biodegradable polymer, renewable resources, environment friendly, sustainability

P055- Inspired by Innovation: Smart Dyes and Their Transformative Role in Textiles and Beyond"

Mira Dhapa, Rutvik Patel; Dilip V Vasava*

Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad - 380009, Gujarat, India

dvvasava@gujaratuniversity.ac.in

Abstract: The future of various industries, including textiles, is increasingly inspired by functional and AI-based smart products. The textile industry, which has long relied on traditional dyes for coloration, is now embracing smart dyes to meet the evolving demands of consumers and technological advancements. While functional dyes like UV-protective, antimicrobial, and moth-repellent dyes add specific functional properties to textiles, it is the realm of smart dyes that truly brings innovation to the forefront. These dyes undergo reversible color changes in response to external stimuli, such as light, temperature, or electric fields, giving textiles dynamic, adaptive qualities. Smart dyes including photochromic, thermochromic, electrochromic, and solvatochromic types are inspiring the creation of smart textiles that can adjust to their environment. These dyes enable textiles to change colour based on factors like temperature or light, allowing for applications such as thermoregulation and camouflage. Beyond textiles, smart dyes are making waves in a variety of industries, including automobiles, robotics, medicine, medical textiles, smart packaging, fashion, and even surgery, enabling a new generation of multifunctional, responsive materials. To fully harness the potential of smart dyes, advanced characterization techniques are crucial. UV-Visible Spectroscopy is used to study reversible colour changes, Fourier Transform Infrared Spectroscopy (FTIR) identifies chemical structures, and Scanning Electron Microscopy (SEM) provides insights into surface morphology. Additionally, Thermogravimetric Analysis (TGA) and Differential Scanning Calorimetry (DSC) evaluate thermal stability, while X-ray Diffraction (XRD) assesses the structural properties of dye molecules.

Keywords: Smart dye, Functional dye, robotics

P056- Revolutionizing Nitrogen Fertilization with Nanotechnology

Parmar Dixit Suresh bhai and Parmar Bhargav Baldev dash

Department of chemistry, School of Science, Gujarat University, Ahmedabad, India.

itsmedixit18@gmail.com, ljias1parmarbhargavkumar13@gmail.com

Abstract: This work highlights the potential of Nano fertilizers to enhance agricultural sustainability by improving nitrogen efficiency, reducing environmental impact, and boosting crop yields. Nano fertilizers, utilizing nanotechnology, offer a more efficient and sustainable approach to nitrogen (N) fertilization. By encapsulating nitrogen in nanoparticles, this fertilizers provide slow, controlled realese improving nutrient uptake, reducing leaching and minimising environmental pollution. Nanofertilizers enhance crop yields, lower fertilizer costs, and decrease nitrogen loss, offering a greener, more sustainable solution for agriculture and addressing challenges related to food security and environmental impact.

P057- Advanced Nanocomposites for Environmental Remediation: A Study on Spinel Ferrite/MWCNTs.

Misamraza Charaniya, Nisarg Visani, Arpit Parmar, Akshay Thaker

Master of Science (analytical chemistry & organic chemistry), semester-2, St. Xavier's College (Autonomous), Ahmedabad, Gujarat, India.

arpitparmar219@gmail.com

Abstract: Water pollution, particularly from organic dyes like Congo Red, has become a significant environmental concern. These pollutants, common in industries such as textiles, are toxic and persistent in the environment, posing risks to both ecosystems and human health. Therefore, effective methods for water purification are urgently needed, with photocatalysis emerging as a promising solution. This study focuses on the synthesis and photocatalytic properties of $CuFe_2O_4$/MWCNT nanocomposites, combining copper ferrite ($CuFe_2O_4$) with multi-walled carbon nanotubes (MWCNTs) to enhance photocatalytic degradation. The materials were synthesized via the sol-gel combustion method and characterized using FT-IR and UV- Vis spectroscopy, confirming the successful integration of $CuFe_2O_4$ onto functionalized MWCNTs. The photocatalytic performance of the $CuFe_2O_4$/MWCNT nanocomposites was evaluated by testing their ability to degrade Congo Red dye under sunlight. The results showed a 95% degradation efficiency, significantly higher than that of individual components. This enhancement is due to the synergistic effects of $CuFe_2O_4$ and MWCNTs, where MWCNTs improve charge separation and dispersion of $CuFe_2O_4$, boosting the overall photocatalytic efficiency. These findings suggest that $CuFe_2O_4$/MWCNT nanocomposites are promising materials for wastewater treatment and pollutant degradation. Future work should focus on optimizing parameters like calcination temperature and pollutant concentration to further improve their performance.

P058- PETase: Nature's Answer to the Plastic Crisis

Neha Darji, Rutvik Patel; Dilip V Vasava*

Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad - 380009, Gujarat, India

dvvasava@gujaratuniversity.ac.in

Abstract: Plastic- a non-biodegradable polymer has proved to be a significant source for environmental pollution as it is used on a very huge scale. Thus, pollution due to plastic can cause harm to humans, wildlife and the environment in many ways. The development of enzymes capable for degrading different type of plastics is a recent need. Microbes based enzymes like esterase, cutinase and lipases have shown the ability to degrade synthetic plastic. Recently structure based and deep neural networks show desirable potential two generate polyethylene terephthalate (PET) degrading enzyme (PETase). PETase have the highest activity among known enzymes for degrading plastic. Structural biology provides insights for interactions between enzymes and plastic material at an atomic level. The degradation caused by PETase, followed by repolymerization can be sustainable approach. Characterization data for plastic degrading enzyme is necessary for understanding their enzymatic activity, mechanism of action and use in bio remediation. For this several methods including spectrometric, turbidimetric, fluorimetric, titrimetric methods, as well as high performance liquid chromatography (HPLC).

Keywords: Plastic degrading enzyme, synthetic plastic, non-biodegradable polymer, PETase.

P059- Bio-based Polymer: A Pathway to Solving the Global Plastic Crisis

Mrudang Shah; Rutvik Patel; Dilip V Vasava*

Department of Chemistry, School of Science, Gujarat University, Ahmedabad-380009, Gujarat, India

dvvasava@gujaratuniversity.ac.in

Abstract: Polymer sheets derived from natural substances as sustainable alternatives to conventional plastics. Traditional plastics, primarily made from petroleum-based sources, contribute significantly to environmental pollution and resource depletion. In contrast, natural polymers such as those obtained from plant fibers, starch, and proteins offer a biodegradable and eco-friendly solution. Additionally, the use of renewable resources in producing these sheets contributes to a circular economy. By sourcing materials from agricultural by-products or other renewable sources, we can reduce dependency on fossil fuels and support local economies. Moreover, advancements in technology are enhancing the mechanical and thermal properties of natural polymer sheets, making them competitive with traditional plastics. Research is ongoing to improve their performance, focusing on aspects like water resistance and UV stability. One key advantage of natural polymer sheets is their biodegradability. When disposed of, these materials break down naturally, reducing the accumulation of waste in landfills and oceans. By embracing these innovative materials, industries can move towards more sustainable practices, benefiting both the planet and society. Future research and development will be crucial in optimizing these materials for wider use, paving the way for a greener future. This type of polymeric film can be characterized by FTIR, NMR, DSC, SEM, AFM, and zeta potential measurement. Bio-based polymeric film, in particular constitute an exceptionally intriguing area for both scientific and industrial research overview because they find applications in fields such as 3D printing, medicine, food packaging, drug delivery and many more.

Keywords: Biodegradable, Eco-friendly, Renewable resources, Drug delivery

P060- Computational and Synthetic Approach to Benzothiazole Derivatives for Targeting VEGFR2 in Angiogenesis Inhibition

Muskan Goswami[1]; Karan Kamle[2]; Dilip V. Vasava[2*]

[1,2]Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad - 380009, Gujarat, India. dvvasava@gujaratuniversity.ac.in

Abstract: CANCER, the second most death-causing disease, occurs due to angiogenesis, new blood vessel growth, which has a vital role in the development and spreading of cancer. So, the scientific researchers have produced various types of angiogenesis inhibitors or anti-angiogenic agents that prevent or reduce the cancer growth. Sunitinib, Pazopanib, Carbozantinib, Gefitinib & Raloxifene are different FDA-approved drugs that have adverse effects in the human body. There is a much-needed discovery of the drugs that are not only safe but also target-specific with less or no toxicity. We are recently working on the RTK (Receptor-type Tyrosine Kinase) supergene family, VEGFR2 (Vascular Endothelial Growth Factor receptor), present on the surface of endothelial cells, in which heterocyclic compounds have great importance. Therefore, attempting various trials where benzothiazole derivatives are linked with PABA through a linker CAC, synthesizing our main target molecule, and further its reaction with different potent aliphatic and aromatic amines. The newly-designed series has shown computationally more binding affinity sites than the standard drugs, which have been confirmed by the Schrodinger molecular docking study.

Keywords: Angiogenesis; Benzothiazole derivatives; Molecular docking; VEGFR-2.

P061- SYNTHESIS AND CHARACTERIZATION OF BINARY CHALCOGENIDES BI_2SE_3 NANO-PARTICLES

N.T.Sailor[1], D. S. Parmar[1], N.N.Prajapati[1], H.M.Patel[2], P.B.Patel[2], H.N.Desai[2], J.M. Dhimmar[1*], B.P.Modi[1]

1 Department of Physics, Veer Narmad South Gujarat University, Surat, India.

2 C. B. Patel Computer College and J. N. M. Patel Science College, Bharthana, Surat, India.

** jitendradhimmar@yahoo.co.in*

Abstract: V-VI semiconductor chalcogenides exhibit some attractive properties that make them interesting for various applications. Hydrothermal synthesis is a popular method for creating various nanomaterials, including Bi_2Se_3 nanoparticles. It offers a relatively simple and cost-effective way to achieve precise the size and morphology of the resulting particles. Bi_2Se_3 Nano particles were prepared by hydrothermal method. The synthesized nano particles are characterized by X-ray diffraction (XRD), FE-SEM (Scanning electron microscope), energy dispersive X-ray analysis (EDAX). The electrical characterization of Bi_2Se_3 was carried out at room temperature. The current-voltage characteristics Bi_2Se_3 pellet has identified three types of conduction mechanism: Ohmic region, TCLC (Trapped charge limited current) region, SCLC (Space charge limited current) region. Also, SCLC parameters such as trapping parameter, effective density of states in conduction band, total trap concentration, uniform distribution of localized states density are determined.

Keywords: SCLC

P062- Exploring Pyrimidine-Based Hybrid Molecules for Targeting CSF-1R in Cancer Immunotherapy

Nigam Banugariya[1]; Karan Kamle[2]; Dilip V. Vasava[2*]

[1,2]Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad - 380009, Gujarat, India.

dvvasava@gujaratuniversity.ac.in

Abstract: The gradual increase in the number of cancer cases is causing remarkable challenges. Especially the increase in breast cancer has astonished the world, as its burden is projected to be 29.8 million in 2025; this grabs researcher attention towards the discovery of potential anticancer therapeutic agents. CSF-1 (Colony-stimulating factor 1), which is also known as M-CSF (macrophage colony-stimulating factor), plays a crucial role in the growth of TAMs (tumor-associated macrophages). which leads to the depletion of T-cells. The function of T-cells is to break the TAM cells and protect the immune system. There are many drugs like Pexidartinib (Turalio), Emactuzumab, and BLZ-945 that are used as inhibitors but have some adverse effects. So, we are currently working on developing such molecules that can control the differentiation and proliferation of TAMs by binding with the CSF-1R receptor. In developing such molecules, we have found that heterocyclic compounds serve the purpose. Especially the pyrimidine derivatives possess great potential. A hybrid approach has been taken into consideration by combining pyrimidine derivatives with PABA to design our target molecules. The designed target molecules were possessing the great binding affinity computationally, which was confirmed by the Schrodinger molecular docking study.

