

A Three Days International
Conference on Recent Innovations
of Chemistry & Biology Entitles

ChemBio Innovate2026

17th, 18th & 19th September, 2026

*Bridging Chemistry, Biology and Allied Sciences
for Innovation*

Organized by

Department of Chemistry &
Department of Lifescience, School of Science,
Dr. Subhash University, Junagadh

In association with

Indian Society of Chemists & Biologists, Lucknow.



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Dr. Mayank K. Pandya

Dean, School of Science, Dr. Subhash University, Junagadh

Coordinator**Dr. Hardik L. Varu**

Department of Chemistry, School of Science, Dr. Subhash University, Junagadh

Co-coordinators**Dr. Ranjan P. Kuvad****Prof. Megha R. Chovatia****Dr. Hitesh N. Parmar****Prof. Bindu B. Raigar****Dr. Harshad D. Vadhel****Prof Urvashi G. Bhatu****Dr. Rushikesh C. Pokar****Prof. Niralee J. Malaviya****Organizing Committee****Dr. Pradip D. Kachhiya**

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Head, Department of Microbiology and Clinical Technology, School of Science, Dr. Subhash University, Junagadh

Dr. Ghanshyam D. Jadav

Head, Department of Physics, School of Science, Dr. Subhash University, Junagadh

Prof. Chirag J. Bhut

Head, Department of Chemistry, School of Science, Dr. Subhash University, Junagadh

Dr. Sagarkumar K. Babariya

Head, Department of Mathematics, School of Science, Dr. Subhash University, Junagadh



Preface



ChemBioInnovate 2026- A Three Days International Conference on Recent Innovations of Chemistry & Biology is a premier platform for academicians, researchers, scientists, students, and industrial partners to present and promote their research work on recent innovations of chemistry & biology.

Chemistry and biology are at the frontier of modern problems, ranging from health-care, pharmaceuticals, biotechnology, environment, and related areas to challenges in modern physics and materials science. These areas are undergoing a period of remarkable creative growth driven by an increasing interaction between the various fields, presenting both a challenge and an opportunity to meet the needs of our changing world. ChemBioInnovate 2026 focuses on highlighting the relevant emerging areas in chemistry and biology, providing a forum for exchange and collaboration among various participants, and disseminating information on recent innovations in chemical and allied sciences.

It is a matter of great pleasure for us to present you with this collection of innovative research work carried out by the authors in the fields of Chemistry, Biology, and related areas. We hope that the abstract book will provide a stimulus for further research and collaboration in the area.

We express our sincere gratitude to the speakers, authors, delegates, reviews, organizing committee members, volunteers, and supporting units for their generous contributions and support to us to make this ChemBioInnovate-2026 possible. We look forward to welcoming you all at Dr. Subhash University, Junagadh, during ChemBioInnovate 2026, and hope that you all will like the event.



Message from the President of Dr. Subhash University (DSU)

Mr. Rajbhai J. Chavda

President, Dr. Subhash University



It is with great pleasure and pride that I extend a warm welcome to all participants of “ChemBioInnovate 2026 – A Three Days International Conference on Recent Innovations of Chemistry & Biology” at Dr. Subhash University, Junagadh. We are honored to host this international conference on Chemistry & Biology at our university, which promotes academic excellence, research, innovations, and interdisciplinary learning.

Dr. Subhash University through Department of Chemistry and Department of Lifescience, School of Science, is organizing this conference in association with the Indian Society of Chemists & Biologists (ISCB), Lucknow. The conference will provide a platform to explore recent innovations and emerging trends in Chemistry, Biology and their interdisciplinary areas for meeting the current needs and demands of healthcare, pharmaceuticals, biotechnology, environment, and allied areas.

I am confident that ChemBioInnovate 2026 will provide a valuable platform for collaboration, exchange of knowledge, innovations, and inspiration to meet the challenges of contemporary issues. The conference deliberations will contribute to promoting and fostering interactions among academicians, researchers, scientists, students, and industries.

I appreciate the efforts of the organizing committee and all those who made this conference possible.

Thank you for participating and supporting this conference. I wish all delegates a fruitful, inspiring, and enriching conference experience.

Warm regards,



Message from the Provost of Dr. Subhash University (DSU)

Dr. Dipak D. Patel
Provost, Dr. Subhash University



It is with great pleasure that I welcome you all to ChemBioInnovate 2026-A Three Days International Conference on Recent Innovations of Chemistry & Biology, organized by Dr. Subhash University, Junagadh, in association with Indian Society of Chemists & Biologists (ISCB), Lucknow. The conference will provide an excellent opportunity for all of us to meet and share knowledge on recent innovations and emerging trends in Chemistry, Biology, and related disciplines.

We hope that this conference will help to create an atmosphere of free exchange of ideas and information among participants and serve as a forum for discussing ways and means for addressing the research and developmental needs of the emerging scenario.

The conference will include keynote and invited lectures, oral and poster presentations, and provide ample opportunities for delegates to exchange ideas, learn from each other, and interact with renowned scientists and academicians.

I am optimistic that ChemBioInnovate 2026 will leave an enduring legacy of inspiration, innovation, and interaction among scientists from various parts of the globe.

I express my sincere gratitude to all the members of the organizing committee, speakers, authors, delegates, reviewers, and volunteers for their support, time, and effort in making this conference possible.

I also extend my warm welcome to all the delegates and wish them a fruitful and pleasant stay here.

Warm regards,



Message from the President, ISCB, Lucknow

Prof. Anamik Shah
President, ISCB, Lucknow



Esteemed Delegates, Researchers, Academicians, and Participants,

It's a pleasure to welcome you all to "ChemBioInnovate 2026 – A Three Days International Conference on Recent Innovations of Chemistry & Biology." The conference will provide you with an opportunity to explore the cutting-edge developments in Chemistry, Biology, and related areas. Chemistry and Biology are the key disciplines that drive the growth of healthcare, pharma, biotechnology, environment, material science, and other areas. Therefore, their convergence creates new dimensions for innovations and solutions needed in the modern world.

The conference theme is entirely relevant as, nowadays, disciplines, technologies, and innovations are intertwined, so that interdisciplinary communication and information exchange helps to foster scientific breakthroughs and technological progress. Thus, it is important to create a forum where delegates and participants can share ideas and find potential collaborators in different fields.

I believe that keynote and invited talks, oral and poster presentations, and other sessions will help you get inspired and gather useful information for your own research. In addition, I believe that young researchers and students, in particular, will benefit from networking and interacting with more experienced scientists.

I appreciate the efforts of Dr. Subhash University, the organizing committee, keynote and invited speakers, authors, delegates, reviewers, volunteers, and others who were involved in organizing ChemBioInnovate 2026.

I wish a great success to the conference and all delegates a fruitful, inspiring, and knowledge-packed experience during their stay in the host city.



Message from the Dean, School of Science, Dr. Subhash University (DSU)

Dr. Mayank Pandya

Convener, ChemBioInnovate2026 Conference
Dean, School of Science,
Dr. Subhash University.



Dear Esteemed Delegates,

It is indeed great pleasure for the Dr. Subhash University to organize “ChemBioInnovate 2026 – A Three Days International Conference on Recent Innovations of Chemistry & Biology.” It is a great opportunity for all of us to come together and have the benefit of interacting with the subject matter experts and to enable an exchange of knowledge.

The conference will be an eye-opener for all of us where various keynote/investigative lectures, oral and poster presentations, and scientific discussions will converge to deliberate on recent innovations and latest technologies in Chemistry, Biology and other associated areas. Convergence of various allied disciplines of science has tremendous potential in innovating newer methodologies and approaches for meeting the challenges in the field of Healthcare, Pharmaceuticals, Biotechnology, Environment and related areas.

I am sure that this conference will promote research, innovations, knowledge exchange, and collaborative networking. I am optimistic that deliberations and discussions at this conference will be inspiring and motivating for all of us, and it will motivate young researchers and students to get engaged in these areas of science. I am indeed thrilled about the enthusiastic response and the support that we received for organizing this conference.

We express our profound gratitude to the Management of Dr. Subhash University, Organizing Committee, Faculty members, Speakers, Researchers, Delegates, and Volunteers for their immense support and valuable contributions towards the successful completion of this conference.

I hope that ChemBioInnovate 2026 will create long-lasting academic and professional relationships and inspire collaborative research and innovation for years to come. Wishing all of you a fruitful and enriching conference experience.

Warm regards,



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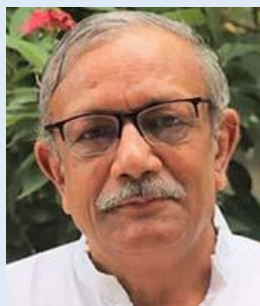


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KEYNOTE SPEAKERS

AI in Drug Discovery: Yesterday, Today & Tomorrow



Prof. Anamik K. Shah

President, ISCB, Lucknow

Abstract: Drug discovery has evolved from labor-intensive, instrument-driven synthesis toward a data-rich, computationally guided science. This talk traces that journey through four decades of work at the Centre of Excellence in Drug Discovery, showing how foundational infrastructure, training, and industry partnerships have set the stage for AI-enabled transformation.

Yesterday—Drug discovery relied on manual multistep synthesis, classical separation techniques, and hands-on instrumentation training (NMR, HPLC, GC-MS, FTIR) to identify and characterize new chemical entities, supported by curriculum reforms embedding medicinal chemistry, regulatory affairs, and IPR into pharma education. Today — This legacy has matured into a full ecosystem — analytical facilities, structure-based drug design, molecular docking, QSAR modeling, and toxicity profiling — supporting SMEs and pharma companies in process development, impurity profiling, and regulatory compliance, while training thousands of students now leading roles in global pharma, biotech, and regulatory agencies. Tomorrow — Computational drug design, deuterium chemistry, green analytical methods, and AI-driven simulation promise faster lead identification, reduced attrition, and solutions for polymorphism, nano-enabled drug delivery, and herbal/ayurvedic formulation science. Realizing these future needs integrated, skill-based training programs preparing scientists to combine AI with traditional pharmaceutical expertise. This abstract reflects on lessons from building a nationally recognized drug discovery hub and outlines a roadmap for embedding AI into the next phase of pharmaceutical research and HR development in India.



Perspectives and Challenges in Drug Research: Design and Synthesis of Nitrogen Heterocycles as Novel Therapeutic Agents



Prof. Prem Man Singh Chauhan

Former Chief Scientist and Professor (AcSIR), Central Drug Research Institute,
Lucknow 226031,

Email: premsc58@hotmail.com, secretaryiscb@gmail.com

Abstract: Infectious diseases continue to take an enormous toll on human health, particularly in tropical regions. The major burden is caused by the protozoa, helminthes and bacteria. Tropical diseases (malaria, leishmaniasis and trypanosomiasis) and tuberculosis, together contribute about 5% of the global disease burden. Focus of the present study will be on malaria, leishmania and tuberculosis.

It is well known fact that the heterocycles have immense importance in earlier period of human life and they still have much significance at present and in future too. Majority of these heterocyclic rings are known for their diversified good biological response. So, exploring in synthesis of new heterocycles would be a great advantage for human kind. In chemotherapeutic point of view, the search for the molecule having multiple targets has always been a very attractive strategy for medicinal chemists. The realistic approach to fight against drug resistant diseases is to combine active heterocycle units with independent mode of action. The modern approach to the development of new chemical entities against infectious diseases.

The recent advances and future scope in this area will be discussed briefly.

Keywords: Infectious diseases, Malaria, leishmaniasis, Nitrogen heterocycles



Plant-derived Bioactives as Therapeutic Drug Leads for Chronic Metabolic Diseases



Prof. Anoja Attanayake

Department of Biochemistry, Faculty of Medicine, University of Ruhuna, Sri Lanka

Abstract: Plant-derived bioactives have evolved from a plethora of medicinal plants with diverse therapeutic potentials and have been recognized as rich sources of therapeutic drug leads for the prevention and/or early management of chronic metabolic diseases. Globally, the prevalence of chronic metabolic diseases has reached epidemic levels, driven by a unique combination of genetic predisposition, environmental and lifestyle factors, including unhealthy diet and sedentary lifestyle. In particular, in South Asian countries, the prevalence of chronic metabolic diseases has shown a massive increase in disability-adjusted life years. Plant-derived bioactives are structurally diverse secondary metabolites, characterized by enormous scaffold diversity and structural complexity that have evolved to bind to proteins and other biological targets, modulating various human signaling or functional pathways. Nanotechnology has also proven to be instrumental in connecting the realms of plant-derived bioactives in the development of novel therapeutic entities. These novel plant-based drug delivery systems represent significant advances in improving biological activities by controlling drug release, improving drug solubility and permeability, drug targeting, reducing adverse reactions, and increasing physical and chemical stability. The in vitro, in vivo, and clinical trial data have shown that plant-derived bioactives such as *Coccinia grandis* (Linn.) Voigt, *Gmelina arborea* Roxb., *Spondias pinnata* (L.f.) Kurz, and nanoencapsulated plant-derived bioactives such as *Murraya koenigii* (L.) Spreng. *Senna auriculata* (L.) Roxb. are effective against hyperglycemia and dyslipidemia in diabetes mellitus. In silico studies conducted on secondary metabolites such as fucosterol and coccinoside C isolated from *C. grandis* leaves reveal more stable receptor-ligand complexes and greater binding affinity of each compound for a given receptor in α -amylase and α -glucosidase enzymes, signifying antidiabetic effects. Further, a polyherbal formulation composed of three medicinal plants, *Abelmoschus moschatus* Medik., *Asparagus falcatus* L., and *Barleria prionitis* L. has already been validated for its efficacy and mechanisms of action, with no acute and sub-chronic toxicity effects at the pre-clinical level, ensuring the promise of a nephroprotective therapeutic drug lead. In conclusion, the above scientific findings validate the therapeutic efficacy of



plant-derived bioactives against chronic metabolic diseases. Furthermore, the success stories in the therapeutic drug discovery pipeline demonstrate that integrating traditional phytomedicine with modern technology offers a highly viable, scalable strategy for mitigating the epidemic burden of chronic metabolic diseases.



Harmonizing Sustainability: Unveiling the Synergy of Green Chemistry and Green Hydrogen for a Sustainable Future



Prof. Nisheeth Desai

Editor-in-Chief,

Polycyclic Aromatic Compounds and Analytical Chemistry Letters

Taylor & Francis Group, <https://www.tandfonline.com>

Email: dnisheeth@rediffmail.com

Abstract: The escalating challenges of climate change, environmental degradation, and the depletion of fossil fuel resources have intensified the global transition toward sustainable chemical processes and clean energy systems. Green chemistry has emerged as a transformative framework for designing safer chemicals and sustainable manufacturing processes by minimizing hazardous substances, reducing waste, improving resource efficiency, and promoting renewable feedstock. Simultaneously, green hydrogen, produced using renewable energy resources, is gaining recognition as a pivotal clean energy carrier capable of decarbonizing the chemical, energy, and transportation sectors while supporting global net-zero emission targets.

This presentation explores the synergistic relationship between the principles of green chemistry and emerging green hydrogen technologies, highlighting their collective role in advancing a circular and sustainable economy. Particular emphasis will be placed on the Twelve Principles of Green Chemistry and their application in chemical and pharmaceutical manufacturing, sustainable catalytic transformations, solvent selection, mechanochemistry, and carbon-efficient synthetic methodologies.