Keywords: CSF-1R; molecular docking; Pyrimidine derivatives; TAMs;

P063- Polymeric nanodrug delivery system of Metformin-loaded Alginate for diabetes therapy – An *in vitro* study

Panth Raval, Archana George, Pranav S. Shrivastav*

Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad-380009

ravalpanth89@gmail.com ; archanamarygeorge@gmail.com; pranav_shrivastav@yahoo.com;

Abstract: Current modalities utilized for the diagnosis and treatment of diabetes still exhibit several contraints such as erratic absorption, need of elevated dosage, lack of sensitivity or specificity, drug resistance, substantial morbidity and mortality, chronic complications, and patient-to-patient variability over the course of treatment. This study concentrated on the development of metformin encapsulated alginate nanoparticle as a carrier with extended drug release properties that optimize the period for the treatment. As a Biopharmaceutics Classification System (BCS) class III drug, metformin is characterized as hydrophilic in nature with exhibiting high solubility yet poor absorption profiles. To concurrently facilitate gastrointestinal absorption and intestinal permeability, metformin was incorporated into alginate nanocapsule prepared via an ionic gelation technology. The characterization of these metformin incapsulated alginate nanoparticles employed Fourier transform infrared (FTIR) spectroscopy, dynamic light scattering (DLS), zetasizer and transmission electron microscopy (TEM). Key parameters such as the concentration of calcium chloride and sodium alginate, homogenization rate and homogenization duration redounded to the achieving desired nanoparticle formation. The drug loading and encapsulation efficiency in metformin-loaded alginate nanoparticles were 3.12 mg (the amount of metformin added in 100 mg of nanoparticles) and 92 %, respectively. The results from in vitro drug release studies exhibited enhanced efficiency and response of metformin loaded alginate nanoparticles relative to unmodified metformin.

Keywords: biodegradable polymers, nanoparticles, alginate, diabetes

P064- Fabrication and Evaluation of transdermal patch using biodegradable polymers for treatment of type 2 diabetes

Payal Vishwkarma, Archana George, Pranav S. Shrivastav*

[*]Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad-380009, India

vishwkarmap755@gmail.com; archanamarygeorge@gmail.com; pranav_shrivastav@yahoo.com

Abstract: Transdermal drug delivery system has become a major research interest to the scientists for its controlled drug release and improved patient compliance. In this mode of drug administration, the drug enters the systemic circulation after passing through multiple layers of skin. It has major advantages such as by-passing first-pass metabolism in the liver and reducing adverse systemic reactions such as gastrointestinal tract disorders. Moreover, this mode of drug administration is painless as compared to intravenous drug delivery, and hence, it is patient compliant. Biodegradable polymers have been a popular choice among researchers to improve formulations for transdermal drug delivery due to their biodegradability and biocompatibility. With this background, several formulations for transdermal patches were prepared by solvent casting method using different types of polymers of natural origin (xanthan gum, starch and its derivatives, chitosan, cellulose and its derivatives and alginate) for treatment of type 2 diabetes. The formulations were prepared by varying the ratio of polymers as well as the drug. They were assessed for their physical properties as well as swelling abilities in water and different buffer media. Results from Fourier Transform Infrared Spectroscopy indicated the interaction between drug and

polymer. The prepared patches are believed to exhibit sustained release profile of drug for diabetes therapy.

Keywords: transdermal patch; drug delivery; diabetes; biodegradable polymers

P065- Integrative Analysis of Herbal Plant-Based Compounds for Diabetes Management: Molecular Docking and Dynamics Approaches

Tauseem Shaikh[1] and Niketan Deshmukh[1*]

[1]*L J School of Applied Sciences, L J University, Ahmedabad, India.*

Abstract: Current oral medications for type 2 diabetes often target a single physiological mechanism, such as enhancing insulin sensitivity, increasing insulin secretion, or inhibiting glucose absorption or production. Despite their effectiveness, these drugs are associated with limited efficacy when used alone in advanced stages of diabetes, necessitating costly combination therapies that may lead to compounded side effects. Natural compounds, particularly those derived from traditional medicinal systems like Ayurveda, Unani, and Homeopathy, offer promising alternatives due to their reduced risk of adverse effects.

In this study, we screened 602 phytochemicals from herbal plants traditionally cited in Ayurveda, Unani, and Homeopathy for their potential as natural inhibitors against four diabetes-related protein targets: PTP1B, DPP-4, SGLT-2, and FBPase. Utilizing computer-aided drug discovery techniques, including ADMET profiling and molecular docking, we identified several promising candidates with high binding affinities and favourable pharmacokinetic profiles. While molecular dynamics (MD) simulations and MM/PBSA energy calculations remain ongoing, our molecular docking results have revealed multiple potential inhibitors for each target protein, underscoring their suitability as leads for multi-target drug development.

These findings highlight the therapeutic potential of phytochemicals from traditional medicinal systems in addressing the multifaceted pathophysiology of diabetes. Further investigations, including MD simulations and experimental validations, are recommended to advance these natural compounds toward the development of safe and effective multi-target anti-diabetic therapies.

Keywords: Molecular docking, Diabetes, Ayurveda, Unani, CADD

P066- Synthesis and characterization of cadmium incorporated tin sulfide nanoparticles

N. N. Prajapati[1], P. B. Patel[2], H. N. Desai[2], J. M. Dhimmar[1], B. P. Modi[1*]

[1](Department of Physics, Veer Narmad South Gujarat University, Udhana - Magdalla Rd, Surat, Gujarat 395007)

[2](Department of Physics, C. B. Patel Computer College and J. N. M. Patel Science College, Bharthana, Vesu, Surat, Gujarat 395017)

bpmodi@vnsgu.ac.in

Abstract: Cadmium incorporated tin sulfide [$(Cd_{0.5}Sn_{0.5})S$] nanoparticles were synthesized through hydrothermal method, offering a simple and effective route to produce nanoparticles with desirable properties. The as-synthesized nanoparticles were systematically characterized to investigate their compositional, morphological, structural and optical properties. Energy dispersive X-ray analysis, along with elemental mapping, confirmed the homogeneous distribution of cadmium (Cd), tin (Sn), and sulfur (S) within the $(Cd_{0.5}Sn_{0.5})S$ nanoparticles. Field emission scanning electron microscopy revealed uniform and interconnected (network-like) morphology. X-ray diffraction pattern was analysed, that identified a mixed-phase structure comprising SnS and CdS indicating successful synthesis of $(Cd_{0.5}Sn_{0.5})S$ nanoparticles. Ultraviolet visible spectroscopy showed significant absorption in the 350 nm to 750 nm with optical bandgap 1.68 eV, that make $(Cd_{0.5}Sn_{0.5})S$ nanoparticles attractive material for optoelectronic devices.

Keywords: Hydrothermal synthesis, $(Cd_{0.5}Sn_{0.5})S$ nanoparticles, micro-structural parameters, optical bandgap.

P067- Encapsulated nanocatalyst for sustainable development of coupling reactions

Prashant trivedi[1]; Shreyansh Mevada[2]; Dilip V Vasava[2]*

[1,2]Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad - 380009, Gujarat, India.

mailto:dvvasava@gujaratuniversity.ac.in

Abstract: Nanoparticles are found to be robust, green and sustainable nanocatalyst for the different reactions like oxidation, reduction, C-C cross coupling, A^3 coupling, KA^2 coupling, Carbon-heteroatom coupling, hydrogenation and esterification. By this various reaction, synthesized molecules can be utilize as a building block in fields like Agrochemicals, Active Pharmaceutical ingredients (API), Polymers, feedstock chemicals, material science, cosmetics, defense industry and medicinal chemistry. Moreover these molecules have common bioactivity like antifungal, antibacterial, antimicrobial, anti-diabetic, antimalarial, anticancer and also antihypertensive activity. These nanoparticles are mainly Metals and metal oxide such as Vanadium(V), Manganese (Mn), Molybdenum (Mo), Bismuth (Bi), zinc (Zn), copper (Cu), Palladium (Pd), Platinum (Pt), titanium (Ti), chromium (Cr), and tungsten (W) can be capsulated with various supports like Graphitic carbon nitrite (g-C_3N_3), multi walled carbon nanotubes (MWCNTs), Alumina (Al_2O_3), Silica (SiO_2) and many more. Robust catalyst is well characterized by several analytical techniques such as SEM, XRD, FTIR, TEM, ICP-AES, and XPS analysis. Nano catalyst is easy to be recovered and it shows recyclability up-to 5 to 7 cycles, hence the development of catalyst exhibits robust and green development.

Keywords: A^3 and KA^2, Green chemistry, Robust, Sustainability

P068- Breaking Down Microplastics: The Role of Bioremediation and Future Perspectives

Prisha Parikh, Harsh Vaghela

Department of Biotechnology, LJ Institute of Applied Science, Ahmedabad, India

parikhprisha06@gmail.com

Abstract: Microplastics are so prevalent worldwide in our ecosystems, raising a significant environmental health concern. Several bioremediation techniques are employed to break down microplastics. Large plastic litter fragmentation or direct environmental emissions are the sources of microplastics, which may impact the soil's nitrogen cycle. Human health, environmental function, and biodiversity are all at sake to remove organic pollutants such as polycyclic aromatic hydrocarbons, phthalates, and polychlorinated biphenyls, phytoremediation primarily uses microbial breakdown of organic pollutants in the rhizosphere. Microorganisms that use the rhizosphere as a carbon source are essential to the breakdown of microplastics. Pollutant-degrading microorganisms and functional genes, particularly gene clusters involved in the biodegradation of organic pollutants, are enriched in the rhizosphere. It's interesting to note that the microbial community may adapt well to pollution stress by altering its composition, functions, and structure when certain sensitive taxa are reduced. Through enzymatic activity, some microorganisms, such as bacteria and fungi, also break down microplastics. To produce radicals that further deteriorate plastic, they first oxidize aromatic and non-aromatic polymers. The high expenses and difficulties in obtaining broad scalability restrict the use of microorganisms for microplastic breakdown. Understanding the relationship between microplastics and microbes can be aided by the application of many technologies, such as genomics, proteomics, and nanotechnology. By anticipating enzyme composition and enhancing metabolic pathways, artificial intelligence (AI) may also be used to create and optimize genetically modified organisms (GMOs) for improved microplastic breakdown. To increase biodegradation's efficiency and make it feasible on a broader scale for environmental protection, further research and development are required.

Keywords: Microplastic; Phytoremediation; Rhizosphere; Nanotechnology; Genetically Modified Organism (GMO)

P069- Synthesis And Application of Nano Fertilizers.

Rathod Jyotiben Mahendrabhai

Department Of Chemistry, School of Science, Gujarat University, Ahmedabad, India.

rathodjyoti19902@gmail.com

Abstract: Excessive use of synthetic fertilizers cause several disadvantages including; economic burdens, increasing soil, water and atmospheric pollution, nutrient runoff, groundwater contamination, toxic salt build up, root burn etc. Nano Fertilizers have shown great potential for their sustainable uses in soil fertility, crop production and with minimum or no environmental tradeoffs. Nano fertilizers are of submicroscopic sizes, have large surface area to volume ratio, can have nutrient encapsulation, and greater mobility hence they may increase plant nutrient access and crop yield. Nano Fertilizers have the potential to reduce input costs for farmers, and save the government on subsidy bills and urea imports. However, long term effects on the nutritional quality, bio safety, efficacy and reliability requires further research and thorough audit of field trials to establish the effectiveness and safety of using nano fertilizers on crops. Due to these properties nano fertilizers are regarded as deliverable smart system of nutrient. However the problems in the agroecosystem are broader than existing developments. This research paper provides an overview of various uses of nano technology in agriculture.

P070- A Holistic approach to bioplastic production: Isolation, Optimization, and Characterization of PHB producing bacteria from oil contaminated soil.

Jaiswal Priyanka and Akash Patel.

Department of Microbiology, LJ University of applied science, Ahmedabad, India.

khushi2000@gmail.com

Abstract: Plastic pollution is a growing environmental concern, and biodegradable bioplastics like polyhydroxybutyrate (PHB) offer a promising solution. In this study, bacteria capable of producing PHB were isolated from oil-contaminated soil. The isolates were screened using minimal salts medium (MSM) enriched with cost-effective carbon sources. Among the isolates, strains 2,3 and 5 showed significant potential for PHB production.

To enhance production, key parameters such as carbon source concentration, pH, and incubation time were optimized through the one-variable-at-a-time approach. Additionally, Response Surface Methodology (RSM) was used to fine-tune the fermentation process. PHB extraction was carried out using the Sodium hypochlorite-chloroform method, and its presence was confirmed through staining, UV fluorescence, and other analytical techniques.

The study found that carbon sources like whey supported bacterial growth and PHB production, but the yield remained inconsistent. Optimization efforts improved production to some extent, but further research is needed to maximize yield and scale up the process for industrial use. This work highlights the potential of microbial bioplastics as a sustainable alternative to conventional plastics.

Keywords: Bioplastics, Oil-contaminated soil, Optimization, Sustainable materials.

P071- β-cyclodextrin surface functionalized ZnS Nanoparticle for fluorescence biosensing of tryptophan

Ritu Shah[1], Sahaj Gandhi[1*], Pinkesh Sutariya[2], Krsuhna Baraiya[2], Divyeshbhai Chaudhari[1]

[1]Department of Physics, Bhartiya Vidya Bhavan's Shri Ishvarlal L. P. Arts Science & J. Shah Commerce College (Affiliated to Sardar Patel University), Dakor, 388225, Gujarat, India

[2]Department of Chemistry, Sardar Patel University, Vallabh Vidyanagar, 388120, Gujarat, India

**sahajg7@gmail.com*

Abstract: Zinc Sulfide nanoparticles (ZnS NPs) have great potential as biosensors or biomarkers due to their tunable optical properties. In this work, the surface functionality of capped ZnS NPs with biomolecule β-cyclodextrin was explored for bio-sensing application. The basic characterized such as UV–Vis spectroscopy, X-ray Diffraction (XRD), Dynamic Light Scattering (DLS), Zeta potential, Photoluminescence (PL), and Fourier Transform Infrared spectrophotometer (FTIR) were performed. The interaction between the ZnS-based complex with amino acids at 1:1 ratio was analyzed through UV–Vis and PL spectroscopy. In UV analysis, the absorbance peak of the ZnS complex shows a 6 nm red shift in the presence of DL-Tryptophan. The ZnS complex enhances the PL emission as a fluorescent sensor for detecting DL-tryptophan. The results showed that the fluorescence selective sensing of DL-tryptophan may be due to the intramolecular charge transfer (ICT) process.

Keywords: Zinc sulfide, β-cyclodextrin, sensing, tryptophan

P072- **Aminoanthraquinone Resorcin[4]arene-Based Receptors: Fluorescent Detection of Fe^{3+} in Real Samples with Logic Gate Applications**

Ronak S. Patel[1], Mohan N. Patel[1], Hitesh M. Parekh[1*]

[1] *Department of Chemistry, Sardar Patel University, Vallabh Vidyanagar-388120, Gujarat. India.*

**hitesh_parekh@spuvvn.edu*

Abstract: Resorcin[4]arene based fluorescent sensors (RES-AAQ) functionalized with eight anthraquinone groups were developed for precise Fe^{3+} ion detection. Fe^{3+} plays a critical role in biological, environmental, and diagnostic applications, necessitating sensitive and selective sensing methods. Sensors were characterized using FT-IR, ^{1}H-NMR, ^{13}C-NMR, and ESI–MS, revealing strong interactions with Fe^{3+}. Fluorescence quenching via PET was systematically analyzed using Stern-Volmer plots, showing exceptional detection limits (10.47–10.51 nM) and high binding constants (up to 9.07×10^{9} M^{-1}). Molecular docking, DFT studies, and ESI-MS provided detailed binding insights. The sensors demonstrated real-world applicability in human serum and tap water, overcoming limitations of traditional Fe^{3+} detection methods. A combinatorial logic gate further elucidated their operational mechanism.

Keywords: Fluorescence studies, Host-guest interaction, Real Sample analysis, Logic gate application

P073- **Selective and Synergetic Extraction of Lithium ions using Hydrophobic Deep Eutectic solvent.**

Samir Bhavsar [a], Dushyantsingh Rajpurohit [a1], and Pranav S. Srivastav [a*].

[a]*; Department of Chemistry, School of Science, Gujarat University, Navrangpura, Ahmedabad 380009, Gujarat, India.*

pranavs@gujaratuniversity.ac.in

Abstract: The omnipresent resource like seawater contains almost 230 billion tons of Lithium reserves in form of chloride which has attracted the attention globally. However, its separation and purification directly remain a challenge because of colossal concentration of interfering ions failing the traditional process of precipitation of lithium in form of Li_2CO_3. Passive technologies are widely adapted but are captivated by weak extraction ability making the process dreary and inefficient. Hydrophobic Deep Eutectic Solvents (H-DES) has recently gained much attention because of their green properties and ability to extract metal ions from aqueous medium rapidly with minimum loss and recyclable characteristics. Herein, we have used two natural biodegradable compounds i.e.; Hinokitiol (4-isopropryl tropolone) and Oleic Acid [(9Z)-Octadec-9-enoic acid] for synthesizing deep eutectic solvent (DES) which has strong affinity towards lithium ions from dilute solutions. The melting point and density of free-flowing DES was determined 260 K and 0.942 ρ/g.cm^3 respectively. The %loading capacity of DES was determined circa ~ 100% in solid-liquid extraction (SLE) whereas, in liquid-liquid extraction (LLE) around ~ 75% extraction was achieved successfully in 1000 ppm Li-solution. Using co-extractant such as TOPO/TPP, the extraction efficiency in LLE of DES was achieved ~ 87% and in competitive metal ions studies ~ 72% of extraction was determined. Finally, DES was applied to sea-brine model where it was selectively up taking Li^+ ion excluding other interfering ions representing its potential application in large scale recovery of the metal ion.

P074- Water as a Green Solvent in Organic Synthesis

Santh Kuldeep Das, Maitri Patel, Priya Patel

Department of chemistry, St. Xavier's college, Master of Science

kuldeepvaishnav606@gmail.com

Abstract: As a result of environmental consciousness in the chemical industry, greater emphasis has been placed on green and environmentally friendly practices in the synthesis of chemicals. This also includes a new approach of employing less toxic solvents that follow the principles of green chemistry. Since the days of large consumption in chemical and pharmaceutical manufacturing, solvents have remained as one of the most vital contributors to environmental impact and human health. A prime substitute for traditional harmful solvents are green solvents, such as water.

Being a solvent, water has the advantage of making chemical synthesis with water free from environmentally toxic chemicals and suitable for 'green' synthesis processes. Aquous solutions make the reaction softer than those which require a less amount of energy and, thus can easily recycle their catalysts by decreasing the overall production cost. Water is playing a significant role in chemical, organic, nanomaterial, organometallic, and polymerization processes, mainly for environmental reasons. Water is seen as a green solvent in all of these above processes, in the place of the traditional conventional solvents which are expensive and environmentally hazardous.

Water plays a key role in promoting greener and more sustainable chemical reactions as applied in several synthetic processes. These topics also explore the application of water as a solvent in the syntheses of organic, nanomaterials, organometallic compounds, and polymerization, in which it increases reaction efficiency, minimizing ecological and health risks involved in using traditional solvents. Through its incorporation into chemical industry as a solvent, this industry has a good potential for reducing environmental footprint in achieving sustainability in chemical production

Keywords:1. Environmental sustainability; 2. Eco-friendly processes; 3. Toxic solvent reduction; 4. organic synthesis

P075- Green Synthesis of Chitosan and Cinnamaldehyde Schiff Base and it's Diversified Biological Application

Shakirali Shabbirali Manusiya, Kachhi Arif Karimbhai, Aghara Deep Mukeshbhai, Dalwadi Om Mukeshbhai

Sant Xavier's College (Autonomous), Ahmedabad.

shakiralisvm@gmail.com

Abstract: Chitosan is a biopolymer extracted from the shell chitin of crustaceans with special characteristics such as biocompatibility, biodegradability, and antibacterial activity. Schiff bases are compounds that combine an imine or azomethine group with a carbon-nitrogen double bond to form an organic molecule. Cinnamaldehyde Schiff bases are commonly employed as flavouring ingredients and can kill bacteria, fungi, and viruses. Metal complexes of chitosan and Schiff bases are synthesised by reacting the biopolymer or Schiff base with the metal ion in an appropriate solvent. Metal complexes have different characteristics depending on the metal ion, the ligand, and the production technique**.**

P076- β cyclodextrin-EDTA polymer in host–guest recognition of glucose monitoring using boronic acid-substituted azobenzene

Sarika kanungo, Anshumala Vani & Uma Sharma

School of Studies in Chemistry & Biochemistry, Vikram University Ujjain.

Abstract: Diabetes mellitus is a chronic metabolic disorder caused by the dysfunction of insulin secretion or insulin resistance leading to abnormal glucose level in the blood and potentially severe health complications. Devices for continuous glucose monitoring are currently a major focus of research in the area of diabetes management, it is desirable to develop a new glucose sensing system with low cost, ease of use, high stability and good portability. Since maintaining normal blood glucose level is recommended. In order to develop colorimetric sugar sensors we have used phenyl boronic acid conjugated with Allura red dye containing azobenzene group which gives orange coloured complex. On addition of aqueous solution of sugar significant red colour appears. The B-N dative bond causes a significant red shift of the absorption maximum, and it is cleaved upon sugar addition which results in a significant colour change. The introduction of β cyclodextrin EDTA polymer in glucose monitoring system due to their high supramolecular recognition capabilities not only impacts the sensitivity but also improves biocompatibility and stability. So we have performed the experiment with or without β cyclodextrin–EDTA polymer with the variation of sugar solution and results shows that β cyclodextrin-EDTA create high affinity with glucose and found to be very effective. This is an ecofriendly method.

Keywords: Azobenzene, boronic acid, glucose sensor

P077- Exploring Nanoparticle-Based Alternatives for Food Preservation: A Study on Spoiled Vegetables

Shreya Suresh and Viral Shukla

Department of Microbiology, LJ School of Applied Sciences, LJ University, Ahmedabad–382210, Gujarat, India

viral3007@gmail.com

Abstract: Food spoilage caused by pathogenic bacteria is a significant concern for food safety, particularly in vegetables and fruits. Existing spoilage control methods, such as the use of chemical preservatives, have raised health and environmental concerns. This study aims to identify pathogenic bacteria from spoiled vegetables and evaluate the antimicrobial efficacy of herbal extract-based nanoparticles and metal nanoparticles as alternatives for food preservation. Bacteria were isolated from spoiled vegetables (tomatoes, eggplants, carrots, potatoes, and onions) using serial dilution and plating methods. A total of 12 bacterial strains were identified from these samples. Identification was performed using Gram staining, conventional biochemical methods, and confirmed by MALDI-TOF analysis. The study focused on synthesizing neem extract-based nanoparticles and metal nanoparticles (zinc and magnesium), to assess their antibacterial properties. Although the nanoparticles have not yet been characterized, their antimicrobial effectiveness will be evaluated using the Minimum Inhibitory Concentration (MIC) method. This research seeks to explore the potential of nanoparticles as a sustainable, eco-friendly alternative to chemical preservatives, offering a safer method for preserving vegetables by inhibiting microbial growth.

Keywords: Food spoilage, Chemical preservatives, MALDI-TOF analysis, Herbal extract-based nanoparticles, Metal nanoparticles, antimicrobial efficacy.