The lecture will further discuss state-of-the-art renewable hydrogen production technologies, including water electrolysis powered by renewable energy, biomass- and biogas-derived hydrogen, and emerging plasma-assisted processes. Recent developments in carbon dioxide utilization, catalytic CO₂ hydrogenation, and green methanol synthesis will be presented as representative examples of integrating carbon capture with renewable hydrogen to establish closed-carbon-cycle processes. The role of green solvents, energy-efficient reaction technologies, and



innovative catalytic systems in reducing the environmental footprint of chemical synthesis will also be highlighted.

By integrating advances in sustainable chemistry with renewable hydrogen technologies, this presentation demonstrates how these complementary approaches can accelerate the transition toward low-carbon industrial processes, sustainable energy systems, and environmentally responsible innovation. The discussion aims to provide researchers, educators, and industrial practitioners with a comprehensive perspective on the opportunities and future directions at the interface of green chemistry and green hydrogen.



Nano-Enabled Herbal Therapeutics for the Management of Diabetes Mellitus



Dr. Walimuni Nayomi Deshani De Silva

Department of Biochemistry, Faculty of Medicine, University of Ruhuna,
Sri Lanka

Abstract: Diabetes mellitus is a common, serious, chronic, and complex metabolic disorder of multiple aetiologies with profound consequences, both acute and chronic that has increased in prevalence over the past few decades. Over time, convincing evidence has been established to present and confirm the involvement of inflammatory processes and oxidative stress in pathophysiological pathways in the development and progression of diabetes mellitus and its complications. Hyperglycaemia-induced oxidative stress triggers inflammatory pathways, while inflammation further enhances reactive oxygen species production, creating a vicious cycle that exacerbates disease progression. This intricate interplay highlights the need for therapeutic intervention capable of simultaneously targeting hyperglycaemia, oxidative stress, and inflammation. There is an ever-increasing interest in miraculous herbal therapeutic agents to manage various diseases such as diabetes mellitus. The impetus to exploit such alternative therapies lies in the intention to identify new drug lead molecules that may potentially be more effective than existing drugs and with minimum side effects. It has been widely proposed to combine herbal extracts with nano matrices as one of the newest and most current trending ways for the development of drug leads which allows for potentiation of the action of plant extracts, reducing the required dose and side effects and improving activity. The extracts of *Aegle marmelos* L. (Family: Rutaceae), *Coccinia grandis* L. (Family: Cucurbitaceae), *Catharanthus roseus* L. (Family: Apocynaceae), encapsulated alginate nanoformulations, as well as *Asparagus falcatus* L. (Family: Asparagaceae) loaded alginate/chitosan nanoformulations possess remarkable antidiabetic, antioxidant, and anti-inflammatory properties. Further, *in vivo* investigations have confirmed the efficacy and safety of *A. marmelos* loaded alginate nanoformulations highlighting their potential as a promising therapeutic candidate against diabetes. The investigations on *in vitro* release and stability underscore the advantage of nanoencapsulation as an advanced delivery strategy, enabling controlled pH responsive release while enhancing the stability, preservation, and protection of bioactive compounds against adverse environmental conditions. *In silico* investigations revealed that key phytoconstituents of *A. marmelos* exhibited strong binding affinities and stable receptor-ligand interactions with critical



therapeutic targets including α -amylase, α -glucosidase, DPP-IV, xanthine oxidase and hyaluronidase highlighting its antidiabetic and anti-inflammatory effects. The growing body of evidence generated from herbal extracts encapsulated alginate/chitosan nanoformulations marks a transformative step in bridging traditional phytomedicine and modern nanomedicine. These advances provide a scientifically validated pathway toward clinical translation and the eventual development of multifunctional nano herbal drug for diabetes mellitus.

Turning Chemistry into Cure: Struggle and Story Behind the Discovery of Phase II Clinical Candidate



Prof. Diwan Singh Rawat

Senior Professor of Chemistry, University of Delhi
Vice Chancellor, Kumaun University, Nainital, Uttarakhand
E Mail: dsrawat@chemistry.du.ac.in

The ‘one drug, multiple targets’ concept has gained attention of both the academic and the pharmaceutical industry in recent years. To achieve such goals concept of molecular hybridization was put forward wherein two or more distinct pharmacophores are covalently linked into a single molecule.^{1,3} The benefit of using molecular hybrid is to activate different or same targets by a single molecule, and increase the therapeutic efficacy and bioavailability. Molecular hybridization approach has resulted many drug candidates with improved activity profile and some of these compounds are in clinical trials.⁴ We have utilized this concept in designing antimalarial molecules with aminiquinoline and pyrimidine pharmacophore and many hybrids showed low nano molar activity. Later a massive multi-institutional collaboration was started and over 700 new molecules were studied for Nurr1 activation, a potential target for Parkinson disease model and identified 15 hits out of which 3 compounds have cleared pre-clinical trials.⁵⁻⁸ These molecules activate the Nurr1 enzyme which is essential for the survival of the dopamine neurons, stops the aggregation of α -synuclein protein in the brain, and promotes autophagy. Systematic studies demonstrated that these compounds can cure the Parkinson induced mice model at 5 mg/kg body weight without any toxicity and recently one of the molecules has successfully cleared phase I human clinical trials and it has moved to human phase II clinical trials (Figure) and two molecules are in the pre-clinical stage of development, one for auto-immune disease and other for dementia.

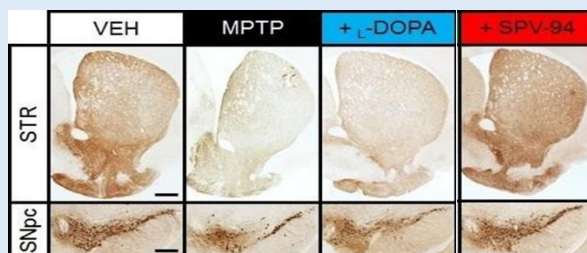


Figure: (1) Striatum of healthy mice, (2) with PD, (3) after treatment with L-DOPA, (4) after treatment with our compound

References:



1. B. Meunier, B. Acc. Chem. Res. 2008, 41, 2008.
2. S. S. Shikha, M. Sharma, P.M.S. Chauhan, Drug News Perspect, 2010, 23, 632.
3. M. P. P., de Sena L. S., Franco, T. L., Montagnoli, C. A. M. Fraga, Expert Opin. Drug Discov., 2024, 19, 451.
- A. L. Parkes, I. A. Yule, Expert Opin. Drug Discov. 2016, 11, 665.
4. S. Manohar, D. S. Rawat, ACS Med. Chem. Lett. 2012, 3, 555.
5. M. Tripathi, D. Taylor, S. I. Khan, B. L. Tekwani, P. Ponnann, T. Velpandian, U. Das, D. S. Rawat, ACS Med. Chem. Lett. 2019, 10, 714.
6. W. Kim, M. Tripathi, C. Kim, S. Vardhineni, Y. Cha, S. K. Kandi, M. Feitosa, R. Kholiya, E. Sah, G. Sindhu, Y.-S. Kim, B. Cohen, D. S. Rawat, K.-S. Kim, Nature Communications, 2023, 14, 4283.
7. D. S. Rawat, Sunny Manohar, Ummadisetty Chinna Rajesh, Deepak Kumar, Anuj Thakur, Mohit Tripathi, Panyala Linga Reddy, Shamseer Kulangara Kandi, Satyapavan Vardhineni, Kwang-Soo, and Chun-Hyung Kim, Amino-quinoline based hybrids and uses thereof. Pub no: US 2017/0209441 A1; EP Application No. 13758678; PCT/US2013/28329; WO2013134047 A3, PCT/US2013/028329 (2013). US 11,026,943 B2 (2021), ES2899730T3 (2022), CA3175047A1 (2022), EP3971178A1 (2022), PT2822936T (Portugal, 2021).



The Age of Intelligent Plant Science: May the AI Be with You



Dr. Bhupendrasinh Jadeja

Department of Botany, M. D. Science College, Porbandar

Abstract: Artificial Intelligence (AI) is rapidly transforming the way biological systems are observed, analysed, and understood, marking the emergence of a new era of intelligent plant science. Traditionally, plant biology has relied on direct observation, experimental measurements, statistical analysis, and increasingly sophisticated molecular techniques. Today, AI and machine learning are providing new approaches to process complex biological information at unprecedented speed and scale. From identifying plant species and detecting diseases to quantifying phenotypic traits, monitoring crop health, predicting stress responses, and integrating environmental and molecular datasets, AI is expanding the analytical capabilities of plant scientists. This talk explores the transition from image recognition to predictive biology, with particular emphasis on emerging Indian developments. Examples including AI-assisted crop diagnosis, smartphone-based plant health assessment, rice stress evaluation, AI-enabled plant phenotyping, remote sensing, and AI-designed genome-editing tools demonstrate how computational intelligence is moving from experimental algorithms toward practical biological applications. These developments illustrate a progression from AI that can see and identify plants to systems capable of measuring, predicting, advising, and potentially designing biological interventions. However, intelligent plant science must extend beyond impressive accuracy values. Challenges including dataset bias, limited field validation, poor generalization across crops and environments, explainability, infrastructure constraints, and the distinction between statistical prediction and biological understanding remain critical. The talk therefore examines emerging directions including multimodal AI, edge computing, explainable AI, foundation models, AI-integrated omics, and autonomous experimentation. Ultimately, the future of plant science lies not in replacing the botanist, but in combining human biological insight with machine computational intelligence to observe more, integrate more, and discover better.

Keywords: Artificial Intelligence; Plant Biology; Machine Learning; Plant Phenotyping; Predictive Biology



Sustainable Multicomponent Approaches for Bioactive Molecules and Responsive Chemosensors



Prof. Naval Kapuriya

Professor & Head

Department of Chemistry and Forensic Science, Bhakta Kavi Narsinh Mehta
University Junagadh-362263

Email: navalkapuriya@bknmu.edu.in

Abstract: Multicomponent reactions (MCRs) have emerged as powerful synthetic platforms that align efficiency, molecular diversity, and sustainability—three pillars essential for modern chemical science. This talk highlights how MCR strategies can be leveraged to rapidly construct complex bioactive scaffolds and functional chemosensing architectures with minimal environmental footprint. By integrating atom economical transformations, solvent reduced protocols, and energy efficient activation modes, MCRs enable the streamlined generation of heterocyclic frameworks, privileged pharmacophores, and tunable sensing motifs in a single operational step. The approach not only accelerates the discovery of therapeutic leads but also facilitates the design of responsive molecular probes capable of detecting biologically and environmentally relevant analytes with high selectivity. Case studies will illustrate how scaffold diversity, mechanistic flexibility, and green chemistry principles converge to deliver innovative anticancer agents, antimicrobial candidates, and colorimetric/fluorometric sensors. The presentation underscores the translational potential of sustainable MCR chemistry as a unifying strategy for advancing both drug discovery and molecular diagnostics, offering a versatile toolbox for next generation functional molecules. An overview of organocatalysis, application of bifunctional catalysis and our recent findings will be discussed.



Beneficial Microbes in Modern Medicine: Emerging Trends and Future Opportunities



Prof. Ramesh Kothari

UGC-CAS Department of Biosciences, Saurashtra University, Rajkot-360005,
Gujarat

Email: kothari1971@gmail.com

Abstract: The rising prevalence of multidrug-resistant (MDR) infections, the growing burden of chronic diseases, and the limitations of conventional therapeutics have accelerated interest in beneficial microorganisms as novel tools in modern medicine. Beneficial microbes, particularly probiotics and other health-promoting bacteria associated with fermented foods and natural ecosystems, are increasingly recognized for their therapeutic potential beyond their traditional role in maintaining gut health. Their ability to modulate the host microbiome, regulate immune responses, produce bioactive metabolites, exhibit anticancer potential, and inhibit pathogenic microorganisms has positioned them as promising candidates for next-generation microbial therapeutics.

Keywords: Probiotics, Microbial Therapeutics, Multidrug-Resistant (MDR) Infections, Host Microbiome Modulation



Metabolic Vulnerabilities in Cancer: Cellular Reprogramming and Multitarget Identification of Plant-Derived Leads



Prof. Suhash Vyas

Department of Life Sciences, Bhakta Kavi Narsinh Mehta University, Junagadh

Abstract: Cancer cells undergo significant metabolic adaptations that enable them to sustain proliferation, biosynthesis, and survival despite variations in the microenvironment. Although the Warburg effect is a well-documented aspect of cancer metabolism, metabolic reprogramming extends beyond increased glycolysis and lactate production. It involves coordinated alterations in glucose processing, pyruvate metabolism, biosynthetic pathways, and survival signaling. Elucidating these adaptations provides a foundation for identifying metabolic vulnerabilities that could expedite therapeutic lead discovery. This presentation highlights how metabolic shifts associated with cancer affect therapeutic susceptibility, with a focus on glycolytic regulation and the functional role of pyruvate kinase M2 (PKM2). Additionally, the presentation will discuss how metabolite profiling and mass spectrometry-based approaches can produce molecular signatures of altered cellular metabolism, thereby guiding the selection of biologically relevant targets and pathways. Building on this biochemical foundation, the study integrates chemical profiling, computational analysis, and experimental validation to investigate plant-derived compounds for multitarget anticancer efficacy. Gas chromatography–mass spectrometry-based profiling of a relatively understudied medicinal plant revealed a chemically diverse collection of metabolites; candidate scaffolds were subsequently selected for interactions with multiple cancer-associated proteins. The selected candidates demonstrated promising multitarget binding, and extract-level cell experiments further showed dose-dependent cytotoxicity against A549 lung cancer cells. Collectively, the findings present a comprehensive metabolism-to-molecule-to-biology framework for identifying potential cancer treatments. The study underscores that by comprehending metabolic plasticity, cancer research can advance from merely describing pathways to identifying and validating novel molecular vulnerabilities.

Keywords: Metabolic adaptation, Glucose metabolism, Therapeutic susceptibility, Plant-derived compounds, Multitarget anticancer activity



Chemoinformatics via Electronic Structure Methods: Fundamentals, Computational Capabilities, and Molecular Analysis



Dr. Jasmin Bhalodia

Department of Chemistry and Forensic Science,
Bhakta Kavi Narsinh Mehta University,
Junagadh-362263, (Gujarat) India
E-mail: jasmin_bhalodia@yahoo.com

Abstract: Chemoinformatics serves as an interdisciplinary field combining chemistry, computer science, and data science to analyze, manage, and predict chemical properties across vast molecular spaces. It utilizes computational frameworks to organize, retrieve, and interpret chemical structures and database records efficiently. Primary module domains involve design of molecule, structure representation techniques, and chemometrics. To optimize molecular geometries, quantum mechanical routines (Hartree-Fock, Density Functional Theory) and molecular mechanics force fields (MMFF, CHARMM, UFF) refine spatial orientations, stability, and dipole moments. Electronic reactivity, charge delocalization, and stability profile assessments are systematically evaluated through Frontier Molecular Orbital (HOMO-LUMO) interactions, Natural Bond Orbital (NBO) population dynamics, and topological techniques like Quantum Theory of Atoms in Molecules (QTAIM) and Molecular Electrostatic Potential (MEP) surfaces. A broad array of open-source and proprietary software platforms—including Gaussian, ORCA, Avogadro, Multiwfn, ChemAxon, and RDKit—underpins modern data-driven chemical exploration. Driven by advancements in artificial intelligence, machine learning, and quantum computing, chemoinformatics continues to streamline chemical screening, property modeling, and data-centric molecule optimization.