P078- Phyto-Assisted Synthesis of Iron Nanoparticles using Acacia nilotica Pods and Seeds Extract: Characterization and Antimicrobial Activity

Sumit Halpati, Disha khetani and Divya Gangal

Chemistry department, St. Xavier's College Ahmedabad (Autonomous)

Disha.khetani@sxca.edu.in

Abstract: Acacia seeds and pods1, traditionally used in folk medicine, have garnered attention for their phytochemical richness and potential applications. This study explores the extraction of bioactive compounds from Acacia seeds and pods, followed by the synthesis of nanoparticles using these extracts. The resulting nanoparticles exhibit unique properties, making them suitable for various applications. The extracted compounds and synthesized nanoparticles demonstrate antimicrobial,2 and its phytochemical analysis3 highlighting their potential as natural alternatives in various industries. Currently, the majority of nanoscale metals are produced chemically, which might have unforeseen consequences like environmental contamination, high energy usage, and even health issues. Green synthesis, which employs plant extracts rather than synthetic chemical agents to lower metal ions, was created as a solution to these problems. Because green synthesis is less expensive, produces less pollution, and enhances the safety of the environment and human health, it is preferable to traditional chemical synthesis. An extract from the seeds and pods of Acacia nilotica was used to create iron nanoparticles (FeNP). Ultraviolet-Visible Spectroscopy and Phyto analysis and antimicrobial characterization was observed to see the FeNP. The synthesis of FeNP4 was confirmed by UV absorption in the 200-270 nm region. The antimicrobial activity of iron nanoparticles synthesized using Acacia nilotica seeds and pods extract was investigated, and the results showed significant efficacy against various bacterial strains, demonstrating the potential of these phyto-assisted synthesized nanoparticles as effective antimicrobial agents.

Keywords: Acacia seeds and pods, Antimicrobial Activity, Phytochemical analysis, FeNP (Iron nanoparticles)

P079- Selective and Sensitive Detection of Co^{2+} and NO_3^- Using a calix[4]pyrrole based Fluorescent sensor

Zalak G. Thakker[1], Hitesh M. parekh[2*]

Department of chemistry, Sardar Patel university, Vallabh Vidyanagar (388-120), Gujrat, India

hitesh_parekh@spuvvn.edu

Abstract: Cobalt (Co^{2+}) and nitrate (NO_3^-) are key indicators of water pollution, posing serious risks to the environment and human health when present in high levels. Detecting these ions requires advanced sensors that are both selective and sensitive. Fluorescent sensors are ideal for this purpose due to their high sensitivity, quick response, and ease of use. The fluorescent receptor C4P-Q8S has been designed for efficient detection of cobalt (Co^{2+}) and nitrate (NO_3^-) ions. Functionalized with quinoline groups, it exhibits enhanced fluorescence properties. C4P-Q8S shows a "turn-on" fluorescence response to Co^{2+} via Chelation Enhanced Fluorescence (CHEF) mechanism and a distinct fluorescence change for NO_3^- through hydrogen bonding. It offers high sensitivity, low detection limits, and strong binding constants. Binding studies confirmed a 1:1 stoichiometry, supported by Job's plot, ESI-MS, and ^{1}H-NMR. These results establish C4P-Q8S as a promising tool for real-time monitoring.

Keywords: Calix[4]Pyrrole, Host-guest interaction, Fluorescence studies, Binding stoichiometry

P080- Coordination Chemistry for Photocatalyst Design

Surbhi singh, Raghav Dhruv, Sen pratik

St. Xavier's College (Autonomous), Ahmedabad, Gujarat, India.

surbhiessjay@gmail.com

Abstract: Photocatalysis is a pivotal process for energy conversion, with applications in environmental remediation, hydrogen production, and carbon dioxide reduction. It involves the use of catalysts to harness light energy for chemical transformations. Among the types of photocatalysts, heterogeneous catalysts have been widely utilized due to their practical benefits. These include easy separation from reaction products, recyclability, and compatibility with continuous industrial processes. However, homogeneous photocatalysts have gained significant attention for their superior activity and selectivity. This is attributed to their atomically dispersed catalytic sites and customizable light absorption properties, allowing precise control over the reaction environment.

The current trend in photocatalysis seeks to combine the strengths of both homogeneous and heterogeneous systems. This hybrid approach benefits from the stability and recyclability of heterogeneous photocatalysts, alongside the high efficiency and tunability of homogeneous catalysts. Coordination chemistry plays a central role in bridging these two types. It provides a versatile toolkit for designing photocatalytic systems with enhanced performance. Coordination chemistry can be used to engineer catalytic sites, improve light-harvesting capabilities, and optimize charge transfer kinetics.

Coordination chemistry allows the creation of well-defined catalytic sites, crucial for achieving high selectivity and activity. By designing specific metal-ligand complexes, researchers can tailor the electronic and geometric properties of catalytic centers. These modifications enable precise control over reaction pathways, minimizing side reactions and improving efficiency.

Another significant advantage lies in tuning light absorption properties. By incorporating light-absorbing chromophores into coordination complexes, the spectral response of the photocatalysts can be expanded. This increases their ability to utilize a broader range of the solar spectrum, enhancing overall efficiency. Furthermore, coordination chemistry facilitates charge separation and transfer within the photocatalytic system, addressing a major limitation of traditional heterogeneous catalysts. This ensures better energy utilization and reduces recombination losses, critical for achieving high photocatalytic performance.

The applications of coordination chemistry in heterogeneous photocatalysis are diverse and impactful. For instance, it has been used in water splitting reactions for hydrogen production, where it aids in proton reduction and water oxidation. In carbon dioxide reduction, coordination complexes help convert CO_2 into valuable chemicals and fuels. Additionally, these systems find applications in organic transformations, enabling more sustainable chemical synthesis routes.

Despite these advancements, challenges remain. The stability of coordination complexes under photocatalytic conditions needs improvement. Additionally, scaling up these hybrid systems for industrial applications requires further research. Understanding the fundamental mechanisms at play is also crucial, necessitating advanced spectroscopic techniques for in-depth characterization.

In conclusion, coordination chemistry serves as a powerful tool for advancing heterogeneous photocatalysis by combining the best of homogeneous and heterogeneous systems. It offers innovative solutions for designing efficient and selective photocatalytic systems with broad applications in energy and environmental sectors. Overcoming the existing challenges will pave the way for more sustainable and efficient energy conversion technologies.

P081- Synthesis of chitin nanoparticles for efficient bio adsorption of congo red Dye –a green approach.

Suva Nency J., Dr. Divya Gangal, Disha khetani

Chemistry Department, St. Xavier's College (autonomous), Ahmedabad.

divya.gangal@sxca.edu.in

Abstract: The release of dyestuff into water resources poses significant environmental harm, necessitating effective and cost – efficient removal methods. Adsorption using biodegradable and renewable biopolymers like chitin offers a promising solution. Chitin nanoparticles, extracted from sea shells and subjected to acid hydrolysis, were investigated for adsorption efficiency of Congo red dye ($C_{32}H_{22}N_6Na_2O_6S_2$) and antibacterial activity against Bacillus cereus. The compositional and morphological properties of the chitin nanoparticles were characterized using FTIR spectroscopy and UV – visible Spectroscopy. The results demonstrate the potential of chitin nanoparticles as an adsorbent for Congo red dye removal, highlighting their feasibility for environmental remediation applications. The study reveals that the -NH2 and -OH groups of chitosan enhance the adsorption capacity of the nanoparticles, while their low surface area and crystalline nature contribute to efficient dye removal. The findings suggest that chitin nanoparticles could be a visible alternative to traditional adsorbents, offering a sustainable and eco-friendly solution for textile waste water treatment. Moreover, the nanoparticles exhibited significant antibacterial activity, inhibiting the growth of Bacillus cereus, making them a promising material for water purification and biomedical applications.

Keywords: chitin nanoparticles, antibacterial activity, UV – visible Spectroscopy, FTIR spectroscopy

P082- Phytochemical, Pharmacological, and Therapeutic Potential of *Solanum xanthocarpum* in the Treatment of Lung Diseases: A Comprehensive Study

Aarya Manoj Patel

[1]*L J School of Applied Sciences, L J University, Ahmedabad, India.*

Abstract: *Solanum xanthocarpum*, a prominent herb in traditional medicine, has exhibited significant promise in treating respiratory ailments, particularly pulmonary diseases. This plant is a rich source of bioactive phytochemicals, including saponins (Diosgenin), flavonoids (Apigenin), and alkaloids (Solasodine), collectively contributing to a diverse spectrum of pharmacological activities, such as anti-inflammatory, bronchodilatory, and antioxidant effects. Prior research has demonstrated its capacity to attenuate airway inflammation, diminish oxidative stress, and augment pulmonary function, positioning *S. xanthocarpum* as a potential therapeutic agent for asthma, bronchitis, and chronic obstructive pulmonary disease (COPD). The inherent antimicrobial properties of this plant further augment its therapeutic potential by effectively targeting respiratory pathogens. This review critically examines existing research to elucidate the molecular mechanisms underlying its therapeutic actions and evaluates its potential as a complementary or alternative treatment modality for pulmonary diseases. While preclinical evidence is promising, further rigorous clinical trials are imperative to establish its safety, efficacy, and optimal dosage in human populations.

P083- Sustainable Air Filtration: Biodegradable Copper Oxide Nanotechnology for Airborne Virus Inactivation and Pollution Control.

Milee R. Araple[1], Janki N. Thakker[2]

1. Department of Biological Sciences, P. D. Patel Institute of Applied Sciences, CHARUSAT University, Anand, Gujarat – 388421, India.

miliraraple@gmail.com , jankithakker.bt@charusat.ac.in

Abstract: Airborne viruses pose a significant global health threat, contributing to the rapid spread of diseases such as COVID-19 (SARS-CoV-2), Influenza (H1N1), Measles, Middle East Respiratory Syndrome (MERS**)**, Respiratory Syncytial Virus(RSV), and Tuberculosis. According to a report by the World Health Organization (WHO), nearly 7 million people died from air pollution-related diseases in 2012, and approximately 4.3 million were caused by indoor air pollution. Current filtration technologies, including N95 masks and Heating, Ventilation, and Air Conditioning (HVAC) filters, effectively trap airborne viruses but do not inactivate them, increasing the risk of secondary contamination. Additionally, these conventional filters are composed of non-biodegradable materials such as polypropylene (PP) and melt-blown synthetic fibres, leading to environmental hazards, microplastic pollution, and long-term waste accumulation. To address both airborne virus filtration issues1 and environmental sustainability, a biodegradable, antiviral air filtration system integrating Copper Oxide (CuO) nanoparticles with Polylactic Acid (PLA),non-woven fabric will be developed. CuO nanoparticles will provide dual-action filtration, capturing airborne viruses while generating reactive oxygen species (ROS) to damage viral RNA and proteins, rendering them inactive. Other than antiviral properties, CuO nanoparticles exhibit antibacterial and antifungal activity, enhancing overall microbial protection. Unlike Polyvinylidene Fluoride (PVDF) based nanofibers, CuO nanoparticles will not require electrostatic charging, ensuring long-term stability and effectiveness. The biodegradable PLA non-woven fabric will replace synthetic polymers, making the filter eco-friendly, cost-effective, and free from plastic waste concerns without compromising filtration efficiency. The optimised CuO-PLA multi-layered filter is expected to achieve >90% virus capture efficiency while maintaining a low airflow resistance (<30 Pa), making it suitable for PPE masks, HVAC systems, and industrial air purification. This innovative approach is anticipated to eliminate concerns related to plastic waste, long-term stability, and environmental degradation, offering a sustainable and scalable alternative to traditional filtration technologies.

Keywords: Copper Oxide (CuO) nanoparticles, Polylactic Acid (PLA), eco-friendly air filters, green nanotechnology, environmental sustainability infiltration.

P084- Eco-Friendly Synthesis of Thiazolidinone Derivatives Using Green Methods and Nano-Catalysts"

Dr. Poonam Gautam [1], Dr. Deepika Gautam [2*]

Department of Chemistry, Silver Oak University, near Bhavik Publication, Gota Gam, Gota, Ahmedabad, Gujarat 382481

poonamgautam.sci@silveroakuni.ac.in

Abstract: The synthesis of thiazolidinone derivatives has garnered significant attention due to their diverse biological activities and potential applications in pharmaceuticals. This discusses innovative approaches to synthesize these compounds using environmentally friendly methods and nano-catalysts. By employing green chemistry principles, the synthesis process not only minimizes harmful waste but also enhances the efficiency of the reactions. The use of nano-catalysts further accelerates the reaction rates and improves yields, making the synthesis of thiazolidinone derivatives more sustainable and

economically viable. This synthesis strategy represents a significant advancement in the field of medicinal chemistry, aligning with the growing demand for greener methodologies in chemical research.

Keywords: Thiazolidinone, nano- catalyst, heterocyclic compounds.

P085- Hydrogeological Framework and Groundwater Quality Assessing Trends in Gujarat, India.

Vidhi Prajapati, Saloni Maurya, Ankita Hadiyal, Dr. Pranav S. Shrivastav*

Department of Chemistry, School of Sciences, Gujarat University, Navrangpura, Ahmedabad-380009, Gujarat, India

vidhip1401@gmai.com, mauryasaloni.12@gmail.com, ankitahadiyal07@gmail.com; pranav_shrivastav@yahoo.com

Abstract: One of Gujarat's most important natural resources for irrigation and drinking is groundwater. Even though Gujarat is home to 5% of India's population and 63% of its people work in agriculture, the state currently has only 2% of the nation's total water resources. Certain large aquifer recharge zones and groundwater are impacted by a number of factors, including shifting weather patterns, environmental-climate change, frequent droughts, anthropological disturbances, increased irrigation water consumption, the use of chemical fertilizers, undervaluation, poorly managed practices, and misconceptions. Here, we have separated the state into five zones and highlighted each zone's hydrogeology, topography, and physical characteristics. Following a review of the literature, the current work focuses on the state's hydrochemistry as it is now by discussing the physical and chemical criteria, quality evaluation, synthesis of ion sources, and analysis of hydrochemical data using a variety of techniques. This study is broken down into six sections for a more thorough grasp of the subject: 1) Groundwater Quality Assessment; 2) Seawater Intrusion; 3) Fluoride in Groundwater; 4) Evolution of Geothermal Spring Water; 5) Heavy Metals in Groundwater; and 6) Anthropogenic Impact on Groundwater. The quality of groundwater used for drinking and irrigation is evaluated using a variety of indices in order to evaluate these characteristics. A range of graphical tools for managing complex groundwater resources, evaluating groundwater resources and their quality, applying statistical and multivariate statistical approaches to pinpoint and isolate the main underlying causes of changes in water quality, and using GIS-based techniques for mapping, understanding, and resolving environmental issues, as well as strategies like groundwater vulnerability assessment for the preservation of water table resources. Researchers, decision-makers, and administrators who want to guarantee the sustainable development of groundwater can use this draft document as a prospective guide.

Keywords: Groundwater, Hydrogeochemistry, Quality Assessment, Gujarat

P086- Composites of Chitosan - GO as an efficient green adsorbent for dye removal

Shivangi Machchhar, Amit Trivedi, Dr. Angel Mary Joseph

St. Xavier's College (Autonomous), Ahmedabad, Gujarat, India.

angelmary.joseph@sxca.edu.in

Abstract: Dyes are among the most harmful pollutant to the ecosystem because of their high chemical stability and consequently difficult degradation. Even though there are a variety of methods established to remove the dye from the water bodies, the use of nanomaterials and nanocomposites stand as an ideal method due to their high efficiency. However, challenges remain in the use of nanocomposites such as the use of synthetic hydrocarbon-based polymers which itself are environmentally harmful, need of excess amount of the nanofiller and the associated difficulty of homogeneous distribution. In the current work, we have synthesized a composite of Chitosan, which is a potential natural polymer with Graphene oxide- a 2D nanofiller. Since the filler is 2D in nature, it enhances the adsorption of the dye due to its increased surface area. The composite made with various weight percentages of GO showed a very good adsorption behaviour of more than 90 %. In order to understand the role of chitosan, we have studied the adsorption with chitosan's of different molecular weight as well. In subject to this particular study, Crystal Violet (dye) was taken as model effluents to study their absorbance through adsorption using GO-CTS composite. Sheets of GO-CTS were taken for the adsorption experiment and the concentration of dye before and after adsorption through GO-CTS were obtained in UV spectra which confirms GO-CTS composite as an adsorbent.

P087- Herbicide Degradation using Photocatalyst Method

Megha Dave

PDPIAS, CHARUSAT, Changa, Anand, India

Abstract: Herbicides' environmental persistence presents serious ecological hazards, hence effective degrading techniques are required to lessen their effects. An efficient method for decomposing herbicidal substances in soil and water systems is photocatalysis, a potential enhanced oxidation process. With an emphasis on the processes, photocatalysts, and environmental factors affecting efficiency, this study examines current developments in the photocatalytic degradation of herbicides. The capacity of key materials like zinc oxide (ZnO), titanium dioxide (TiO_2), and innovative composite catalysts to produce reactive oxygen species when exposed to light is highlighted. These materials oxidise and mineralise herbicides into non- toxic byproducts. To maximise photocatalytic processes, factors that impact degradation rates such as light wavelength, herbicide molecule structure, and catalyst surface area are investigated. With the goal of achieving full mineralisation and lasting remediation, the possibility of combining photocatalysis with biological treatments is also assessed. Future directions highlight the necessity of catalyst stability and reusability in addition to investigating sunlight-driven systems for large-scale, reasonably priced applications. This paper demonstrates how photocatalysis can revolutionise the breakdown of herbicides, offering a sustainable way to lower agricultural pollutants and improve the quality of water and soil.

Keywords: Photocatalyst, Zinc oxide (ZnO), Titanium dioxide (TiO_2)

P088- Unleash Therapeutic Potentials of Cinnamon-Ag Nanoparticles

Khushi prajapati[1], Mayur Purohit[1], Gayatri Gounder[1], Daisy Saini[1], Suman Rawat[1], Hirva Raval[1]

LJ School of Applied Sciences[1], LJ University, Ahmedabad, 382210, India.

niketan.deshmukh_ljias@ljinstitutes.edu.in

Abstract: In recent times, there has been an increase in dependency on synthetic drugs, which cause side effects to humans like inflammation, bacterial infection, and much more. To prevent these side effects, medicinal herbs are a better option because, with time, herbs have co-evolved with humans and have significantly fewer aftereffects. Among the most popular herbs used to spice food is cinnamon bark. Cinnamon bark, branches, twigs, and leaves all contain significant phytochemicals; however, the bark is the most commercialized part among them. This abstract highlights the therapeutic benefits of cinnamon-Ag nanoparticles. There are two main varieties of cinnamon; *Cinnamomum zeylanicum* and *Cinnamon cassia*, Among which *Cinnamon cassia* has been reported to have anti-inflammatory, anti-oxidant, antimicrobial, and antibacterial. The most important constituents of cinnamon are cinnamaldehyde and trans-cinnamaldehyde. In the present study, the extraction of bioactive molecules from cinnamon was carried out with the help of maceration and soxhlet using 70% ethanol as a solvent. This extract is used for the green synthesis of cinnamon-Ag nanoparticles (CNPs). Nanoparticles are usually the size of 1 to 100 nm and exhibit different characteristics based on their smaller size, distribution, and morphology compared with bulk materials of the original sources. A variety of plant extracts have been tested as potential reductants in Ag nano synthesis instead of toxic chemicals, which are used in chemical reduction, and radiation chemical reduction.

Keywords: Antibacterial, Anti-inflammatory, Anti-oxidant, Cinnamon-Ag silver nanoparticle, Cinnamon bark

P089- Extraction and synthesis of nano silica from rice husk and its catalytic application in organic synthesis.

Chhuchhar Harshbhai H.[1]*, Majithiya Yagnikkumar B.[2]

L J School of Applied Sciences, L J University, Near Sarkhej-Sanand Circle Off. S.G. Road, Ahmedabad-382210

chhuchharharsh9614@gmail.com

Abstract: This study explores the synthesis of nano-silica from rice husk and its application as a heterogeneous catalyst. Rice husk, an abundant agricultural byproduct, serves as a cost-effective and renewable source for extracting silica. The silica is extracted using a simple chemical method and then processed to obtain nano-sized particles, which are characterized by various techniques such as Fourier-transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), Particle Size analyser, scanning electron microscopy (SEM), The obtained nano-silica is further functionalized by anchoring transition metal ions like Iron, Cobalt and Copper to enhance its catalytic properties. The catalytic performance is evaluated in a series of model reactions, where the nano-silica shows promising efficiency and stability. The results suggest that nano-silica derived from rice husk is a highly effective and sustainable catalyst for various chemical processes. This research demonstrates the potential of utilizing rice husk as a green source for producing high-performance nano-silica, which can be applied in diverse industrial catalysis applications, thereby offering an environmentally friendly alternative to traditional catalysts.

Keywords: Nano silica, rice husk ash, heterogeneous catalyst, organic synthesis.

P090- Photo degradation of dyes and other organic pollutants

Dr. Pranav Trivedi, Harshil Dhandhukiya, Neha Yadav

Abstract: The production of synthetic dyes and over 100,000 commercially available dyes by various industries, has led to significant environmental damage, particularly in waterways. The leftover colors from these processes are discharged into the environment, potentially causing poisonous, transmissible, and carcinogenic dyes that can cause health issues. Even small amounts of dyes can hinder sunlight penetration and plant growth. Our study focuses on reducing these organic contaminants.

Our study explores the effectiveness of various nanomaterials, including copper and silver nanoparticles, graphene oxide doped with Ag and Cu nanoparticles, and graphene quantum dots, in photodegrading organic pollutants and dyes under visible light. The results show that GO-doped nanocomposites and GQDs showed superior photocatalytic activity, with enhanced degradation rates due to synergistic effects and improved charge separation efficiency. This highlights the potential of nanomaterials and quantum dots in sustainable pollution control.

References:

Muhammad Farhan Hanafi, Norzahir Sapawe, A review on the water problem associate with organic pollutants derived from phenol, methyl orange, and remazol brilliant blue dyes.

Ibrahim Khan, Khalid Saeed, Idrees Khan, Nanoparticles: Properties, applications and toxicities • Lu, Yizhuo C Wan, Xingyuan C Li, Long C Sun, Peng fei C Liu, Guoyan. (2021). Synthesis of a reusable composite of graphene and silver nanoparticles for catalytic reduction of 4-nitrophenol and performance as anti-colorectal carcinoma. Journal of Materials Research and Technology.

Study of Reduced Graphene Oxide Preparation by Hummers' Method and Related Characterization Ning Cao, Yuan Zhang

P091- Tailoring the Antimicrobial Properties of Silver Nanoparticles: A Multi-Species Study on Bacteria and Fungi

Dhruvansh Patni[1], Chhaya Rathva[1], Priyanka Shinde[1*], Nandan Pomal[1*]

[1]*Faculty of Science, Sigma University, Vadodara, Gujarat, India.*

pps1402@gmail.com, nandan.pomal999@gmail.com

Abstract: Using a one-pot synthesis route via chemical reduction method with varying concentrations of materials, silver nitrate was used as a salt precursor, polyvinyl pyrrolidone (PVP) as a stabilizing agent, and hydrazine hydrate as a reducing agent to prepare five new, highly stable, distinct silver nanoparticle (AgNPs). AgNPs-S1, S2, S3, S4, and S5 all were characterized by UV-Visible spectrophotometer in which surface plasmon resonance (SPR) peaks at 410, 422, 420, 410 and 471 nm, respectively. For biomedical application, gram-negative bacteria like *E. Coli* and *P. aeruginosa*, gram-positive bacteria like *S. aureus* and *B. cereus*, and the fungal species *C. albicans* have all been evaluated using the disc diffusion technique. The promising discrete zones of inhibition were observed for each sample of AgNPs against the species are mentioned above.

Keywords: Silver nanoparticles, antimicrobial, Surface Plasmon Resonance, biomedical applications, gram-positive bacteria.