Nanobiotechnology-driven approaches for sustainable healthcare



Dr. Sougata Ghosh

Department of Microbiology, School of Science, RK University, Rajkot-360020,
Gujarat, India;

Visiting Professor, Department of Physics, Faculty of Science, Kasetsart
University, Bangkok, Thailand

Email: sougata.ghosh@rku.ac.in

Abstract: Nanomaterials with shape- and size-dependent physicochemical and optoelectronic properties can be designed using several physical and chemical methods. However, hazardous reaction conditions and toxic chemical reagents used in these methods compromise the biocompatibility of the synthesized nanoparticles, making them unsuitable for biomedical applications. Hence, several environmentally benign biological routes have been designed to synthesize gold, silver, platinum, palladium, copper, and bimetallic nanoparticles using viruses, bacteria, fungi, algae, and medicinal plants. As a part of our growing interest in novel nanomedicine, we have developed methods to use various medicinal plants found in nature, like *Dioscorea bulbifera*, *Gnidia glauca*, *Plumbago zeylanica*, *Barleria prionitis*, *Gloriosa superba*, and many more, for synthesizing nanospheres, nanohexagons, nanotriangles, and nanorods. Careful optimization of time, temperature, pH, and concentration of metal salts may help in the synthesis of nanomaterials with well-defined shape and size. Further, naturally occurring bioactive principles like curcumin, diosgenin, etc. may stabilize and enhance the anticancer, antioxidant, antidiabetic, antimicrobial, and antibiofilm activities of the biogenic nanoparticles. In view of the background, it can be concluded that there is huge scope for further research towards translation of the biogenic nanoparticles as potential nanomedicine in the future.

Keywords: Nanoparticles, biological synthesis, medicinal plants, functionalization, biomedical applications.



Bridging Chemistry and Biology Through Small Peptide: Design and Conjugation for Future Therapeutics

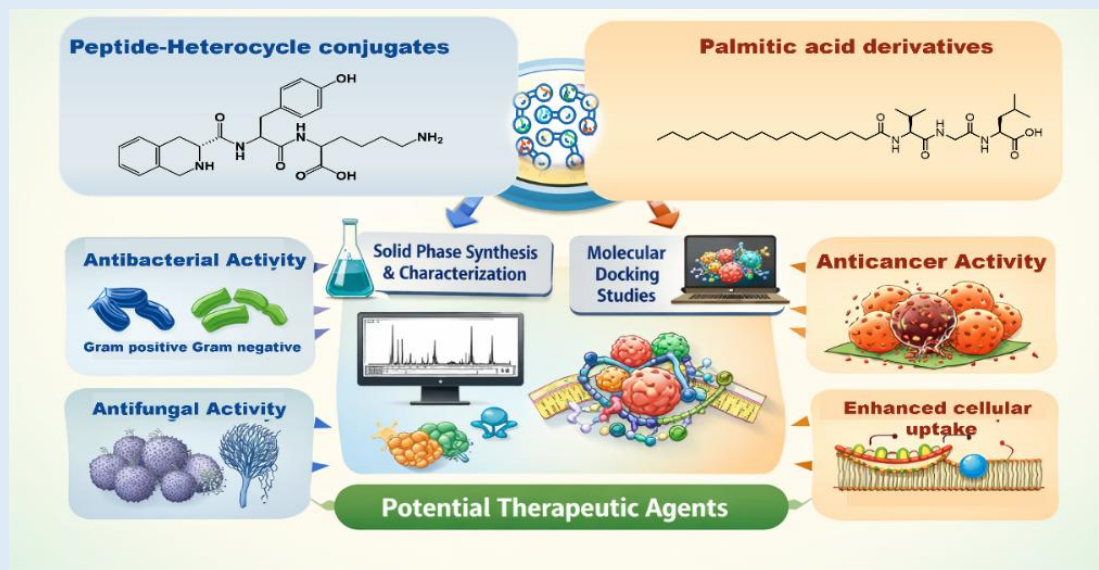


Dr. Yashwantsinh Jadeja

Associate Professor, Department of Chemistry, Faculty of Science, Marwadi University, Rajkot.

Abstract: Recent advances in peptide-based therapeutics are leading to drugs that are less toxic and are biocompatible. They are highly specific, structural versatility, and have potent cell permeability. To increase stability and bioavailability, peptides can be conjugated to fatty acids such as palmitic acid, linoleic acid, retinoic acid and bioactive heterocycles such as benzothiazole, indole, tetrahydroisoquinoline, thiophene, pyrrolidine which can modulate biological activity and improve structure–activity relationships. Innovative strategies such as cationic amino acid enrichment, backbone modification, and cyclization can be used to further enhance peptide performance.

In the present study, we have conjugated dipeptides with different bioactive heterocycles and fatty acid. Solid-phase peptide synthesis and solution phase peptide synthesis protocols were used for the synthesis of molecules. The synthesized compounds having fatty acid conjugation were evaluated for anticancer and dermatology-based applications. Heterocycle conjugated peptides were evaluated for antimicrobial activity against Gram-positive and Gram-negative bacteria, as well as antifungal strains, demonstrating promising results. Molecular docking studies was performed to understand the interaction of these compounds with relevant biological targets. The study shows that by conjugating peptide scaffold with heterocycle moieties, lipid conjugation can improve its therapeutic potential.



References:

1. Lalani, N., Tivari, S., Jain, V., & Jadeja, Y. (2024). Review on therapeutic potential of peptides: Advancements in synthesis methods, linear and cyclic peptides, and strategies for overcoming challenges. *Peptide Science*, 116(4), e24343.
2. Tivari, S. R., Kokate, S. V., Sobhia, E. M., Kumar, S. G., Shelar, U. B., & Jadeja, Y. S. (2022). A Series of Novel Bioactive Cyclic Peptides: Synthesis by Head-to-Tail Cyclization Approach, Antimicrobial Activity and Molecular Docking Studies. *ChemistrySelect*, 7(27), e202201481.
3. Tivari, S. R., Kokate, S. V., Delgado-Alvarado, E., Gayke, M. S., Kotmale, A., Patel, H., ... & Jadeja, Y. (2023). A novel series of dipeptide derivatives containing indole-3-carboxylic acid conjugates as potential antimicrobial agents: the design, solid phase peptide synthesis, in vitro biological evaluation, and molecular docking study. *RSC advances*, 13(35), 24250-24263.
4. Tivari, S. R., Kokate, S. V., Belmonte-Vázquez, J. L., Pawar, T. J., Patel, H., Ahmad, I., ... & Jadeja, Y. (2023). Synthesis and evaluation of biological activities for a novel 1, 2, 3, 4-tetrahydroisoquinoline conjugate with dipeptide derivatives: insights from molecular docking and molecular dynamics simulations. *ACS omega*, 8(51), 48843-48854.
5. Tivari, S. R., Kokate, S. V., Gayke, M. S., Ahmad, I., Patel, H., Kumar, S. G., & Jadeja, Y. S. (2022). A series of dipeptide derivatives containing (S)-5-Oxo-pyrrolidine-2-carboxylic acid conjugates: design, solid-phase peptide synthesis, in vitro biological evaluation, and molecular docking studies. *ChemistrySelect*, 7(48), e202203462.



Bioprospecting Across Diverse Ecosystems and Unlocking the Future of Microbial Technology



Dr. Dushyant Dudhagara

Department of Life Sciences, Bhakta Kavi Narsinh Mehta University, Khadiya-
362263, Junagadh, India

Email of Corresponding author: dushyant.373@gmail.com

Abstract: Marine and hot spring ecosystems harbour rich, unexploited microbial diversity capable of producing unique biomolecules with profound pharmaceutical potential. Despite this recognized wealth, targeted isolation of microorganisms producing high-value therapeutic enzymes from such extreme environments remains limited. Here, we report the functional characterization of *Brevibacillus* sp. and *Alcaligenes* sp. as robust producers of two key anticancer enzymes: L-asparaginase (ASNase) and L-methioninase. To achieve sustainable, high-yield production, agro-industrial residues, specifically cottonseed oil cake and groundnut oil cake, were utilized as low-cost substrates, significantly enhancing enzyme yields. Characterization revealed that both ASNase and L-methioninase operate optimally at 50 °C and pH 8.0. Steady-state kinetic analysis of the purified enzymes yielded a V_{max} of 1.51 U/mL and a K_m of 0.13 mM, demonstrating remarkably high substrate affinity. In vitro pharmacological evaluations demonstrated multifaceted therapeutic activities, including notable antioxidant, hemolytic, and potent cytotoxicity against MCF-7 breast cancer cell lines (IC_{50} = 60.36 μ g/mL). These findings underscore the strategic importance of exploring extreme marine and geothermal habitats to discover high-performance microbial enzymes with transformational potential in oncology and broader biomedical applications.

Keywords: Hot Spring; L-asparaginase; L-methioninase; Anticancer activity, Biomedical Application

**ORAL PRESENTATION - ACADEMICIAN****ORAL 1****Development of an Efficient Synthetic Methodology for Imidazo[1,2-A]
Pyridine Derivatives and Their Antimicrobial Evaluation****Dr. Khyati L. Bharti, Rana Nirali, Bhavesh Rathod, Dr. Saurabh K. Patel***

Veer Narmad South Gujarat University Surat-395007, (Gujarat) India

* Email of Corresponding author: bkhyati919@gmail.com**Abstract:**

A series of structurally diverse novel imidazo[1,2-a] pyridine derivatives were developed through a systematic optimization of the synthetic protocol. The influence of reaction parameters, including solvent, catalyst, temperature, reaction time, and reactant ratio, was evaluated to identify efficient reaction conditions. The optimized methodology demonstrated improved synthetic efficiency, affording the target compounds in good to excellent yields with reduced reaction times and a straightforward work-up procedure. The structures of the synthesized derivatives were established using IR, ¹H NMR, and mass spectroscopic techniques. In addition, antimicrobial screening revealed that a number of the synthesized compounds exhibited moderate to good activity.

Key words: Imidazo[1,2-a] pyridine, synthetic methodology, antimicrobial activity

**ORAL 2****Risk Based LC–MS/MS Assessment of Chloroacetic Acid as a Genotoxic Impurity in Midodrine Drug Substance****Bhavin B Dhaduk****Hitesh Thumbar*¹, Bhavin Dhaduk**^{1,2}**^{1, 2} Analytical Development Laboratory, Zydus Research Center, Baroda.^{1,2} Department of Chemistry, Faculty of Science, Atmiya University, Rajkot.* Email of Corresponding author: dr.bhavindhaduk@gmail.com**Abstract:**

Chloroacetic acid (CAA) is a known potential genotoxic impurity (PGTI) that could exist at trace levels in the midodrine drug substance drug substance. Due to its toxicological significance, accurate and highly sensitive quantification of CAA is essential to ensure patient safety and compliance with regulatory standards. However, CAA poses analytical challenges due to its high polarity and low molecular weight. To overcome these limitations, a derivatization strategy using 5-bromovaleric acid was employed to improve sensitivity, recovery, and method robustness. A robust LC-MS/MS protocol was developed and validated following ICH Q2(R1) and ICH M7(R1) guidelines. Chromatographic separation was accomplished using an ACE PFP C18 column (150 mm × 4.6 mm, 3 μm). A gradient elution was used with 0.1% formic acid (Mobile Phase A) and methanol (Mobile Phase B), starting with 90:10 (v/v) ratio. The instrument was operated with flow rate of 0.8 mL/min, an injection volume of 25 μL, and the column temperature maintained at 30°C. The method exhibited excellent linearity for CAA across the concentration range of 0.15–1.0 μg/mL, with a regression coefficient (r^2) of 0.9999. LOD and LOQ were 0.075 μg/mL and 0.15 μg/mL, respectively. % Recovery results ranged from 88.43 % to 98.38%, and precision at the 100% level demonstrated a % RSD of 0.46. This validated LC-MS/MS method is robust, accurate, and appropriate for routine trace level analysis of chloroacetic acid in midodrine drug substances within quality control environments.

Key words: LC-MS; Midodrine; Genotoxicity; Derivatization; Quantification.

ORAL 3

Synthesis and Structure of Mononuclear Nickel(II), Cobalt(III) and Trinuclear Cadmium(II) Complexes Using N₂O-Donor Schiff Base Ligand

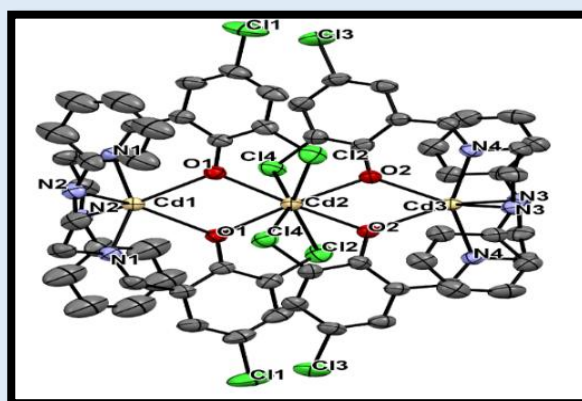
Sadeka J. Munshi*

Department of Applied Science and Humanities, Sardar Vallabhbhai Patel Institute of Technology,
Vasad- Gujarat, India - 388306

* Email of Corresponding author: sadeka.chem@yahoo.com

Abstract:

Schiff base ligands continue to attract significant attention in coordination chemistry owing to their versatile coordination behavior and ability to stabilize metal ions in diverse nuclearities and coordination environments. One N₂O-donor tridentate ligand 2,4-dichloro-6-(((2-(phenylamino) ethyl) amino) methyl) phenol (HL3) has been synthesized by the condensation of N-phenyl ethylenediamine and 3,5-dichlorosalisaldehyde. The tridentate N₂O-coordinate ligand has been used in the synthesis of two mononuclear complexes [Ni(L3)₂]. H₂O and [Co(L3)₂]. ClO₄ and one trinuclear complex [Cd₃(L3)₄] (ClO₄)₂ and the complexes were characterized by spectroscopic techniques and single crystal X-ray diffraction studies. Single crystal X-ray diffraction data shows Ni (II) complex has distorted octahedral geometry and two ligands are coordinated to the nickel centers and one H₂O molecule is outside the coordination sphere but Cd (II) complex is trinuclear where two end Cd centers i.e. Cd (1) and Cd (3) has octahedral geometry and middle cadmium i.e. Cd (2) has distorted tetrahedral geometry. The complexes exhibited antimicrobial activity against Gram-positive and Gram-negative bacteria, with Co (III) showing the highest activity.



**ORAL 4****The Morpho-Physiological Attributes Improvement Through L-Tryptophan
Priming in Brinjal Cultivars****J. D. Dobaria*, J. J. Dhruv and N. J. Patel**Department of Biochemistry & Physiology,
Anand Agricultural University, Anand

Abstract:

Brinjal is the fifth most economically important solanaceous crop. It is a nutrient-dense vegetable grown worldwide for its tender edible fruit. Seed quality plays an important role in crop production and lack of quality seed is one of the major hindrances in bridging the yield gap. Seed priming has emerged as a promising pre-sowing treatment that involves exposing seeds to specific chemical compounds under controlled conditions to improve their physiological and biochemical traits. L-Tryptophan boosts internal production of indole-3-acetic acid for better root and shoot elongation and thus germination. Considering the relationship of L-Tryptophan priming with germination-associated traits, this study tested the hypothesis that exogenous supply of L-Tryptophan to seeds can affect germination and physiological vigor in seedlings. Brinjal seeds were exposed to soaking solutions containing different concentrations of L-Tryptophan (0, 25, 50, 75, 100, 125, 150, 175, 200, 225 and 250 ppm), and the seedlings of two brinjal cultivars (GAB 6 and GRB 8) were evaluated after 15 days after germination. The results revealed that treated seeds showed better germination fitness and seedlings showed greater vigor, and these parameters increased with increasing concentrations of L-Tryptophan. The root weight, root length, shoot weight, shoot length, seedling height, germination percent, vigor index I and vigor index II were increased and mean germination time decreased by 26.60 %, 25.95 %, 8.97%, 13.47%, 20.52%, 17.64%, 25.15%, 13.90%, and 11.51%, respectively in 200 ppm L-Tryptophan treatment over control. On the other hand, the cultivar GRB 8 performed better than GAB 6 cultivar among all traits. Thus L-Tryptophan seems to be an important imino acid for seedling performance and vigor of brinjal seeds.