P092- New Calix[4]pyrrole-Gold Nanoparticles for Selective Fungicide Detection and Anticancer Application

Nandan C. Pomal[a], Keyur D. Bhatt[b]

[D]epartment of Physical and Chemical Sciences, Faculty of Science, Sigma University, Vadodara, Gujarat, India

[D]epartment of Chemistry, Mehsana Urban Institute of Sciences, Ganpat University, Mehsana, Gujarat, India

Abstract: A rapid and facile approach for the synthesis of highly stable gold nanoparticles (AuNPs) has been developed using calix[4]pyrrole tetrahydrazide (CPTAH) as both a reducing and stabilizing agent. The synthesized CPTAH-functionalized AuNPs (CPTAH-AuNPs) were systematically characterized using Surface Plasmon Resonance (SPR), Transmission Electron Microscopy (TEM), Selected Area Electron Diffraction (SAED), and Energy Dispersive X-ray (EDX) analysis. The nanoparticles exhibited an average size of 11 ± 2 nm and demonstrated exceptional stability at pH 7.0 for over 150 days. The potential of CPTAH-AuNPs as a fungicide sensor was assessed for a range of agrochemicals, including Metalaxyl, Mancozeb, Tebuconazole, Tricyclozole, Dimoxystrobin, Kresoxim-methyl, and Carbendazim. Notably, Dimoxystrobin (DMX) was selectively detected via a visible aggregation phenomenon, achieving a detection limit of 5 ppm through a "Turn-on" fluorescence enhancement mechanism. Beyond their sensing capabilities, CPTAH-AuNPs exhibited significant anticancer activity against the KB-3-1 cell line, demonstrating their potential applications in biomedical research. This study highlights the multifunctional role of CPTAH-AuNPs in both environmental and healthcare sectors, paving the way for future advancements in nanomaterial-based sensing and therapeutic applications.

Keywords: Gold nanoparticles, Calix[4]pyrrole, Fungicide sensing, Fluorescence Sensing, Anticancer activity, Nanomaterials.

P093- Application of Nanotechnology in diagnosis and Treatment of cancer.

Khushi Chande

Chemistry Department, LJ institute of Applied Science, Ahmedabad

chandekhushi04@gmail.com

Abstract: There is no apparent end in sight to the battle against cancer that modern medicine has been fighting for almost a century. Cancer treatments have come a long way, but there is still a need to improve selectivity and lower systemic toxicity. The quality of life and prognosis outlook of patients can be improved with early diagnosis, and diagnostic instruments are about to undergo a technological revolution. Nanotechnology's ability to enhance each and improve patient care has led to its steady expansion into imaging, radiation, chemotherapy, and diagnostics. Nanomaterials are incredibly versatile, useful, and can be used to construct robust imaging modalities, precise early-detection tools, better radiation adjuvants, and specifically targeted cancer medicines. This review sheds light on the most recent preclinical and clinical nanotechnological uses for imaging, therapeutics, diagnostics, and radiation therapy.

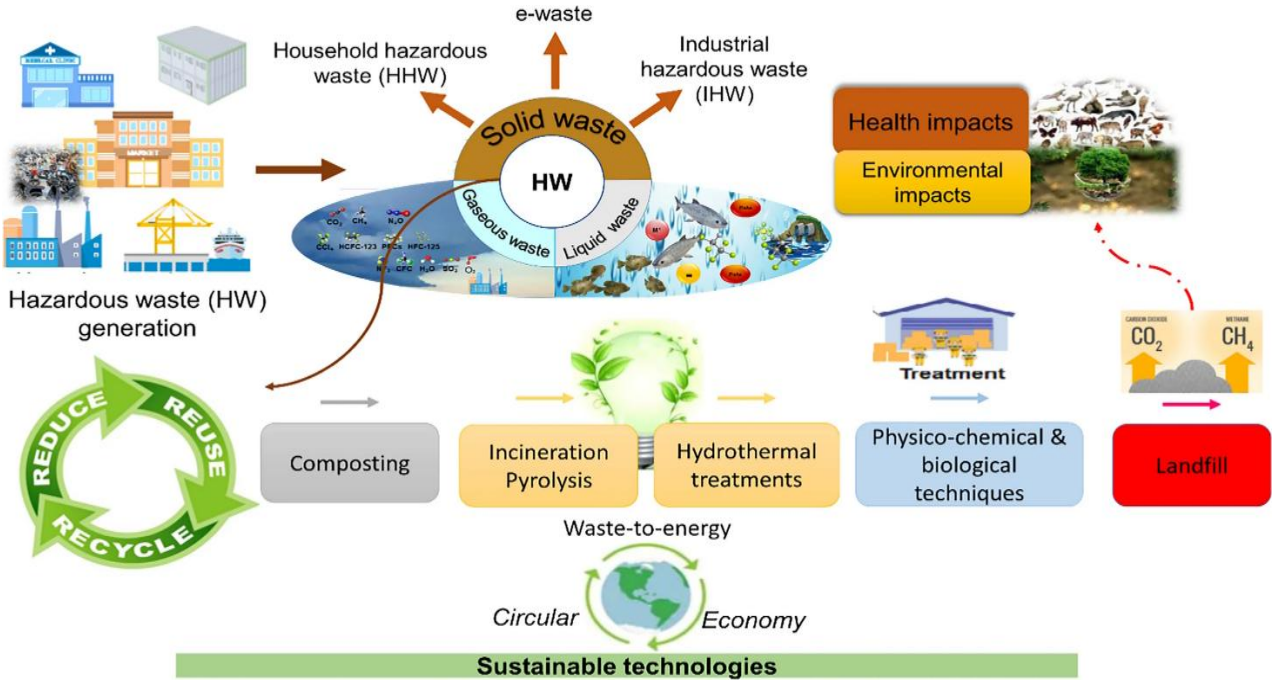
Keywords: cancer, nanomaterial, nanomedicine, therapy, diagnosis

P094- Hazardous and Industrial Chemicals Waste Management

Quraishi Asfiyabanu Munawerhussain, Shaikh Afifa Shakil Ahmed

asfiyaqureshi2019@gmail.com, shaikhafifa2109@gmail.com

Abstract: Waste management is one of the vital environmental issues since last few decades . It has been noted that the generation of waste increase with the increasing of population, urbanization and industrialization etc. In India there is no proper secured landfill facility available to dispose of hazardous waste till 1977. There are very few industries in India, mostly in large scale and a few in medium scale that own proper treatment of hazardous disposal facility. Disaster occur due to both natural and man made activities. A hazard is an extreme event that adversely impact on human life , environment and other living beings. Hazardous waste are classified into four categories: Solid waste, Liquid waste, Gaseous waste, Sludge waste. The government of India has promulgated the hazardous waste management and handling rules in 1989 through the Ministry of environmental and forests (MOEF) .In recent years, investigation reporting a wide spectrum of health risks for local populations living in the areas of surroundings hazardous waste dumping sites. A WHO report on waste and health concludes "Despite the methodological limitations, the scientific literature on the health effect of landfills provides some indication of the association between residing near a landfills site and adverse health effect."



P095- Advancements in Food and Microbial Nanotechnology: Innovations and Applications

Sundar Koladiya

sundarvipulbhai@gmail.com

Abstract: The integration of microbial nanotechnology into food science represents a transformative approach to addressing critical challenges in food safety, quality, and sustainability. This emerging field

leverages nanoscale materials and microbial interactions to develop innovative solutions, such as advanced antimicrobial agents, intelligent packaging systems, and enhanced nutrient delivery mechanisms. Nanostructured materials, including metallic nanoparticles and bioactive nanocomposites, exhibit potent activity against foodborne pathogens, offering targeted inhibition while minimizing impacts on beneficial microbiota. Concurrently, nano-enabled packaging incorporates sensors and gas-scavenging functionalities to monitor freshness and extend shelf life, reducing waste. Microbial nanotechnology also enhances nutritional outcomes through the encapsulation of probiotics, vitamins, and bioactive compounds, improving their stability and bioavailability during digestion. However, the application of these technologies necessitates careful evaluation of health and environmental risks, particularly regarding nanoparticle toxicity and long-term ecosystem effects. Regulatory frameworks and standardized safety assessments are essential to ensure responsible innovation. Future advancements may focus on eco-friendly synthesis methods, precision targeting of pathogens, and scalable manufacturing processes. By bridging microbial science with nanotechnology, this interdisciplinary domain holds promise for revolutionizing food systems, balancing technological benefits with ethical and safety considerations to meet global food demands sustainably.

Keywords: Food, nanotechnology, food safety, sustainable practices

P096- Histological effects of combined therapy involving scar resection, decellularized scaffolds, and human iPSC-NS/PCs transplantation in chronic complete spinal cord injury

Smit Parmar ,Anurag Panchal, Aum Vyas

Biotechnology Department, L J School of Applied Science , L J University, Sarkhej – Gandhinagar Highway Ahmedabad , India

Email: - *parmarsmit.sp01@gmail.com*

Abstract: Chronic Complete spinal cord injury (SCI) represents a functional recovery due to the lack of regenerative capacity in the central nervous system. In this study investigated and used advanced strategies such as a combined approach involving scar resection, decellularized scaffold, and human iPSC-NS/PC transplantation. By using Kidney- Derived ECM hydrogel to reduce risks such as prion disease. In the Chronic SCI rat model, to increase neuroprotective microglia and macrophages in the microenvironment for spinal cord regeneration by removing inhibitory scar tissue. This improved the survival of transplanted NS/PCs and facilitated the regeneration of host axons. Transplantation has been proven very effective treatment for chronic complete spinal cord injury by the approach of scar resection dECM hydrogel scaffolding and NS/PCs transplantation

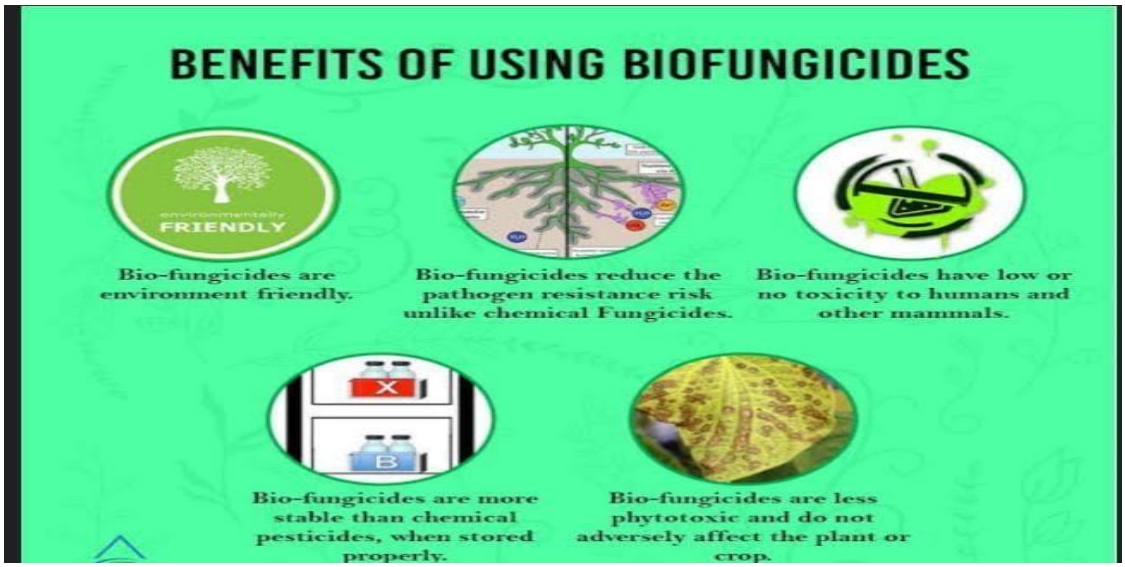
Keywords: Stem Cell, Chronic spinal cord injury, iPSC-derived neural stem cells, tissue regeneration, Decellularized scaffolds, neurogenesis

P097- Natural Plant product as Eco-friendly Fungicides for plant Diseases control

Shaikh Mantasha Tariq Husain, Ansari Munzarin Sartaj Mohammad

E-mail.: *mantashashaikh2623@gmail.com*

Abstract: Fungicides are widely used in conventional agriculture to control plant diseases. The use of chemical pesticides for controlling various plant diseases is still a common practice especially in developing countries. Although with the application of fungicides, plant diseases can be controlled but the hazardous impacts of such product in human health and natural plant are well known As a substitute, environmentally fungicides have been increasingly introduced as alternatives to synthetic fungicides. It is estimated that there are more than 250,000 higher plant species on earth that can be evaluated for their antimicrobial different bioactive chemical compounds. During last several decades researchers have evaluated plant extract and oils against plants pathogens, valuable results have been achieved. Examples are baking soda, neem oil, garlic spray, copper fungicide, apple cider vinegar.



P098- Introduction to Nanotechnology Based Medicine Production

Rushi Chaudhari, Divyansh Sinha, Taqi Damani and Dhruv Negi

Lok Jagruti Kendra University (LJKU), Ahmedabad, India

22006103810024@ljku.edu.in

Abstract: Nanodrugs or Nanomedicines mainly refers to the medicines developed with the help of the process of nanotechnology-based medicines production in the respective pharmaceutical industry. The materials used are mainly of very smaller sizes which ranges within 1 to 100nm respectively. It takes place by the use of materials, such as biocompatible nanoparticles for diagnosis, delivery, sensing or actuation purposes in a living organism. These nanomaterials have abilities which can improve the stability and water solubility of the drug also improves the safety and efficacy of the drug. These medicines can be administered orally, by inhalation and by intravenous injections as well. These medicines offer multiple benefits in treating chronic human diseases by target based orienting medicines

which are site specific in nature as well. Nanomedicines are required due to the need of solutions to urgently required clinical needs including diagnostic techniques and technologies for the use in field and for delivering targeted therapeutics. These medicines identify the specific target related to the respective clinical condition which also minimizes various side effects in the organism as well. Various applications of these medicines are getting reviewed day to day which include biological agents, Immunotherapeutic agents, Chemotherapeutic agents and etc. These are implemented with the use of knowledge and techniques of nanoscience in medicinal biology, disease prevention and remediation. One of the most beneficial aspects by the usage of nanomedicines is that it might be cost effective as compared to the various medicines developed by various foreign companies. This article will focus on certain aspects such as historical background, composition and production of medicines, symptoms and side effects and various other applications respectively. Furthermore, research is still ongoing as of now with slow yet efficient advancement in the field.

Keywords: Nanodrugs, Nanotechnology, Nanomaterials, Site Specific.

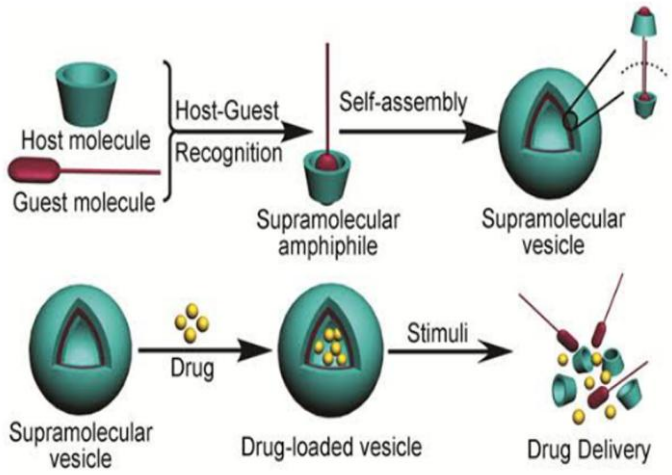
P099- Supramolecular systems in advanced drug delivery application designs and development

Qureshi Uzmabanu Mohammedsharif

Bhavan's Sheth R.A college of science, Gujarat University

Email-uzmaqureshi115@gmail.com

Abstract: Supramolecular chemistry can be a very effective tool to overcome some of the major problems in drug delivery systems because it can provide reversible and dynamic non-covalent interactions. The synthesis of novel supramolecular assemblies targeted to improvement in encapsulation, targeted delivery and controlled release of drugs. Through the use of more advanced synthesis techniques, we were able to design host-guest complexes that self assemble and disassemble in response to physiological stimuli.Our results point out a novel mechanism through which such supramolecular carriers are sensitive to pH and temperature,responding exactly at the target site to liberate the drugs. Study of such systems by spectral and imaging methods exhibits its stability, biocompatibility, and easy drug loading and delivery. Potential application in oncology, gene therapy, and antimicrobial treatment is where this approach is located on the platform of future therapeutics. This work illustrates the potentials of supramolecular chemistry towards solving drug delivery issues and consequently to provide ways to further enhance innovation in biomedical science.



P100- Silver Nanoparticles Synthesis Using Tulsi Extract

Sanvi Patel, Srushti Pawar

L.J. School of science, LJ University, Ahmedabad, India

patelsanvi032@gmail.com

Abstract: Nano technology is a rapidly growing filled with application in medicine agriculture and environmental science. silver nanoparticles exhibit antibacterial, antifungal and antiviral properties. green synthesis using plan extracts is an eco-friendly alternative to chemical and physical methods.

P101- Waste Management using Nanotechnology

God Khushi Santoshkumar

***Department of chemistry**, R. G. Shah Science College, Vasna, Ahmedabad, India*

**ashishgod56@gmail.com*

Abstract: The amount of waste has been steadily increasing due to the increasing human population and urbanization. Waste materials are generated from manufacturing processes, industries and municipal solid wastes (MSW). The increasing awareness about the environment has tremendously contributed to the concerns related with disposal of the generated wastes. This paper presents a detailed review about waste and waste management options, and research published on the effect of waste materials on environment.

Keywords: Reuse; Reduce; Re-Cycle; Recover

P102- Molecularly Targeted therapy of cancer

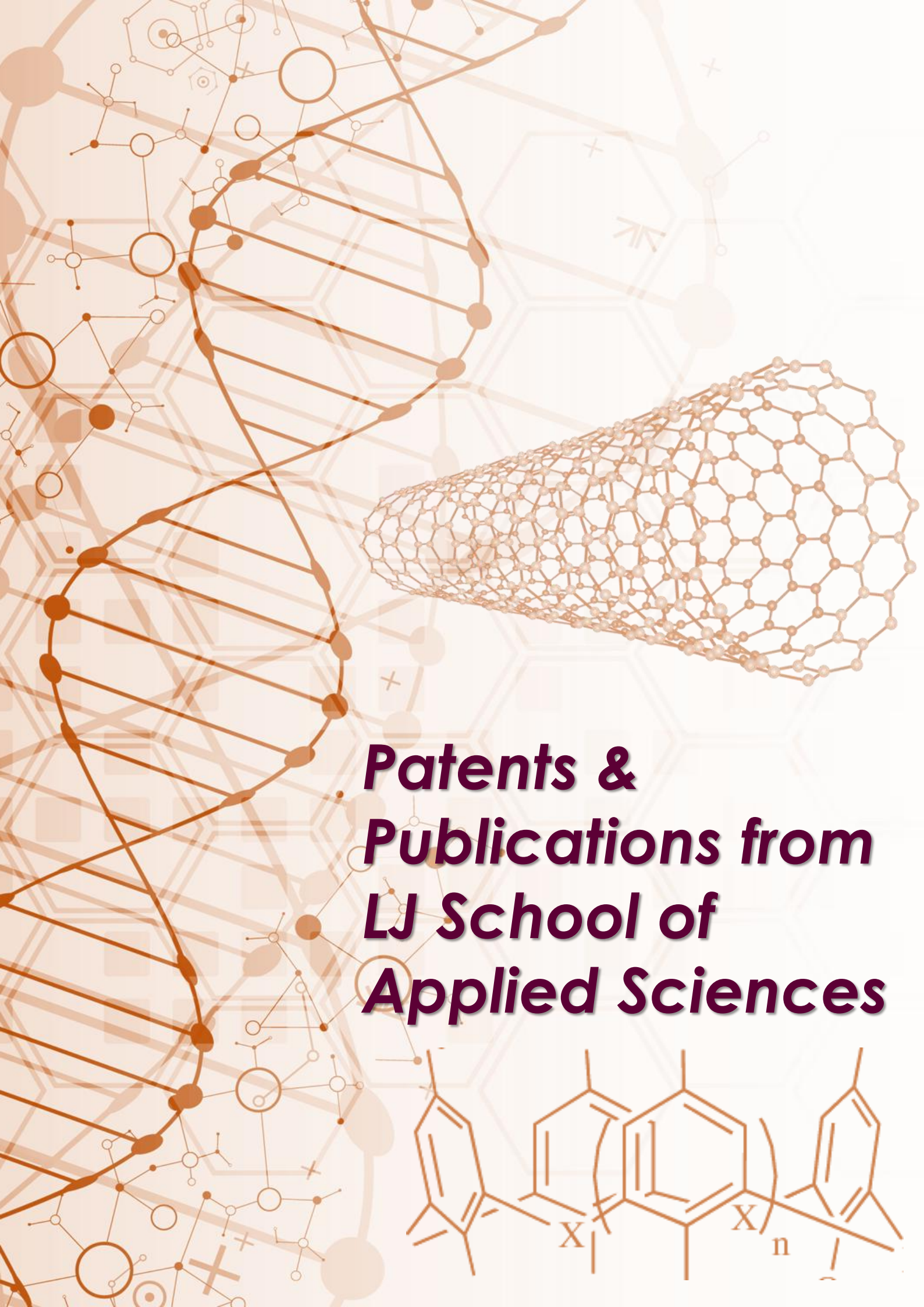
[1]Shreni Modi, [2]Silviya Vadhwaniya

LJ School of Applied Sciences, LJ University, Ahmedabad-382210, India

**Corresponding Author E-mail: shreni2003@gmail.com*

Abstract: Compared to conventional chemotherapy, molecularly targeted therapy offers a more precise approach by targeting the molecular causes of cancer, revolutionizing oncology. These treatments improve patient outcomes by taking advantage of molecular anomalies specific to cancer cells, which lesson collateral damage to healthy tissues. Monoclonal antibodies that target growth factor receptors, small-molecule inhibitors that target intracellular signaling pathways, and immunotherapies that modulate immunological checkpoints like CTLA-4 and PD-1/PD-L1 are important modalities. Next-generation sequencing and biomarker identification advances have made it easier to create individualized treatment plans by matching treatments to particular tumor genetic profiles. Significant clinical benefits, such as increased survival and fewer adverse events, have resulted from this strategy. There are still issues, though, like secondary mutation-induced acquired drug resistance, tumor heterogeneity that results in insufficient targeting, and possible off-target toxicities. In order to overcome these constraints and maximize therapy results, integrative approaches are needed, such as combination therapies, innovative medication development, and dynamic molecular profiling.

Keywords: Molecularly targeted therapy, Cancer treatment, Personalized medicine, Drug resistance, Tumor heterogeneity.



Patents & Publications from LJ School of Applied Sciences

Patent-1

Vermicompost Unit for Plant Waste Recycling

Dr. Ekta Patel. Dhara Bhavsar, **Anita Sharma**

Design Number: 6406885

Registration Date: November 23, 2024

Grant Date: **2, December 2024**

Patent-2

Embedded Alcohol Detection Module for Vehicles

Dr. Ruby Patel, Ms. Radhikaben S. Thakkar, Dr. Ajay L. Makwana, Dr. Dhara Jani, **Ami Dineshchandra Varia**, Dr. Richa Dubey, Dr. Dhara Bhavsar

Design number: 6398684

Grant date: 23 October 2024

Registration date: **17 October 2024**

Patent-3

Wireless Sensor Device for Environmental Monitoring

Shah Bhoomi Anilkumar, Parmar Archanaben Hasmukhbhai, Dr. Ruby Patel, Asmabanu Kamruddin Shaikh, Dr. Hiteshkumar H Mehta, **Dr. Viral Y. Shukla**, **Aakash B Patel**, Dr. Anand Dave, Dr. Ektaben Prahladbhai Patel

Design number: 6356911

Grant date: 15 April 2024

Registration date: 04 April 2024

Patent-4

Compact DNA/RNA Extraction System

Design number: 629039

Dr. Praveen Kumar Dasari, Mr. Saptarshi Das, **Prof. Niketan Deshmukh**, Ms. Meena Bandiya, Prof. (Dr.) Rupesh Soni, Mr. Arpan Kumar Tripathi, Dr. Sanjay Kumar Gupta, Dr. Nabeel Ahmad, Dr. Arin Bhattacharya, Dr. Moataz Dowaidar.