Key words: Brinjal, L-Tryptophan, Seed priming



**ORAL 5****Formulation and Evaluation of Microsponge Loaded Controlled Release****Topical Gel of Mometasone Furoate****Niyati Shah***

Assistant Professor, Department of Pharmacy, Sumandeep Vidyapeeth Deemed to be University,
Piparia, Vadodara-391760, Gujarat.

Abstract:

microsponge loaded gel batch (F10) was subjected for the short-term stability study at $40 \pm 2^\circ\text{C}$ for 30 days. Result: On the basis of various characterization, batch F8 was selected for the topical gel formulation. DSC study showed the melting behavior of drug present into microsponge. SEM studies showed that optimized microsponge was uniformly spherical and porous in nature. The drug release from optimized microsponge formulation follows zero order release kinetic. The microsponge Aim: Aim of present work was to formulate and evaluate Microsponge Loaded Controlled Release Topical Gel of Mometasone Furoate Experimental work: In present study Mometasone Furoate microsponge preparation was prepared by Quassi emulsion solvent diffusion technique using Eudragit RS100. Optimized batch (F8) of Mometasone furoate microsponge was characterized for DSC, SEM, FTIR and BET analysis. The optimized batch of microsponge was further formulated as gel formulation for topical delivery. The prepared gel was evaluated for pH, spreadability, viscosity and diffusion studies and skin irritation study. The drug release data of best microsponges loaded gel formulation was fitted into different kinetic models. The optimized loaded gel formulation releases the drug in controlled manner for 8 hrs. Conclusion: Mometasone Furoate was successfully encapsulated into Microsponge by Quasi Emulsion solvent diffusion technique using Eudragit RS100 as polymer for enhancement of solubility, drug release data and controlling the release rate upto 8 hrs. After stability study no physical changes and almost same drug release with Mometasone Furoate microsponge gel was observed.

Key words: Microsponge; Mometasone Furoate; Control release gel; Quassi Emulsion Solvent Diffusion method.

**ORAL PRESENTATION – PHD SCHOLAR****ORAL 6****Analytical Method Development, Isolation and Characterization of Synthetic Compounds Using Advanced Instrumental Techniques****Arvind Ambabhai Kotadiya**

Abstract:

In the present study, the selected dipeptide molecule GPR-001-C010 was synthesized by solid-phase peptide synthesis (SPPS), providing an efficient and reliable approach for shortpeptide preparation. The synthesized crude peptide was purified by preparative HPLC and subsequently evaluated by analytical HPLC and LC–MS to assess its purity and confirm the molecular mass. Structural characterization was performed using NMR and IR spectroscopy to establish the molecular structure and structural integrity of the synthesized peptide. The purified peptide was subjected to forced degradation studies under suitable stress conditions to investigate its degradation behavior and identify potential degradation products. A major degradation impurity was isolated by preparative HPLC and characterized using LC–MS, NMR, and IR spectroscopy. Based on the analytical and spectroscopic data, the structure of the degradation impurity was elucidated and a probable degradation pathway/mechanism of impurity formation was proposed. The study therefore provides an integrated approach for the synthesis, purification, characterization, and structural elucidation of degradation impurities in the selected dipeptide molecule.

**ORAL 7****Aspergillus Niger Mediates Phosphate Solubilization, Thereby Increasing Nutrient Bioavailability for Enhanced Crop Growth****Stavan Vasoya*** Email of Corresponding author: stavanvasoya5@gmail.com**Abstract:**

Efficient phosphorus management is vital for enhancing crop productivity and ensuring sustainable agricultural practices. However, a significant portion of soil phosphorus remains in insoluble forms, limiting its availability to plants. This study investigates the role of *Aspergillus niger* in the solubilization of inorganic phosphate, aiming to improve nutrient bioavailability in crop production systems. *A. niger* produces organic acids and other metabolites that convert insoluble phosphate compounds into forms accessible to plants, thereby acting as a natural biofertilizer. The application of *A. niger* in agricultural soils resulted in increased phosphorus uptake by crops and improved overall soil fertility. Our findings suggest that harnessing the phosphate-solubilizing ability of this fungus can reduce dependency on chemical fertilizers, support sustainable crop management, and promote environmental health. The integration of *A. niger* as a biofertilizer represents a promising strategy for advancing nutrient management and achieving higher crop yields in an eco-friendly manner.

Keywords: *Aspergillus niger*; Phosphate-solubilizing; Nutrient bioavailability; Biofertilizer; Sustainable agriculture; Crop productivity.

**ORAL 8****Cobalt Removal by *Priestia Megaterium* CO32 and its Role in Mitigating
Cobalt-Induced Stress in *Crotalaria Juncea*****Cressida Mehta*, Mayur Marathe** and Dhruti Amin****

C. G. Bhakta Institute of Biotechnology, Uka Tarsadia University, Maliba Campus, Gopal Vidyanagar, Bardoli-Mahuva Road, Tarsadi, Surat, Gujarat 394350, India

Abstract:

Cobalt (Co) contamination threatens plant growth by disrupting cellular homeostasis and inducing oxidative stress. *Crotalaria juncea* (Sunn hemp), a legume with phytoremediation potential, is sensitive to elevated Co levels. This study aimed to assess the Co-removal capacity of Co-tolerant *Priestia megaterium* CO32 and its potential to mitigate Co-induced stress in *C. juncea*. Bacterial Co removal was evaluated at 0–1200 ppm using adsorption efficiency, cell-associated uptake, and extracellular polymeric substance (EPS)-associated binding, while FTIR identified functional groups involved in Co binding. Plant responses were assessed by comparing *P. megaterium*-treated and untreated seeds under non-stress and Co-stress conditions through germination, seedling vigor, oxidative-stress markers, antioxidant enzymes, photosynthetic pigments, and biochemical parameters. At 100 ppm Co, adsorption efficiency increased from 51.65% at 24 h to 95.78% at 48 h, while cell-associated uptake increased from 34.02% to 68.94% and EPS-associated adsorption increased 1.37-fold. At 1200 ppm Co, adsorption efficiency increased from 11.55% to 23.56%, with cell-associated uptake reaching 99.12 mg/g biomass. FTIR indicated hydroxyl, carboxyl, and amide groups in Co binding. Compared with untreated seeds, *P. megaterium*-treated seeds showed increased germination from 73.3% to 100% and vigor index from 630 to 1076.7 under non-stress conditions. Under Co stress, treated seeds showed improved germination from 53.3% to 86.6% at 800 ppm and from 73.3% to 80% at 1200 ppm compared with corresponding untreated seeds. Bacterial treatment reduced H₂O₂/ROS, proline, phenolics, salicylic acid, POD, and CAT,



while increasing SOD, total protein, reducing sugars, carbohydrates, and total chlorophyll. Overall, *P. megaterium* CO32 demonstrated Co-removal capacity and potential to mitigate Co-induced stress in *C. juncea*, supporting its application in integrated microbial-assisted bioremediation and phytoremediation.

Keywords: Heavy metal stress; Sunn hemp; oxidative stress; plant growth promotion; bacterial-assisted phytoremediation.

**ORAL 9****Comparative Analysis of Antioxidant Enzyme Activities and Kinetics in
Sapindus Mukorossi and *Acacia Concinna*
Naghera Nisha Rameshbhai***

Abstract:

This study compared antioxidant enzyme activities in two saponin-rich plants, *Sapindus mukorossi* and *Acacia concinna*. Dried fruit powders were analysed for catalase, peroxidase, and polyphenol oxidase activities using spectrophotometric methods. Results showed that *Acacia concinna* exhibited higher catalase and peroxidase activities, while *Sapindus mukorossi* displayed greater polyphenol oxidase activity. Enzyme kinetics, evaluated through Michaelis–Menten modelling and Lineweaver–Burk plots, revealed that *Acacia concinna* generally had lower K_m and higher V_{max} values, indicating stronger substrate affinity and catalytic efficiency. Linear Discriminant Analysis explained 96.53% of the variation, and post hoc tests confirmed significant differences ($P = 0.05$) between the species. Overall, the findings highlight distinct enzymatic profiles and kinetic behaviours of these plants, suggesting their potential roles in antioxidant defence and stress response mechanisms.

Keywords: Enzyme; Kinetic; Antioxidant defence; Physiological stress.

**ORAL 10****Enhanced Biodegradation of Targeted Pollutant: Core Microbiome
Optimization and Molecular Pathway Elucidation****Hetvee B Vank*, Dr. Abhijeet Joshi****

Department of life sciences, Atmiya University, Kalawad Road, Rajkot, 360001, India

Abstract:

Over the past several decades, India has experienced significant growth in industrial infrastructure, which is crucial for the nation's economic development. However, this progress often comes at the expense of the environment, as industrial effluents are commonly discharged into natural water bodies. These water sources are not only used for various human needs but also serve as habitats for countless living organisms. Industries such as the textile, plastic, and chemical sectors are major contributors, releasing effluents that eventually merge with rivers, ponds, groundwater, and even reach marine ecosystems. To address this pollution at its source, we can utilize biological processes involving the core microbiome—microorganisms already present at contaminated sites, which have adapted to degrade pollutants through their enzymatic systems. For a sustainable environment, these microbiomes can be harnessed using advanced molecular technologies like 16S rRNA gene sequencing and amplicon sequencing to aid in the degradation and detoxification of polluted soil and water. Isolating microbes from contaminated sites and cultivating them in controlled, toxin-rich environments can enhance their effectiveness. The progress of detoxification can be monitored using analytical techniques such as infrared (IR) spectroscopy, mass spectrometry, and chromatography. The data obtained from these analyses can inform the application of such bioprocesses in natural environments. This approach not only supports environmental sustainability at a lower cost compared to physical and chemical remediation technologies but also promotes the health and quality of soil and water by encouraging the growth of beneficial microbial communities.



Keywords: waterbody; Effluent; Core microbiome; Enzymatic system; Molecular technology; Analytical technique; sustainable nature.

ORAL 11

Enzymatic Dynamic Kinetic Resolution of 3-Bromo/Methylsulfonyl DL-Phenylalanine Ethyl Ester in Miniemulsions: A Key Intermediate for Lifitegrast (Xiidra) Synthesis

Aayushi Ashish Navre^{*ab}, Dr. T Kumaraguru^{**ab}

^a Department of Organic Synthesis and Process Chemistry (OSPC),

CSIR-Indian Institute of Chemical Technology, Hyderabad 500 007, India.

^b Academy of Scientific and Innovative Research (AcSIR), Ghaziabad 201 002, India.

Abstract:

A scalable enzymatic process has been developed for the preparation of optically pure 3-bromo- or 3-methylsulfonylsubstituted L-phenylalanine, which serves as key intermediates in the synthesis of Lifitegrast. This method utilizes enzymatic dynamic kinetic resolution (DKR) of the ethyl esters of racemic 3-bromo- or 3-methylsulfonyl-substituted DL-Phenylalanine esters, catalyzed by the commercially available protease enzyme Alcalase. The reaction was carried out in a miniemulsion system that acts as a nanoreactor with high substrate loading (50% w/v). Notably, the process was completed within 24 h using less than 10% (w/w) of the enzyme. The desired optically pure (S)-isomer was obtained with >90% isolated yield and >99% enantiomeric excess (e.e.) under these conditions. Furthermore, the solvent system, along with the surfactant and enzyme, was successfully recycled, highlighting the sustainability and costefficiency of the process.



Keywords: Lifitegrast; miniemulsion; nanoreactor; DKR; protease; process development

**ORAL 12****Evaluation of Degradation Behavior and Degradation Rate Constants Using Developed Stability-Indicating RP-HPLC Method in the Mixture of Dapagliflozin Propanediol Monohydrate and Bisoprolol Fumarate****Ms. Purvi Ramanuj*¹, Dr. Payal N. Vaja**², Dr. Pragnesh Patani**³**¹ Research Scholar, School of Pharmacy, Dr. Subhash University, Junagadh² Assistant Professor, School of Pharmacy, Dr. Subhash University, Junagadh³ Principal, Khyati College of Pharmacy, Ahmedabad.* Email of Corresponding author: purviramanuj01@gmail.com**Abstract:**

To perform a kinetic forced degradation study of DPM and BPF under various stress conditions and to evaluate their degradation behaviour and degradation rate constants using a developed stability-indicating RP-HPLC method. Forced degradation studies are essential for understanding the intrinsic stability and degradation pathways of pharmaceutical active ingredients. The present study aimed to investigate the degradation kinetics of Bisoprolol fumarate (BPF) and Dapagliflozin propanediol monohydrate (DPM) under different stress conditions using a stability-indicating RP-HPLC method. Chromatographic separation and quantification of BPF and DPM were performed using a Thermo C18 column (250 × 4.6 mm, 5 µm) with Acetonitrile: Methanol: Water (10:40:50, % v/v/v) as the mobile phase. The pH was adjusted to 3.5 ± 0.05 using 0.5% v/v orthophosphoric acid. The flow rate was 1.0 mL/min, the detection wavelength was 224 nm, the injection volume was 10 µL, and the total run time was 8 min. Forced degradation was carried out under acidic (HCl), alkaline (NaOH), and oxidative (3% H₂O₂) conditions at 40°C for 5 h. Samples were withdrawn at predetermined intervals up to 300 min and analysed by RP-HPLC. Degradation profiles were evaluated using kinetic calculations. Both BPF and DPM exhibited progressive degradation with increasing stress exposure. After 300 min, acidic degradation using 1 M HCl was 8.81% and 8.70% for BPF and DPM, respectively. Alkaline conditions produced the maximum degradation, reaching 16.02% for BPF and 15.85% for DPM with 1 M NaOH, identifying alkaline hydrolysis as the predominant degradation pathway. Oxidative stress resulted in comparatively lower degradation of 6.18% for BPF and



3.46% for DPM, indicating greater oxidative stability, particularly for DPM. Kinetic assessment demonstrated zero-order degradation behaviour for both APIs under the investigated conditions. The study establishes comparative degradation behaviour and kinetic profiles of BPF and DPM, providing valuable stability information for analytical method development and pharmaceutical quality assessment.

Keywords: Bisoprolol fumarate; Dapagliflozin propanediol monohydrate; RP-HPLC; Forced degradation; Degradation kinetics; Alkaline hydrolysis; Oxidative stability; Stability indicating method.



**ORAL 13****Experimental Methodology for Evaluating Enzyme Kinetics and Biocatalytic Activity of Antioxidant Systems in Pigmented Ficus Leaves Exposed to Green-Synthesized Silver Nanoparticles****Rushita Parmar*, Suhas Vyas****¹Department of Life Sciences, Bhakta Kavi Narsinh Mehta University, Junagadh, India.* Email of Corresponding author: rushitaparmar8@gmail.com**Abstract:**

Plant-derived biomaterials provide a sustainable platform for the development of functional nanostructures and biocatalytic systems. In this study, the kinetic properties and biocatalytic efficiency of catalase (CAT), peroxidase (POD), and polyphenol oxidase (PPO) were evaluated in green and red leaves of *Ficus benghalensis* and *Ficus amplissima* using Michaelis-Menten kinetics. Red leaves of both species consistently exhibited lower K_m values and comparable or higher V_{max} values than green leaves, indicating enhanced substrate affinity and catalytic efficiency. For catalase, the K_m value decreased from 34.88 to 13.23 mM in *F. benghalensis* and from 21.47 to 10.44 mM in *F. amplissima* in red leaves. Similarly, peroxidase activity in red *F. amplissima* leaves showed a higher V_{max} ($\mu\text{mol min}^{-1} \text{mg}^{-1} \text{protein}$) than green leaves ($17.27 \mu\text{mol min}^{-1} \text{mg}^{-1} \text{protein}$) demonstrating improved catalytic turnover. Phytochemical analysis revealed elevated levels of phenolics, flavonoids, tannins, alkaloids, and saponins in red leaves, while elemental profiling confirmed the presence of Fe, Cu, Mn, and Zn, which support enzymatic activity. FTIR analysis confirmed the presence of hydroxyl, carbonyl, amide, and aromatic functional groups associated with phenolics, flavonoids, proteins, and polysaccharides, indicating their role in biocatalytic activity and nanoparticle synthesis. Leaf extracts were further utilized as reducing and stabilizing agents for the green synthesis of AgNPs. The synthesized AgNPs exhibited characteristic surface plasmon resonance (SPR) peaks between 413 and 443 nm, confirming nanoparticle formation. AgNPs showed enhanced biological activity compared with crude extracts, with DPPH radical scavenging activity reaching 81.16% in red *F. benghalensis* leaves and



antibacterial activity producing inhibition zones up to 14.9 mm against *Enterococcus*. Summarized *F. benghalensis* exhibited stronger antioxidant enzyme activity, whereas *F. amplissima* demonstrated higher biomass yield and peroxidase catalytic efficiency. These findings identify pigmented *Ficus* leaves as effective biomaterials for sustainable AgNP synthesis and enzyme-based biocatalytic applications in biotechnology, agriculture, and environmental systems.

Keywords: Green nanoparticles; Oxidative stress Michaelis-Menten kinetics; Biocatalysts Bio-materials; Antioxidant enzymes.

**ORAL 14****From Foliage to Functional Food: In Vivo Evaluation of Bauhinia Spp. Leaves for Nutritional Management of Anaemia****Payal Bhatt*1, Meonis Pithawala**1**

C. G. Bhakta Institute of Biotechnology, Uka Tarsadia University, Gopal Vidyanagar, Bardoli
Mahuva Road, Tarsadi Surat-394350, Gujarat, India

* Email of Corresponding author: bhattpayal34@gmail.com

Abstract:

Anaemia, especially iron-deficiency anaemia, remains a critical nutritional deficiency globally, particularly among adolescent girls and women of reproductive age (WRA). Despite the widespread pharmacological supplementation programmes, the prevalence of anaemia still remains high due to poor adherence to iron supplements, gastrointestinal side effects and restricted access to nutrient-rich foods. These limitations highlight the need for an affordable food-based strategies to improve the iron status. The present study explored the nutritional and functional efficacy of *Bauhinia variegata* and *Bauhinia purpurea* leaves as a plant-based intervention for treating anaemia. Based on the preliminary findings, *Bauhinia* leaf-enriched wheat-based cookies were formulated and evaluated for nutritional quality and iron content. The study examined the biological efficacy of the formulated cookies in Wistar albino rats. A total of 30 Rats were randomly divided into five groups (n=6). Group I received a standard basal diet and served as normal control. Anaemia was induced into remaining 24 animals by intraperitoneal injection of phenylhydrazine at 40 mg/Kg for two consecutive days. From these anaemic rats, group II received standard diet and served as an anaemic control. Group III was fed on cookies prepared using wheat flour which served as negative control, whereas Group IV and V were fed on formulated cookies prepared with wheat flour supplemented with leaf powder of *B. variegata* and *B. purpurea* respectively. To track the changes in erythrocytic indices and recovery, haematological parameters were evaluated at baseline, and at a regular interval of 15 days post inducing anaemia through-out total treatment period of 45 days. The observed nutritional characteristics and



therapeutic potential of *Bauhinia* leaves indicate promising development of sustainable plant-based dietary interventions for treating iron deficiency anaemia.

Keywords: *Bauhinia*; Functional food; Anaemia; Nutritional composition; Haematological evaluation; Rat model.

**ORAL 15****Green Multicomponent Synthesis of Benzo[A]Phenazin-5-Amine Derivatives
as Fluorescent Chemosensors for Picric Acid Detection****Mayurkumar P. Vala*, Naval P. Kapuriya****

Department of Chemistry and Forensic Science, Bhakta Kavi Narsinh Mehta University,
Junagadh-362263, Gujarat, India

* Email of Corresponding author: valamayur121@gmail.com

Abstract:

A sustainable multicomponent synthesis of benzo[a]phenazin-5-amine derivatives (4a–4n) was developed using a PEG-SO₃H/water catalytic system. The catalyst was successfully reused for four cycles with only a slight decrease in yield. The synthesized compounds were characterized and their photophysical properties were investigated. Among them, compound 4j showed excellent fluorescence properties and was selected for picric acid (PA) sensing. Compound 4j exhibited a selective fluorescence turn-off response toward PA, with a detection limit of 4.06 μ M and $R^2 = 0.992$. The sensor also showed good pH stability, selectivity, and 98.07–99.49% recovery in real water samples. Overall, the study demonstrates a sustainable approach for synthesizing fluorescent benzo[a]phenazin-5-amine derivatives and highlights 4j as a promising chemosensor for selective PA detection.

Keywords: Benzo[a]phenazin-5-amine; Multicomponent reaction; Chemosensor; Picric acid (PA) detection; Solvatochromism.

**ORAL 16****Heteroaryl Bis-Chalcone Fluorescent Chemosensors for Real-Time Hydrazine Monitoring: Molecular Design, Synthesis and DFT Studies****Vatsalsinh B. Chavda^{*1}, Nidhi H. Oza^{*1}, Rajamouli Boddula^{**1,2}, Paresh N. Patel^{**1}**¹Laboratory of Bio-Organic Chemistry, Tarsadia Institute of Chemical Science (TICS),
Uka Tarsadia University, Bardoli – 394 350, Gujarat, India²Department of Chemistry, School of Sciences and Humanities, SR University, Warangal,
Telangana 506371, India* Email of Corresponding author: vatsal.kp2025@gmail.com**Abstract:**

Hydrazine is a highly toxic and environmentally hazardous compound widely used in aerospace, agriculture, and industrial applications, highlighting the need for sensitive and reliable detection methods. Herein, an eco-friendly strategy for hydrazine detection is developed using novel heteroaryl-based bis-chalcone chemosensors synthesised via Claisen-Schmidt condensation under mild conditions. KOH and pyrrolidine were employed as catalysts in toluene, THF, and ethanol. KOH afforded a shorter reaction time (2 h, 77% yield), while pyrrolidine provided a higher yield (94%) within 5 h in ethanol. The synthesised probes were characterised by spectroscopic techniques, and their photophysical properties were systematically investigated. Both probes exhibited dual colourimetric and fluorometric responses toward hydrazine. Mass spectrometric analysis confirmed that hydrazine induces irreversible cyclisation to a 1H-pyrazole product, disrupting π -conjugation and intramolecular charge transfer (ICT), thereby causing rapid fluorescence quenching and distinct optical changes. DFT calculations provided further insight into the electronic structure and ICT characteristics. The probes demonstrated excellent analytical performance, with low limits of detection (LoD) of 1.1 and 1.3 μM and limits of quantification (LoQ) of 3.4 and 4.1 μM for 3a and 3b, respectively, at a fixed probe concentration of 5 μM . The sensors showed high selectivity, broad pH stability (5–10), and successful hydrazine detection in water, soil, and food samples with excellent recovery within 60 s. A low-cost paper-



based platform further enabled portable, equipment-free hydrazine detection at ppm levels under varying temperature and humidity conditions.

Keywords: Biphenyl; Chemosensors; Hydrazine; Real-Time Sensing; Environment; Food Safety.



**ORAL 17****Heterocyclic Biphenyl-Based Fluorochrome Sensor for Rapid Hydrazine****Detection: Design, Synthesis, Single Crystal XRD, and DFT Studies****Dinkal V. Kasundra*, Rajamouli Boddula, Bhumin N. Patel and Paresh N. Patel ****

Laboratory of Bio-Organic Chemistry, Tarsadia Institute of Chemical Science (TICS),
Uka Tarsadia University, Bardoli - 394 350, Gujarat, India

* Email of Corresponding author: pareshn111@yahoo.com

Abstract:

As part of our continuous research focused on enhancing sensing technologies, this study presents a series of novel fluorochromes featuring a biphenyl scaffold. The fluorochrome sensors were synthesized with various heterocyclic aldehydes via Claisen–Schmidt condensation using KOH and pyrrolidine as catalysts. KOH provided a rapid reaction (2–3 h; 71–80%), while pyrrolidine afforded higher yields (5–6 h; 85–95%). The structures of the synthesized fluorochromes were characterized using various spectroscopic techniques and single-crystal XRD. Their photophysical properties were investigated using UV–vis and fluorescence spectroscopy in different solvent systems, and density functional theory (DFT) calculations showed good correlation with the experimental results. Fluorochrome 3g, exhibiting the highest Stokes shift (129 nm) and photoluminescence quantum yield (QY 0.87), was investigated for hydrazine detection. Upon addition of hydrazine, significant fluorescence quenching and a visible color change from yellow to colorless were observed due to hydrodiazole formation via cyclization. A strong linear response was obtained over a hydrazine concentration range of 1–5 μM in methanol, with a limit of detection (LOD) of 1.1 μM using 5 μM 3g. Fluorochrome 3g showed selective hydrazine detection over a pH range of 4–10 in the presence of interfering analytes and was successfully applied to real water, soil, and air samples. The sensing mechanism was supported by spectral studies. Furthermore, a simple and cost-effective probe-coated paper sheet was developed for environmental hydrazine detection, demonstrating the potential of 3g for practical sensing applications.



Keywords: Heterocyclic fluorochrome; Hydrazine sensing; Biphenyl-based sensor; Fluorescence sensing; DFT studies.

**ORAL 18****Hexavalent Chromium Reducing Potential of Indigenous Bacterial Isolates from Agro-Industrial Soil: Implications for Bioremediation of Hexavalent Chromium****Heena Vyas*¹, Ritesh Tandel**¹**

Department of Environment and Life Sciences, Krantiguru Shyamji Krishna Verma Kachchh University, Bhuj

* Email of Corresponding author: heenavyas31@gmail.com**Abstract:**

In agro-industrial environments, chromium contamination, especially in its hexavalent form [Cr (VI)], is an increasing ecological hazard due to its mutagenic, carcinogenic, and non-biodegradable properties. In this research, two chromium resistant bacterial strains CSA2 and CSA3 which were isolated from agricultural soil collected from locations near active industrial zones were screened. Cr (VI) reduction experiments were conducted on the two strains in controlled batch conditions from the initial concentration of 160 mg/L. The residual Cr (VI) concentration was determined by diphenylcarbazide (DPC) colorimetric method spectrophotometrically at 540 nm for 15 days at an interval of 24 h. On day 11 strain CSA2 achieved 99.97% Cr (VI) removal decreasing its concentration from an initial value of 120.81 mg/L (24 h) to a residual value of 0.050 mg/L. Strain CSA3 achieved complete (100%) elimination of Cr (VI) during the equivalent duration. Within a time, frame of 96 to 144 hours, both isolates presented with accelerated elimination kinetics, reaching 83% efficiency at that point. The results show that these indigenous soil bacteria have important chromate reduction capabilities in the presence of high Cr (VI) concentrations, so they are promising candidates for the development of native microbial consortia for the remediation of chromium-contaminated agro-industrial soils.

Keywords: Cr (VI) reduction; chromate tolerant bacteria; agro-industrial soil; bioremediation; diphenylcarbazide assay.

**ORAL 19****Isolation and Molecular Characterization of *Colletotrichum Gloeosporioides* from *Mangifera Indica* L.****Vijay P. Rabar* and Ranjan P. Kuvad****

Department of Botany, School of Science, Dr. Subhash University, Junagadh-362001

* Email of Corresponding author: vijeyagalchar@gmail.com**Abstract:**

Mango (*Mangifera indica* L.) is considered as one of most popular fruits grown worldwide. Mango trees are affected by a number of fungal, virus and bacterial diseases at various stages of their life. Scab, stem-end rot and bacterial spot are all recorded diseases of mango. In this experiment fungus was isolated from infected leaves of mango plants in the nearby area of Junagadh. Isolated fungus was placed on PDA medium incubated 25°C (5-6 weeks) which was scraped and mechanically disrupted by using liquid nitrogen to fine powder using mortar and pestle. Total DNA was extracted and measured and confirmed using agarose gel electrophoresis. Specific primer 28S was designed for gene amplification of DNA. The amplified DNA undergoes for DNA Sequencing. So, it was identified as *Colletotrichum gloeosporioides* on the basis of morphological characters and by using molecular marker. Sequences were confirmed for identification using repeated blast with already available sequences for identification taxonomy of *Colletotrichum gloeosporioides* using NCBI BLAST. For further confirmation of sequences MSA, Phylogenetic tree and Seqscape were done and obtained results discussed.

Keywords: *Mangifera indica* L; *Colletotrichum gloeosporioides*; DNA Sequencing; Phylogenetic; Endophytic fungi.



**ORAL 20****Microbial-Induced Struvite Precipitation (Misp) As A Sustainable and Innovative Platform for Nutrient Recovery and Metal Immobilization****Dhanvanti Kamaliya* Dr. Dushyant R. Dudhagara****

Department of Life Sciences, Bhakta Kavi Narsinh Mehta University, Junagadh, India.

* Email of Corresponding author: dushyant.373@gmail.com**Abstract:**

The exponentially increasing world population and rapid industrialization have generated a large quantity of wastewater, which harms ecosystems by causing eutrophication, reducing biodiversity, and contributing to climate change by releasing greenhouse gases (GHGs) and heavy metal contamination, including toxic and several carcinogenic metals. The wastewater is typically enriched with large amounts of nutrients such as N and P, which create several significant environmental problems. The MISP is a promising and attractive eco-friendly biotechnological strategy for sustainable nutrient recovery, biocementation, metal immobilization and mitigating environmental pollution. In the study demonstrated that MISP bacterial strains for susceptibility to nutrient recovery in wastewater matrices. The MISP isolates successfully recovered NH_4^+ and P as struvite, a valuable slow-release fertilizer with biocementation potential. Therefore, struvite observed in a stereomicroscope undergo primary screening, which is carried out by different spectrophotometric methods, while secondary screened by SEM-EDX. To investigate the multifunctional remediation potential of the system, spectrophotometric monitoring indicated effective metal immobilization within the MISP-driven system. Overall, the study demonstrated that the multifunctional MISP is a biologically driven innovative platform for nutrient recovery, wastewater treatment, and metal immobilization, and contributes to a circular economy for resource management in environmental systems.

Keywords: Microbial-Induced Struvite Precipitation (MISP); Nutrient Recovery; Wastewater Treatment; Circular Economy; Biocementation; Metal immobilization.