Copyright

NOVEL PEDAGOGY FOR MASTER'S PROGRAM IN APPLIED SCIENCES

L-127766/2023

Dr. Manish Shah and **Prof. Niketan Deshmukh**

Research Articles (2023 & 2024)

Sr. No.	Publication Title	Author-Name	Journal-Name	Year
1.	Green and Selective Cycloaddition of CO_2 to Oxiranes over Schiff Base Cu II Complexes as Catalysts	Anita Sharma, Minaxi S. Maru, Parth Patel, Chandan Pashavan	*Taylor and Francis*	2024
2.	Online sequential separation, preconcentration, extraction, and transport of Ti, Zr, and Hf by ICP–MS and recovery from nuclear waste	Chandramauly Sharma, Devarshi Thakar, Yadvendra Agrawal	Bulletin of the Chemical Society of Japan	2024
3.	RP-HPLC Study of the Complexation of Acetamiprid, Imidacloprid and Carboxin Guest Molecules With Thiophosphorylated Calix [6] Arene in Dimethylformamide-Acetonitrile-Water	Chandramauly R Sharma, Vijay Mishra, Yadvendra Agrawal	Journal of Chromatographic Science	2024
4.	Liquid Crystalline Behavior of Metal–Hydroxamates	S Shukla, N Pandya, C Sharma, M Kureshi, Y Agrawal	Russian Journal of Physical Chemistry B	2024
5.	Studies Of Thermoluminescence Properties Of Liquid Crystalline N – Phenyl Substituted Phenyl Polysiloxane Hydroxamic Acids , Luminescence	Nirav Pandya , Chandramauly Sharma , Gaurangi Desai , Yadvendra Agrawal.	Luminescence	2024
6.	Solvent Extraction And Trace Determination Of Cadmium(Ii) By Spectrophotometry And Icp-Ms	Janvi Jadvani , Chandramauly Sharma , Meet Joshi	Vietnam Journal Of Chemistry	2024

7.	Solvent Extraction And Trace Determination Of Hg (Ii) By Cold Vapour Aas	Meet Joshi , Chandramauly Sharma , Janvi Jadvani	Vietnam Journal Of Chemistry	2024
8.	Side Chain Liquid Crystalline Polysiloxane Hydroxamic Acids And Their Liquid Crystalline Behaviour	Chandramauly Sharma, Nirav Pandya, Gaurangi Desai, Yadvendra Agrawal	Reactive And Functional Polymers	2024
9.	Extraction, Separation, Recovery, Transportation, Icp-Aes Trace Determination Of Thorium(Iv) With Calix[4]Resorcinarene-2, 8, 14,20-Tetrakis [N-Phenylbenzo]-Hydroxamic Acid	Chandramauly Sharma , Ritesh Patadia , Yadvendar Agrawal	Chemical Papers	2024
10.	Pinpointing Top Inhibitors For Gsk3β From Pool Of Indirubin Derivatives Using Rigorous Computational Workflow And Their Validation Using Molecular Dynamics (Md) Simulations	Vamangi Pandya Priyashi Rao, Jignesh Prajapati, Rakesh M Rawal, Dweipayan Goswami	Scientific Reports	2024
11.	Biopolymer Hydrogel Matrices For The Stabilization And In-Vitro Delivery Of Anti-Cancer Polyoxometalate [Cow11o39(Cpti)]7−	Vamangi M. Pandya , Dweipayan Goswami' Sachin A. Joshi	Journal Of Macromolecular Science, Part A	2024
12.	Nanoparticles In Managing Bovine Mastitis Pathogens—Isolation,	Riddhi Panchal, Viral Shukla, Yadvendra Agrawal	Bionanoscience	2024

	Identification, And Therapeutic Strategies			
13.	Studies Of Thermoluminescence Properties Of Liquid Crystalline N-Phenyl Substituted Phenyl Polysiloxane Hydroxamic Acids	Nirav Pandya, Chandramauly Sharma, Gaurangi Desai, Yadvendra Agrawal	Luminescence	2024
14.	Efficient Synthesis of Some New Dihydropyrazolo-thiazin-6-amines and Oxazin-6-amines	Priyal Jehani, Dharmik Jivani, Sneha Rupala, Nency Bamnolia, Sandeep Balan, Gaurang Patel, Deepika Gautam, Nitya Chawda, Rati Kanta Bera, Vibha Kunji and Poonam Gautam	Indian Journal of Heterocyclic Chemistry	2024
15.	Efficient Synthesis of some benign Schiff's base Metal Complexes and their Anti-microbial activities	Nikhil Patel Nitya Chawda Deepika Gautam Poonam Gautam Vibha Kunji	Journal of Emerging Technologies and Innovative Research	2024
16.	Microfluidic Device For Forensic Body Fluid Examination	Viral Shukla, Nirav Pandya, Chandramauly Sharma & Yadvendra Agrawal	Bionanoscience	2023
17.	Plant Growth-Promoting Attributes Of Indian Gooseberry (Phyllanthus Embilica L.) Endophytes	Ushma B. Joshi, Mohammed Faisal Ansari, Devayani R. Tipre	Advances In Bioresearch	2023

18.	Functionalization Of A Bacillus Oryzae Corticis Strain R1 For Novel Haloalkaliphilic Protease Production And Process Optimization Using A Complete Factorial Design Approach	Ami D. Varia, Viral Y.Shukla, Devayani R. Tipre, Shailesh R. Dave	Advances In Bioresearch	2023
19.	In Silico Screening Of Potential Inhibitors From Cordyceps Species Against Sars-Cov-2 Main Protease	Niketan Deshmukh, Reshma Talkal & Bhaskaran Lakshmi	Journal Of Biomolecular Structure And Dynamics	2023
20.	Optimization Of Cultural And Nutritional Conditions To Enhance Mycelial Biomass Of Cordyceps Militaris Using Statistical Approach	Niketan Deshmukh & Lakshmi Bhaskaran	Brazilian Journal Of Microbiology	2023
21.	Trace Detection Of La (Iii), Ce (Iii), Ce (Iv), Nd (Iii), And Gd (Iii) Using 2, 8, 14, 20-Tetramethyl-5, 7-Dinitro Calix [4] Resorcinarene Polyhydroxamic Acid By Solid-Phase Extraction And Separation.	Chandramauly Sharma, Ritesh Patadia , Bignesh Thakur , Vamangi Pandya , Yadvendra Agrawal.	Reactive And Functional Polymers	2023
22.	Sequential Separation And Trace Estimation Of Indium(Iii), Gallium(Iii), And Thallium(Iii) In Biological And Standard Samples	Chandramauly Sharma, Yadvendra Agrawal	Journal Of Analytical Chemistry	2023
23.	Microfuidic Device For Forensic Body Fluid Examination. Biosciences	Viral Shukla, Nirav Pandya, Chandramauly	Bionanoscience	2023

		Sharma, Yadvendra Agrawal		
24.	Estimation Of Time Since Death Using Cardiac Troponin I In Case Of Death Due To Asphyxia And Cardiotoxicity Of Acebutolol	Aashima Mathur , Chandramauly Sharma , Viral Shukla , Yadvendra Agrawal	Forensic Science, Medicine And Pathology	2023
25.	Solvent Extraction, Sequential Separation And Trace Determination Of La (Iii), Ce (Iii), Nd (Iii) And Gd (Iii) With 2, 14-Bis[M-Nitrophenyl]-Calix[4]Resorcinarene-8, 20-Bis[N- Phenylbenzo]-Dihydroxamic Acid	C. R. Sharma, R. N. Patadia & Y. K. Agrawal	Solvent Extraction And Ion Exchange	2023
26.	Sequential Separation, Icp – Ms Trace Determination Of As (Iii), Sb (Iii), And Bi (Iii) In The Alloys, Water, Environmental And Human Samples	Chandramauly Sharma , Kuldeep Sharma And Yadvendra Agrawal	International Journal Of Environmental Chemistry	2023
27.	Antioxidant Potential of Cordyceps militaris Mycelium: A Comparative Analysis of Methanol and Aqueous Extracts	Niketan Deshmukh and Bhaskaran Lakshmi	Biosciences, Biotechnology Research Asia	2023
28.	Comparative Analysis of the Antioxidant and Antibacterial Activity of Methanolic Mycelium Extract from Cordyceps militaris: A Comprehensive Study	Niketan Deshmukh and Bhaskaran Lakshmi	Biological Forum – An International Journal	2023

LJ University
University with a Difference

LJ SCHOOL OF APPLIED SCIENCES

1. **Bachelor of Science** (As per NEP-2020)
   - **Chemistry** (for Group-A & B Students)
   - **Microbiology Biotechnology** (for Group-B Students)
2. **Master of Science**
   - **Chemistry** (Organic + Analytical)
   - **Microbiology**
   - **Biotechnology**
   - Medical Laboratory Technology (MLT) for Science Graduate
3. **Medical Laboratory Technician (MLT) One-Year Certificate Course**
4. **Ph.D. Program**
   - **Chemical Science & Bio-Sciences**

Teaching Pedagogy

- Industry and skill based Practical syllabus
- Core Theory subjects framed as per NET Syllabus
- Hands On trainings and workshops
- Seminars and Panel discussion
- Industrial visits and Internship
- Encourage students for Post Graduation and Research
- Prepare students for competitive exams
- Encouraging Start-up & Entrepreneurship with "ANTRAPRENEUR" & "BIOINCUBATOR"
- Central Placement Cell associated with over 200 leading companies for best Career Prospects

ADMISSIONS OPEN

SCAN FOR ADMISSION

CONTACT

B.Sc.: 7359100053, 7016662877
M.Sc. Chemistry: 7575017201
M.Sc. Microbiology / M.L.T. : 8200058820
M.Sc. Biotechnology: 7359100053
For Ph.D. Program - Visit Our Website

ljku.edu.in

B.Sc. / M.Sc. / M.L.T.
Placements & Internships

and many more . . .

PATRON

Prof. Dinesh Awasthi
Vice-Chancellor
LJ University

Dr. Manish Shah
President
Lok Jagruti Kendra

ADVISORY BOARD

Prof. Jerry Atwood
University of Missouri, USA

Prof. V Chandrasekhar
TIFR, Hyderabad

Prof. Peter J Cragg
University of Bringhton, UK

Prof. Gopal Das
IIT Guawahati

Prof. Samar Das
Central University Hyderabad

Prof. C. S. Gopinath
NCL Pune

Prof. D M Guldi
Friedrich Alexander Univ., Germany

Prof. G K Lahiri
IIT Bombay

Prof. J M Lehn
University of Strasbourg, France

Prof. P S Mukherjee
IISc, Banglore

Dr. N Nagesh
CCMB, Hyderabad

Dr. Chandra Patra
BARC, Bombay

Prof. M Sankar
IIT Roorkee

Prof. Isreal Sehtecher
IIT, Hafia, Israel

Prof. Sohan Sen
JNU, Delhi

Prof. J W Steed
Durham University, UK

CONVENOR

Prof. Y K Agrawal
Chairman
Centre of Excellence in
Macromolecules and Nanotechnology

CONTACT US:

ljias@ljinstitutes.edu.in
www.ljku.edu.in
LJ University, Near Sarkhej-Sanand Circle, Off. S.G. Road, Ahmedabad-382210

Scan for the e-copy