**ORAL 21****Phytochemical, Antioxidant and Antimicrobial Screening of Lawsonia Inermis (Henna): A Comparative Study of Natural and Commercial Samples****Joshi Chetankumar Dhirajlal* and Dr. B. A. Jadeja***** Email of Presenting Author: joshichetankumard@gmail.com**Abstract:**

Lawsonia inermis (henna), a traditionally valued dye-yielding and medicinal shrub, is widely used in cosmetic and pharmaceutical applications owing to its rich phytochemical profile. The present study aimed to compare the phytochemical composition, antioxidant potential and antimicrobial efficacy of natural henna powder (NAT) with three commercially available henna brands (C1–Bansi, C2–Trishup and C3–Nupur). Successive extraction was carried out using petroleum ether, water and methanol, in increasing order of polarity. Qualitative phytochemical screening revealed the presence of alkaloids, phenolics, glycosides, flavonoids, tannins, quinones, saponins and coumarins, with the methanolic extract showing the widest and most consistent occurrence of these constituents across all four samples, followed by the aqueous extract; the petroleum ether extract was comparatively poor in phytoconstituents. Quantitative estimation of total phenolic (TPC), flavonoid (TFC) and saponin (TSC) content confirmed that methanolic extracts, particularly of NAT and C1, possessed the highest values (TPC up to 129.15 mg GAE/g). Antioxidant activity, evaluated in terms of the effective concentration required for radical scavenging, was strongest in methanolic extracts (36.5–67 µg/mL), approaching the potency of the ascorbic acid standard (12.39 µg/mL), while petroleum ether extracts were the weakest. Antimicrobial screening against *E. coli*, *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Staphylococcus aureus* and *Candida albicans* showed that methanolic extracts produced the largest zones of inhibition, most notably against *S. aureus* (22–25 mm), whereas petroleum ether extracts showed no activity. Overall, commercial henna samples, particularly Bansi (C1), were phytochemically and biologically comparable to natural henna, validating their continued therapeutic and cosmetic relevance, with methanol identified as the optimal extraction solvent.



Key words: Lawsonia inermis; Henna; Phytochemical screening; Antioxidant activity; Antimicrobial activity; Total phenolic content



ORAL 22

Semi-Bis-Enone Photoluminophores Enabling Real-Time Fluorescence Turn-Off Sensing of Hydrazine: Synthetic, Photophysical, XRD and DFT Insights

Nidhi H. Oza*, Paresh N. Patel

Laboratory of Bio-Organic Chemistry, Tarsadia Institute of Chemical Science (TICS),
Uka Tarsadia University, Bardoli - 394 350, Gujarat, India

Abstract:

The development of reaction-based optical probes that combine molecular precision with practical deployability remains a significant challenge in environmental chemical sensing. Hydrazine, a highly reactive and carcinogenic industrial reagent widely used in aerospace and agrochemical sectors, represents a critical target due to its severe environmental persistence and biological toxicity. Herein, we introduce a conceptually new Semi-Bis-Enone (SBE) photoluminophores that integrates conjugation engineering with reactivity-controlled photo physical switching for the selective detection of hydrazine. Probe are prepared through a condensation strategy (Pyrrolidine: 95-98 % yield, 5-6 h; KOH: 65-80 % yield, 2-3 h) that produces a rigid π -extended aromatic framework incorporating an electrophilically activated enone motif. Structural elucidation by single-crystal X-ray diffraction, supported by comprehensive spectroscopic analysis, reveals an efficient architecture that promotes intramolecular charge transfer (ICT) responsible for high fluorescence Quantum yield (0.99) and large Stokes shift (200 nm). Notably, the SBE scaffold functions as a reactivity-gated fluorophore, wherein hydrazine selectively undergoes nucleophilic addition across the conjugated enone functionality, inducing a disruption of the ICT pathway. This molecular-level transformation results in quick fluorescence quenching induced by a distinct chromogenic response, enabling dual optical readout with remarkable LoD (0.89 μ M) and LoQ (2.70 μ M). Beyond essential photo physical modulation, the probe shows exceptional operational robustness, maintaining selective hydrazine recognition across a broad pH window (4-10) and in the presence of competing organic as well as inorganic nucleophilic species. Importantly, the sensing concept is translated to real-world applicability through reliable hydrazine



detection in complex environmental (i.e. water & soil) and food matrices (i.e. rice & mung) with excellent recovery (~99%). Furthermore, immobilization onto cellulose substrates enables portable and instrument-free vapour sensing, bridging the gap between molecular probe design and field-deployable analytical technology. This study establishes SBE architectures as a versatile and previously unexplored class of reaction-responsive fluorophores, providing a generalizable strategy for designing next-generation molecular sensors for environmental monitoring and chemical safety.

Keywords: Semi-Bis-Enone; Single crystal XRD; Hydrazine sensing; Photoluminophores; ICT; Environmental and food safety monitoring.

**ORAL 23****Sustainable N-Doped Carbon Quantum Dots for Photocatalytic Dye Degradation****Gautam K. Katariya*, Dr. Jasmin Bhalodia**Department of Chemistry and Forensic Science, Bhakta Kavi Narsinh Mehta University,
Junagadh- 362001, India* Email of Corresponding author: kgk.phd2025@gmail.com**Abstract:**

Industrial wastewater contaminated with synthetic dyes, particularly methylene blue (MB), presents significant environmental and health concerns because of the high stability and poor biodegradability of these pollutants. Conventional wastewater treatment methods often have limitations, creating a need for sustainable and efficient alternatives. Photocatalysis is a promising approach that utilizes light-responsive photocatalysts to generate reactive species capable of degrading toxic organic pollutants under mild reaction conditions. The present study demonstrates the potential photocatalytic application of plant-derived nitrogen-doped carbon quantum dots (N-CQDs) for wastewater bioremediation. N-CQDs were successfully synthesized through a green hydrothermal method using *Bauhinia purpurea* bark as a sustainable carbon source and urea as a nitrogen source, resulting in enhanced photocatalytic properties. The synthesized N-CQDs exhibited strong blue photoluminescence with excitation-dependent emission behaviour and a quantum yield of 26.25%. TEM analysis revealed that the N-CQDs were quasi-spherical in morphology, with an average particle size of 3.28 nm. FTIR and EDX analyses confirmed the successful incorporation of nitrogen into the carbon quantum dot framework and the presence of abundant surface functional groups. In addition, the synthesized N-CQDs showed a considerable Stokes shift of approximately 140 nm and an optical band gap of 4.24 eV, indicating strong quantum confinement behaviour. Notably, the prepared N-CQDs demonstrated efficient photocatalytic degradation of methylene blue, achieving a maximum degradation efficiency of 94.25% under sunlight irradiation. Kinetic studies indicated that the degradation process followed pseudo-first-



order kinetics, with apparent rate constants (k_{app}) calculated from plots of $\ln(A_0/A_t)$ versus irradiation time, confirming the rapid decomposition of the dye. Overall, these findings demonstrate that *Bauhinia purpurea* bark-derived N-CQDs are sustainable, low-cost, and effective photocatalysts with significant potential for the remediation of dye-contaminated wastewater.

Keywords: N-doped carbon quantum dots, *Bauhinia purpurea*, Hydrothermal synthesis, Photocatalysis, Methylene blue Dye degradation.

**ORAL 24****Synthesis of Novel Substituted Benzimidazole Derivatives and Profiling of Their Biological Activities****Parth P. Vavaiya and Hardik L. Varu***

Department of Chemistry, School of Science, Dr. Subhash University, Junagadh, 362001, Gujarat, India.

* Email of Corresponding author: parthvavaiya56@gmail.com

Abstract:

Benzimidazole is an important nitrogen-containing heterocyclic scaffold that has attracted considerable attention in medicinal chemistry because of its diverse pharmacological properties and favorable structural characteristics. In the present study, a series of novel substituted benzimidazole derivatives was designed and synthesized with the aim of exploring their potential biological activities. Structural modifications were introduced at selected positions of the benzimidazole nucleus to investigate the influence of different substituents on biological activity and establish preliminary structure–activity relationships (SAR). The synthesized compounds were characterized using appropriate spectroscopic and analytical techniques, including NMR and mass spectrometry. The biological potential of the synthesized derivatives was evaluated using suitable in-vitro assays, and the promising compounds were further investigated to understand their possible mechanism of action. Molecular docking studies may also be employed to explore the interaction of the synthesized compounds with selected biological targets. The study is expected to identify structurally promising benzimidazole derivatives with significant biological activity and provide useful insights for further development of benzimidazole-based therapeutic candidates.



**ORAL 25****Synthesis, Characterization and In-Silico Evaluation of Novel
Benzo[B]Thiophene–Pyrazole Derivatives as Potential Therapeutic
Candidates****Kausha P. Bhatt*, Priteshkumar P. Gajjar, Dr. Mrunal A. Ambasana*** Email of Corresponding author: kpbhatt287@gmail.com**Abstract:**

Benzo[b]thiophene and pyrazole are valuable heterocyclic scaffolds in medicinal chemistry because of their diverse biological properties and potential therapeutic applications. In the present study, a series of novel benzo[b]thiophene–pyrazole derivatives (PG-401–PG-410) was designed and synthesized using a scaffold-combination approach. The structures of the synthesized derivatives were confirmed by spectroscopic and analytical techniques, including FTIR, ¹H NMR, ¹³C NMR, mass spectrometry, and elemental analysis. The synthesized derivatives were further evaluated using in silico approaches to assess their physicochemical and predicted toxicity profiles. Overall, the compounds exhibited favourable drug-like properties, with molecular descriptors falling within acceptable ranges and no violations of Lipinski's Rule of Five. Among the synthesized compounds, PG-401, PG-403, and PG-405 exhibited comparatively favourable predicted toxicity profiles, making them promising candidates for further investigation. The successful synthesis and favourable drug-like properties of the benzo[b]thiophene–pyrazole derivatives highlight their potential as therapeutic candidates. These findings provide a basis for further biological evaluation and structural optimization of the most promising compounds.



Key words: Benzo[b]thiophene; Pyrazole; Heterocyclic synthesis; Drug discovery; Toxicity; In-silico evaluation

**ORAL 26****Unveiling Antibacterial Potential of Marine-Derived Fungus and Actinomycetes against Multidrug-Resistant Bacterial Pathogens****Avani Bhimani*, Yashwantsinh Jadeja, Ashok Kumar Bishoyi**

Department of Microbiology, Faculty of Science, Marwadi University, Rajkot, Gujarat, India

* Email of Corresponding author: avanibhimani2709@gmail.com**Abstract:**

Multidrug resistance (MDR) has become a health concern in infectious disease management. The increasing resistance to existing antimicrobials highlights the urgent need for new antibiotics. Marine microorganisms offer a promising source of diverse bioactive compounds for the discovery of novel antimicrobial agents against resistant pathogens. Therefore, the present investigation aimed to discover novel antimicrobial compounds from marine organisms. A total of 16 marine samples were collected from Narara Reef, Gujarat. Using different media and isolation conditions, 95 bacteria, 18 fungi, and 5 actinomycetes were obtained from the samples. Primary screening for antimicrobial producers was performed using the agar plug method. Four microbial strains, including one fungus (AF5) and three actinomycetes (AA1, AA3, and AA5), showed potent antibacterial activity against MDR bacterial pathogens. Further investigations focused on the most promising isolate, AA3. Based on morphological characteristics and 16S rRNA gene sequence analysis, AA3 was identified as *Streptomyces* sp. Optimization studies showed that Starch M Protein Broth supported the highest antibiotic production, producing an inhibition zone of 24.39 ± 2.03 mm after 4 days of incubation. Among the four solvents tested, chloroform showed the highest extraction efficiency, producing the largest inhibition zone of 27.84 ± 0.09 mm. TLC separation using chloroform (9:1, v/v) yielded seven distinct bands. All seven bands exhibited antibacterial activity in TLC-bioautography, suggesting the presence of multiple antibacterial metabolites in the AA3 extract. The antimicrobial metabolites from AA3 may serve as promising alternatives to antibiotics against drug-resistant pathogens. Further studies are required to enhance production, optimize extraction, and identify the bioactive metabolites for MDR-focused antimicrobial



drug discovery and therapeutic development. This study contributes to Sustainable Development Goal 3 (SDG 3): Good Health and Well-being.

Key words: Antagonistic activity; Bioautography; Marine drugs; Marine microorganisms; Multidrug-resistant (MDR) bacteria.

**ORAL 27****FORMULATION AND EVALUATION OF OPHTHALMIC IN SITU GEL
CONTAINING NANOPARTICLES OF BRINZOLAMIDE****Solanki Urvashi Arvindkumar and Mr. Sumit Chakraborty****Abstract:**

Objective: The primary objective of this research was,

- Created NPs containing Brinzolamide in pH sensitive In Situ gel.
- Aimed to enhance drug bioavailability and therapeutic effect,
- Reduced dosage to mitigate toxicity.
- Improved gel's drug retention for effective glaucoma treatment

Experimental work: The Brinzolamide NPs were produced by ionotropic gelation method and optimized by the three-factor three-level Box-Behnken design (BBD) using the formulation factors like X1 polymer concentration (%w/v), X2 cross linker concentration (%w/v), and X3 stirring rate (RPM). their impacts were examined on the dependent variables, like Particle size Y1 (nm), Poly-dispersity index (PDI) Y2, % Entrapment efficiency Y3. The improved formulation chosen based on its highest desirability factor was put together as In Situ gelling system using Sodium alginate and HPMC K4M and examined. The best In Situ gelling formulation produced a sustained release of drug with efficient antimicrobial activity as validated using cup plate technique.

Result and Discussion: The optimized Brinzolamide NPs had a particle size (PS) of 214.2nm, a polydispersity index (PDI) of 0.161, a zeta potential of +33.1 mV, and an encapsulation efficiency of 63.9%. The independent and dependent response variables demonstrate a strong correlation indicating the rationality of the optimized Brinzolamide nanoparticles. And was found in spherical, nonporous, smooth, and homogenously dispersed. The investigation into drug release unveiled, a sustained release pattern ($96.38 \pm 1.5\%$ over 12 hours) following the Korsmeyer-Peppas kinetic model ($R^2=0.998$). Throughout a 1-month storage



period, no notable alterations in the physical characteristics of the NPs were found. Post one month, the nanoparticles exhibited an initial burst release of 10.9% within the first hour, progressing steadily to 99.2% release over 12 hours.

Conclusion: A study has developed Brinzolamide-loaded NPs in a pH-sensitive In Situ gel, demonstrating promising characteristics such as a particle size of 214.2nm, a PDI of 0.161, a ZP of +33.1 mV, and an % encapsulation efficiency of 63.9%. The In Situ gelling system, designed with sodium alginate and HPMC K4M, generated a sustained drug release profile, releasing $96.38 \pm 1.5\%$ of the drug within 12 hours. The NPs maintained their physical properties over a 1-month storage period, showing an initial burst discharge of 10.9% in 1 hour and continuing to release up to 99.2% in 12 hours. This study presents a promising approach for better glaucoma management by improving bioavailability, reducing administration doses, and enhancing drug holding capacity.

Key words: Brinzolamide, Chitosan, Optimization, BBD, Nanoparticles, In Situ gel, Stability, Sterility

**ORAL PRESENTATION – STUDENT****ORAL 28****Comparative Assessment of Seaweed-Derived Substrates for
Polyhydroxyalkanoate Production Using Halomonas****Disha Padhiyar, Dr. Arup Ghosh*, Dr. Sonam Dubey***Department of Microbiology, School of Science, Dr. Subhash University, Junagadh,
362001, Gujarat, IndiaEmail of Presenting Author: dishapadhiyar30@gmail.comEmail of Corresponding Author: arupghosh@csmcri.res.in, dubeysonam2024@gmail.com**Abstract:**

The growing environmental problems caused by synthetic plastics have led to more interest in finding sustainable, biodegradable alternatives. One promising option is polyhydroxyalkanoates (PHAs) — natural plastics made by microbes. PHAs are biodegradable, can be used like regular plastic, and have many uses in packaging, farming, and healthcare. However, making PHAs commercially is expensive, mainly because the usual food sources (like glucose and sucrose) used to produce them cost a lot. This research looks into using seaweed, especially red macroalgae, as a cheaper and renewable food source for PHA production by a type of bacteria called *Halomonas* spp. Bacteria may convert seaweed's alginate, laminarin, mannitol, and other sugars into simple sugars. Because seaweed production doesn't require land, fertilizer, or fresh water, it is also extremely good to the environment. The main challenge is figuring out how to effectively break down these complex sugars into simpler ones without creating dangerous byproducts that might hinder or stop the formation of PHA. Scientists are searching for natural materials that decompose naturally as the problem of plastic waste grows. A fantastic alternative are polyhydroxyalkanoates (PHAs), which are naturally occurring polymers produced by bacteria and have a variety of applications. However, the cost of producing PHAs is high because to the high cost of common components like sugar. This study looks at using seaweed — especially red, brown, and green types

— as a cheaper, more eco-friendly food source for the bacteria *Halomonas* spp. that make PHAs. The seaweed was processed to break it down into simple sugars that the bacteria can easily use. We compared how much PHA was produced from



each type of seaweed and how good the plastic was. The results showed that different seaweeds gave different amounts of PHA, with red seaweed giving the highest yields. This work shows that choosing the right seaweed and preparing it properly are key steps for making PHAs more efficiently. It also supports seaweed as a sustainable raw material for producing eco-friendly plastics on a larger scale.

Key words: Polyhydroxyalkanoates (PHAs), *Halomonas* spp, Seaweed biomass, Biodegradable plastics, PHA production, Sustainable bioplastics

**ORAL 29****Formulation And Characterization of Modified Release Carvedilol Loaded
Microspheres Using Okra Gum****Mehul Arshibhai Makadiya and Dr. Payal N. Vaja***

Research Scholar, School of Pharmacy, Dr. Subhash University, Junagadh (362001), Gujarat, India

Abstract:

Carvedilol is a medicine used to treat high blood pressure and heart problems. It needs to be taken regularly because it does not stay in the body for a long time. This study aims to prepare modified-release Carvedilol microspheres using natural okra gum.

Okra gum is a natural, safe, and low-cost polymer that can help release the medicine slowly. The microspheres will be prepared using a suitable method with different amounts of okra gum. After preparation, they will be tested for particle size, drug entrapment, production yield, and drug release. Tests like FTIR, DSC, and SEM will also be used to study the properties of the microspheres.

The expected result is that the optimized microspheres will release Carvedilol slowly for a longer time. This may reduce the number of doses needed and improve patient compliance. The study also shows that okra gum can be a useful natural polymer for modified-release drug delivery.

Keywords: Carvedilol; Okra Gum; Microspheres; Modified Release; Natural Polymer; Drug Delivery System.

**ORAL 30****A Novel Dual-Mode Optical Chemosensor for selective and Reversible
Detection of OH⁻ ions****Shivam Mesvaniya and Dr. Mrunal Ambasana***

Department of Chemistry and Forensic Science, Bhakta Kavi Narsinh Mehta

University, Junagadh, (Gujarat), India.

* Email of Corresponding author: shivammesvaniya@gmail.com**Abstract:**

A novel optical chemosensor was synthesized from Eosin Y hydrazide and indole-3-carboxaldehyde and characterized by spectroscopic techniques. The sensor was investigated for the selective detection of OH⁻ ions. The sensor exhibited distinct responses in both UV-Vis and fluorescence spectroscopy. Excellent linearity was demonstrated for both fluorescence spectroscopy ($R^2 = 0.9904$) and a UV-Vis Spectroscopy ($R^2 = 0.9928$). The fluorescence method showed a LOD of 0.1 mg/L and LOQ of 1 mg/L, demonstrating good analytical sensitivity. The sensor showed a clear colour change from colourless to yellow upon addition of OH⁻, with an absorption maximum at 399.5 nm and fluorescence emission at 565 nm. Job's plot confirmed a 1:1 stoichiometric interaction between Sensor MY and OH⁻. The sensing response was also reversible for eight consecutive ON-OFF cycles, demonstrating good reversibility and stability.

Key words: Chemoensor; Eosin Y; OH⁻ sensing; Fluorescence; UV-Vis; Reversible sensor.

**ORAL 31****Bispyrazolones: A New Synthetic Strategy & In Silico Study****Hareshvari A.Vegada, Naval P. Kapuriya***

Department of Chemistry and Forensic Science, Bhakta Kavi Narsinh Mehta University,
Junagadh-362263, Gujarat, India

* Email of Corresponding author: hareshvarivegda218@gmail.com

Abstract:

Bis-pyrazolone derivatives are valuable heterocyclic scaffolds with diverse pharmaceutical potential. In this study, a series of 4,4'-(arylmethylene) bis(3-methyl-1-phenyl-1H-pyrazol-5-ol) derivatives (MTH-1–MTH-10) was synthesized through a one-pot multicomponent Knoevenagel–Michael reaction using triethanolamine (TEOA) as an environmentally friendly base catalyst in methanol. The reactions were performed under reflux conditions at 75–80 °C, affording the target compounds in moderate to good yields. The structures of the synthesized derivatives were confirmed by FT-IR, ¹H NMR, and mass spectrometry. Furthermore, in-silico studies using the pkCSM web server were performed to evaluate their ADMET properties and drug-likeness. Most compounds showed favorable predicted pharmacokinetic properties with limited Lipinski violations, indicating their potential for further investigation as biologically relevant bis-pyrazolone scaffolds.

Keywords: Bis-pyrazolones; Knoevenagel–Michael reaction; Triethanolamine; ADMET analysis.

**ORAL 32****Design and Synthesis of Novel Pyrazole-derived Hydrazone Scaffolds:
Spectroscopic Characterization and Computational Analysis****Rupal K. Khunti and Naval P. Kapuriya***

Department of Chemistry and Forensic Science, Bhakta Kavi Narsinh Mehta University,
Junagadh-362263, Gujarat, India

* Email of Corresponding author: arjunkhunti12@gmail.com

Abstract:

The present work describes the synthesis and in silico evaluation of novel pyrazole-based acetohydrazide and hydrazone derivatives using enaminone as the key starting material. The synthetic route involved conversion of enaminone into substituted pyrazole intermediates, followed by ester formation, hydrazide synthesis, and final condensation with different aldehydes and ketones to obtain the target compounds. The synthesized compounds were characterized by melting point, IR, Mass, and ¹H NMR spectral analysis. In silico studies were carried out to evaluate drug-likeness, pharmacokinetic properties, and toxicity profiles. The results indicated that the synthesized derivatives possess favorable properties and may serve as promising candidates for further biological investigation. Overall, this study provides an efficient approach for the development of biologically important pyrazole-based hydrazone derivatives.

Keywords: Pyrazole; Hydrazone; Enaminone.

**ORAL 33****Hyperchromic shift in iodine absorption as a probe for indirect estimation of cysteine****Vaidehi D. Bagiya and Dr. Mrunal Ambasana***

Department of Chemistry and Forensic Science, Bhakta Kavi Narsinh Mehta

University, Junagadh, (Gujarat), India.

* Email of Corresponding author: bagiyavaidehi1702@gmail.com**Abstract:**

The present study outlines the development of a facile and sensitive spectrophotometric method for the estimation of low molecular weight, thiol-containing biomolecule Cysteine, using molecular iodine as a redox reagent. Upon reaction with Cysteine, Iodine exhibits a notable hyperchromic shift in the UV-Vis spectrum, indicative of the formation of disulfide bonds and the concurrent release of iodide ions. This spectral shift provides a reliable signal for the indirect quantification of Cysteine. The redox based mechanism supports the method's specificity, broadens and its relevance to pharmaceutical and biochemical applications. The method was validated as recommended in ICH guidelines, demonstrating linearity in the range of 0.4–1.6 $\mu\text{g/mL}$ ($r^2 = 0.9854$), with limits of detection and quantification at 0.1 and 0.3 $\mu\text{g/mL}$, respectively. Precision studies showed excellent repeatability, with intraday and interday mean recoveries of 100.51% and 100.38%. Accuracy recovery ranged between 98.14% and 100.43%, confirming the method's reliability for Cysteine estimation.

Key words: Cysteine; Thiol-containing biomolecule; Redox reaction; Hyperchromic shift; Iodide ions; Spectrophotometric method.

**ORAL 34****Microwave assisted an efficient approach for the synthesis of 1,3,5-trisubstituted benzene derivatives mediated by Amberlite IR-120 H resin****Shivani K. Ram and Naval P. Kapuriya***

Department of Chemistry and Forensic Science, Bhakta Kavi Narsinh Mehta University,
Junagadh-362263, Gujarat, India

* Email of Corresponding author: ramshivani3290@gmail.com

Abstract:

An efficient and eco-friendly synthetic methodology has been developed by study of previously reported strategies for the cyclotrimerization of enaminones to the construction of 1,3,5-trisubstituted benzene derivatives. The reaction was mediated through Amberlite IR-120 H resin in microwave irradiation. The new strategy displays a broad scope and provides good yields (60-90%). Compared to other reported strategy has lot of advantages like simple microwave condition, solvent free, shorter reaction time, less waste, metal-free and less manpower.

Keywords: Cyclotrimerization; Multicomponent reaction; Microwave assisted reaction; Amberlite IR-120 H resin.

**ORAL 35****Synthesis, characterization and In-Silico study of highly functionalized pyrrole derivatives through isocoumarin ring opening reaction****Sagun G. Koria and Jasmin J. Bhalodia***

Department of Chemistry and Forensic Science, Bhakta Kavi Narsinh Mehta University,
Junagadh-362263, Gujarat, India

* Email of Corresponding author: shagunkoriya@gmail.com

Abstract:

Pyrrole derivatives are important heterocyclic compounds that exhibit a wide range of biological activities, including antimicrobial, anti-inflammatory, anticancer, and antiviral properties. In the present study, functionalized pyrrole derivatives were synthesized through a base-promoted isocoumarin ring-opening strategy using NaOH in THF. The reaction conditions were optimized to achieve good yields and selectivity through efficient nucleophilic ring cleavage. The synthesized compounds were characterized by FT-IR, ¹H NMR, and mass spectroscopic techniques. Furthermore, in-silico ADMET studies were performed to evaluate their pharmacokinetic and drug-likeness properties, revealing their potential pharmacological applications. Overall, this study presents an efficient synthetic strategy that integrates experimental synthesis with computational evaluation, while the multicomponent reaction approach offers improved atom economy and reduces the number of synthetic steps, highlighting its potential as a sustainable route for the development of biologically relevant pyrrole derivatives.

Keywords: Pyrrole derivatives; Isocoumarine; Ring opening reaction.

**ORAL 36****IVF Awareness and Premarital and Postmarital Reproduction Health
Complications****Riya B Chauhan, Aarchy J Jalu and Sneha Mahesh Sharma, Surbhi
Hitesh Bhai Pandya, Vedant Patel***Department of Microbiology, School of Science, Dr. Subhash University, Junagadh. 362001
Gujarat, India.* Email of Corresponding author: vedant.patel@dsuni.ac.in**Abstract:**

Background: Infertility is an important reproductive health problem that can affect couples before and after marriage. Many people have limited knowledge about the causes of infertility and available treatments. In Vitro Fertilization (IVF) is an assisted reproductive technique that can help some couples who have difficulty becoming pregnant. Lack of awareness may lead to delayed consultation and treatment. Methods: A cross-sectional study can be conducted among people of reproductive age to assess their awareness of IVF and common premarital and post marital reproductive health complications. Information can be collected using a simple, structured questionnaire. The questionnaire may include questions about causes of infertility, risk factors, IVF, its procedure, benefits, limitations, and sources of information.

**ORAL 37****Formulation, In Vitro Evaluation, and SPF Analysis of a Hybrid Mineral-
Phytochemical Sunscreen****Shreyanshi A Kataria* and Niralee J Malviya**Department of Chemistry, School of Science, Dr. Subhash University, Junagadh. 362001
Gujarat, India.

Abstract:

Conventional synthetic sunscreens often trigger environmental degradation (coral bleaching) and adverse skin reactions. This research aims to develop an eco-friendly, high-performance hybrid sunscreen combining mineral UV reflectors with bioactive phytochemicals to achieve an SPF 50+ rating while eliminating white cast and skin irritation.

The formulation was prepared using an oil-in-water (O/W) emulsion technique. The aqueous phase contained rose water, aloe vera, and glycerin heated to 70°C, while the oil phase incorporated carrier oils, micronized zinc oxide, salicylic acid, and antioxidant-rich herbal extracts (chandan, vitamins C and E). Both phases were homogenized at 70°C and supplemented with a starch slurry during cooling as a mattifying agent.

In vitro photoprotection efficacy was evaluated via UV-Vis spectrophotometry across the 290nm to 320 nm range using the Mansur equation ($SPF = CF \times \sum [EE(\lambda) \times I(\lambda) \times Abs(\lambda)]$). By optimizing the concentration of micronized zinc oxide and phytochemical boosters, the adjusted spectrophotometric absorbance (Abs) values yielded a summation of 5.0307. With CF= 10, the calculated SPF was 50.31. The formulated hybrid sunscreen successfully delivers high-level broad-spectrum protection ($SPF > 50$) with enhanced thermal stability and a lightweight, cosmetically elegant matrix, offering a sustainable alternative to conventional sun care products.

Keywords: Hybrid Sunscreen; Zinc Oxide; Mansur Equation; SPF 50+; Green Cosmetics.

**POSTER PRESENTATION – ACADEMICIAN****POSTER 1****Development and Optimization of Dual Drug-Loaded Chitosan Nanoparticles
for Localized Treatment of Periodontitis****Chitrali Talele**

Department of Pharmacy, Sumandeep Vidyapeeth Deemed to be University, Vadodara,
Gujarat, India – 391760.

Email of Corresponding Author: chitralitalele@gmail.com

Abstract:

Background: Periodontitis is a chronic inflammatory disease caused by pathogenic bacterial biofilms that progressively destroy the supporting structures of teeth. Conventional antimicrobial therapy is limited by poor drug retention within periodontal pockets, rapid clearance, and frequent dosing. Nanoparticle-based localized drug delivery systems can overcome these limitations by providing sustained drug release and enhanced therapeutic efficacy.

Objective: To develop and optimize dual drug-loaded chitosan nanoparticles containing minocycline hydrochloride and chlorhexidine gluconate for localized treatment of periodontitis and to evaluate their physicochemical characteristics, antimicrobial activity, and stability.

Methods: Chitosan nanoparticles were prepared by the ionic gelation method using sodium tripolyphosphate as a cross-linking agent. A 3² full factorial design was employed for formulation optimization. The optimized nanoparticles were characterized for particle size, zeta potential, entrapment efficiency, Fourier transform infrared spectroscopy, in vitro drug release, antimicrobial activity, and stability.

Results: The optimized formulation exhibited a particle size of approximately 278 nm with a positive zeta potential and high entrapment efficiency for both drugs. FTIR confirmed drug–excipient compatibility. The nanoparticles provided sustained drug release, achieving 98.16 ± 5.98% cumulative release over 24 h. Significant antimicrobial activity against periodontal pathogens was observed, and the formulation remained stable without notable changes in physicochemical properties or drug release under different storage conditions.



Key words: Periodontitis; Chitosan nanoparticles; Localized drug delivery; Minocycline hydrochloride; Chlorhexidine gluconate; Sustained drug release.

**POSTER 2****Development of Aromatic Amine-Conjugated Thiobarbiturates as Multi-Target Agents: Synthesis, Molecular Docking, and Biological Evaluation**

Bhaveshkumar D. Dhorajiya^{*1}, Pravin M. Patel¹, Sunil M Galani¹, Nirav H. Patel¹, Yogesh O. Bhola², Tushar P. Sutariya³, Bharatkumar Z. Dholakiya⁴, Shital B. Karmur⁵, Tejas S Gandhi⁶, Amit D. Dhorajiya⁷, Rafat M. Mohareb⁸, Vani Senthil⁹, David Sheng-Yang Wang⁹

¹Department of Industrial Chemistry V.P. & R. P. T. P. Science College, Sardar Patel University, Vallabhvidyanagar-388120, Gujarat, India.

²Department of Chemistry, Shree P.N.Pandya Arts, M. P. Pandya Science & D. P. Pandya Commerce College, Shree Guru Govind University, Lunawada-389230, Gujarat, India.

³Department of Chemistry, Sardar Patel University, Vallabhvidyanagar-388120, Gujarat, India.

⁴Department of Applied Chemistry, S.V. National Institute of Technology, Ichchhanath, Surat-395007, Gujarat, India.

⁵Department of Chemistry, The patidar Gin Science College Bardoli, Veer Narmad South Gujarat University-394601, Gujarat, India.

⁶Department of Chemistry, V.S. Patel College of Arts & Science Bilimora, Veer Narmad South Gujarat University-396321, Gujarat, India.

⁷Department of Mechanical Engineering, Parul University, Waghodia-391760. Gujarat, India.

⁸Faculty of Science, Cairo University, Giza, Arab Republic of Egypt.

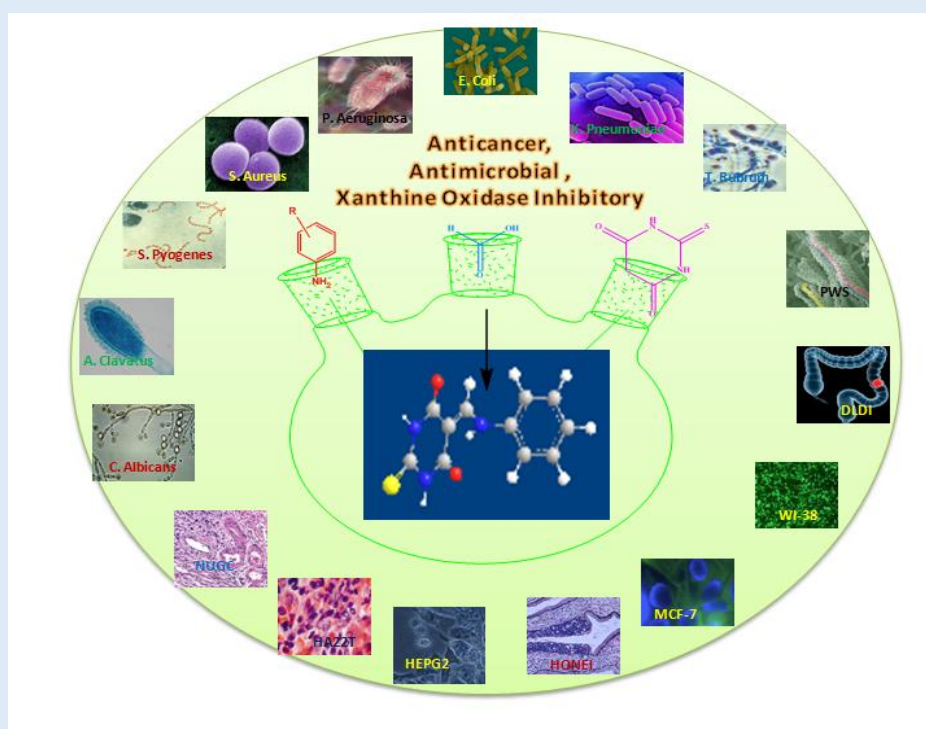
⁹Department of Forestry, National Chung Hsing University, 250 Kuo-Kung Road, Taichung-402, Taiwan (R.O.C), Ph-886-(0)4-22840345*138 or 338

Email of Corresponding Author: bhavesh.orgchem@gmail.com

Abstract:

A simple and efficient one-pot synthesis of 5-[(arylamino)methylidene]-2-thioxodihydropyrimidine-4,6(1H,5H)-dione derivatives has been developed via a multicomponent reaction approach. The newly synthesized compounds were evaluated for their antimicrobial activity against five bacterial strains—*Streptococcus pyogenes* (MTCC 442), *Staphylococcus aureus* (MTCC 96) as Gram-positive bacteria, and *Escherichia coli* (MTCC 443), *Pseudomonas aeruginosa* (MTCC 424), and *Klebsiella pneumoniae* (MTCC 109) as Gram-negative bacteria. Additionally, antifungal activity was assessed against four fungal strains: *Candida albicans* (MTCC 227), *Aspergillus clavatus* (MTCC 1323), *Trichophyton rubrum*

(MTCC 296), and a wild strain of *Penicillium*. Furthermore, the synthesized derivatives were tested for their cytotoxic activity against seven cancer cell lines—gastric cancer (NUGC), colon cancer (DLD1), liver cancers (HA22T and HEPG2), nasopharyngeal carcinoma (HONE1), and breast cancer (MCF-7)—as well as normal human fibroblast cells (WI-38). The compounds were also evaluated for their inhibitory effects on xanthine oxidase, specifically in the oxidation of xanthine to uric acid.



Graphical abstract

Key words: Thiobarbiturates, Molecular Docking, Cytotoxicity, Xanthine Oxidase inhibition, Antimicrobial, Green Chemistry

**POSTER 3****Green Sonochemical Synthesis of Bio-MOFs for Efficient Removal of Xylenol Orange from Wastewater****Dr. Pooja M Bhanderi*, Dr. Ranjan C Khunt**

Department of Chemistry, Saurashtra University, Rajkot

Abstract:

The development of long-lasting porous materials for removing organic dyes from wastewater is critical for the environment. Utilizing L-glutamic acid as an organic linker, three amino acid-based metal–organic frameworks—L-Glu-Mn, L-Glu-Cu, and L-Glu-Zn—were synthesized in this work via a simple sonochemical method. PXRD, FT-IR, FE-SEM, TGA, and BET studies were used to characterize the synthesized Bio-MOFs. At $242.6 \text{ m}^2 \text{ g}^{-1}$, L-Glu-Mn had the largest specific surface area. Xylenol Orange (XO) was used as a model dye to assess the adsorption performance. With a maximum removal efficiency of 93.03%, the synthesized materials showed quick dye removal. The kinetic data followed the pseudo second-order model ($R^2 > 0.990$), although the Langmuir isotherm ($R^2 = 0.996$) provided a superior description of the adsorption equilibrium. The findings show that MOFs based on L-glutamic acid have the potential to be effective and sustainable adsorbents for the treatment of wastewater polluted with dyes.

Key words: Metal–organic frameworks; L-glutamic acid; green synthesis; sonochemical synthesis; Xylenol Orange; dye adsorption; wastewater treatment

References:

1. Bhanderi PM, Vyas AK, Katariya DK, Khunt RC. Facile sonochemical synthesis and characterization of amino acid-based metal-organic frameworks for enhanced dye adsorption. *Journal of Molecular Structure*. 2025 Apr 5;1326:141058.
2. Furukawa, H.; Cordova, K. E.; O'Keeffe, M.; Yaghi, O. M. The Chemistry and Applications of Metal–Organic Frameworks. *Science* 2013, 341, 1230444.
3. Li, J.-R.; Sculley, J.; Zhou, H.-C. Metal–Organic Frameworks for Separations. *Chemical Reviews* 2012, 112, 869–932.



4. Yaghi, O. M.; O'Keeffe, M.; Ockwig, N. W.; Chae, H. K.; Eddaoudi, M.; Kim, J. Reticular Synthesis and the Design of New Materials. *Nature* 2003, 423, 705–714.

**POSTER 4****Natural vs. Synthetic Adsorbents in Edible Oil Refining: A Comparative Review of Decontamination Kinetics, Life-Cycle Assessment, and Industrial Viability****Dhruvi Pethani^a and Pratik Ambasana^b**^aDepartment of Chemistry, KSKV Kachchh University, Bhuj^bDepartment of Chemistry, Tolani College of Arts & Science, Adipur

Abstract:

Adsorptive refining plays a pivotal role in edible oil processing by removing pigments, primary and secondary oxidation products, trace metals, and emerging process contaminants such as 3-MCPD and glycidyl esters. Historically, acid-activated synthetic clays and modified silicas have dominated commercial refineries due to their superior specific surface area and high decontamination kinetics. However, their industrial dominance is increasingly challenged by strict sustainability mandates, high operational costs, and the acute environmental burden of spent earth management, including landfill leaching and spontaneous combustion risks.

This review delivers a critical comparative analysis of natural materials (agri-waste biochars, raw clays, zeolites, biopolymers) versus synthetic adsorbents, evaluating their performance across three critical pillars: decontamination kinetics, environmental footprint via Life-Cycle Assessment (LCA), and industrial viability. We dissect the thermodynamic and kinetic mechanisms governing pigment uptake and contaminant binding, highlighting the yield loss penalty caused by oil entrapment in pores. Through an LCA lens, the carbon footprints, energy intensity, and eco-toxicity of both adsorbent classes are systematically contrasted against circular-economy metrics. Finally, we tried to address the practical difficulties for industrial applicability & adoption including material consistency, regeneration feasibility, and techno-economic balance in sustainable oil refining.

Key words: Edible oil refining; Decontamination kinetics; Life-Cycle Assessment (LCA); Industrial viability; Bio-based adsorbents; Acid-activated clays; Spent earth valorization

**POSTER 5****Potential impact of biostimulants in brinjal leaf cv. GAB 6 for improvement of biochemical and antioxidant attributes****J. D. Dobaria* and J. J. Dhruv**

Department of Biochemistry & Physiology, Anand Agricultural University, Anand

Abstract:

Brinjal (*Solanum Melongena* L.) is the power house of nutrients. Leaves are crucial part of plant provides actionable insights into photosynthetic capacity, responses to environmental stress and yield. Biostimulants are natural compounds that improve the crop quality. Tryptophan and silicic acid represent as a powerful biostimulant with multiple roles in promoting plant growth and quality. Aiming, this research focuses on enhancing the quality of brinjal leaves through the application of biostimulants. The field experiment was conducted with cv. GAB 6 and ten different treatments (T1 control; T2 tryptophan priming; T3 silicic acid priming; T4 foliar application of tryptophan at vegetative stage; T5 foliar application of tryptophan at flowering stage; T6 foliar application of tryptophan at vegetative and flowering stage; T7 foliar application of silicic acid at vegetative stage; T8 foliar application of silicic acid at flowering stage; T9 foliar application of silicic acid at vegetative and flowering stage and T10 foliar application of tryptophan and silicic acid at vegetative and flowering stage) at Main Vegetable Research Station, AAU, Anand, Gujarat. The leaves were analyzed for biochemicals at vegetative and flowering stages. The results revealed that the combined treatment of tryptophan can improve the relative water content, membrane injury, total chlorophyll, total soluble sugars, phenol, activities of anti-oxidant enzymes (poly phenol oxidase and catalase), calcium and silicon content as compared to silicic acid. While the moisture and flavonoid content was enhanced by silicic acid as compared to tryptophan. Thus, the biostimulant tryptophan was better to improve leaf quality of brinjal cv. GAB 6.

Key words: Antioxidant enzymes, Brinjal, Biostimulants, Silicic acid, Tryptophan

**POSTER PRESENTATION – RESEARCH SCHOLAR****POSTER 6****A highly sensitive fluorescence probe based on pyrene-pyrazole-imidazole conjugate: exploration of solvatochromism, selective detection of iodide ion, DFT analysis and cell imaging studies****Yash R. Sorthiya*, Jasmin Bhalodia**Department of Chemistry and Forensic Science, Bhakta Kavi Narsinh Mehta University,
Junagadh-362263, Gujarat, IndiaEmail of Corresponding Author: yashsorthiya1997@gmail.com**Abstract:**

This study reports the development of a novel pyrene-pyrazole-imidazole conjugate (PPIC) fluorescent probe for the selective detection of iodide ions (I^-). PPIC was synthesized using a rapid microwave-assisted multicomponent reaction and characterized by spectroscopic and analytical techniques. The probe showed strong solvatochromic and fluorescence properties, including aggregation-induced emission. PPIC selectively detected iodide through a fluorescence turn-off mechanism, with good linearity from 0–12.5 μM ($R^2 = 0.996$) and a limit of detection of 3.60 μM . Fluorescence lifetime studies indicated a dynamic quenching mechanism, while Job's plot confirmed a 1:1 binding ratio between PPIC and iodide. DFT calculations supported the proposed ICT-based sensing mechanism. The probe was also successfully applied to detect iodide in KI and TBAI catalysts in aqueous media. Furthermore, PPIC exhibited bright blue fluorescence in MCF cancer cells, demonstrating its potential for live-cell imaging and possible cancer theranostic applications. Overall, PPIC is a sensitive and selective iodide-responsive fluorescent probe with promising sensing and bioimaging applications.

Key words: Pyrene-pyrazole-imidazole conjugate, Solvatochromism, Detection of iodide ion, Cell imaging

**POSTER 7****A palladium bio-nanocomposite as an efficient heterogeneous catalyst for nitro reduction: a fungus mediated green and sustainable process****Yashasvi N. Desai*, Hemal B. Rathod, Paresh N. Patel**

Laboratory of Bio-organic Chemistry, Tarsadia Institute of Chemical Science, Uka

Tarsadia University, Bardoli – 394 350, Gujarat, India

Email of Corresponding Author: yashasvidesai42@gmail.com ,hemalrathod24499@gmail.com , paresh.patel@utu.ac.in**Abstract:**

Metallic nanocatalysts, particularly palladium nanoparticles (Pd-NPs), exhibit exceptional catalytic activity due to their high surface-to-volume ratio; however, factors such as aggregation and metal leaching hinder their stability and applicability. This study introduces a sustainable biosynthetic method for producing bio-stabilized Pd-NPs using the fungal strain *Aspergillus trinidadensis* VM ST01 (OL587588) as a reducing and capping agent. The approach allows for the simultaneous bio-reduction of Pd²⁺ ions, nucleation, and surface functionalization without hazardous chemicals or external stabilizers. Factors including culture age (24–54 h), biomass loading (0.08–0.24 g mL⁻¹), and incubation time (8–24 h) were systematically examined to control NP synthesis. Comprehensive characterization (UV-vis, FT-IR, XRD, SEM, TEM, elemental mapping, EDX, XPS, and TGA) affirmed the creation of uniformly distributed Pd-NPs, averaging ~35 nm, embedded within the fungal biomass matrix. The bio-organic framework surrounding the nanoparticles effectively mitigates aggregation and palladium leaching, enhancing catalyst durability. The biosynthesized AtPdNPs were tested for the reduction of nitro-benzene (NB) to amino-benzene (AB) under mild, aqueous conditions (using NaBH₄, at ambient temperature and pressure). The optimized conditions (0.16 g mL⁻¹ biomass, 36 h culture age, and 24 h incubation) achieved complete conversion within 30 min, with a turnover frequency (TOF) of 832 h⁻¹ and a turnover number (TON) of 416. The kinetics were analyzed, and catalytic activity was defined as the pseudo-first-order rate constant (k_{app}). The in situ bio-coating of AtPdNPs significantly reduces palladium leaching (<1.5% ppm), improves storage stability, and ensures environmental compatibility, allowing the catalyst to maintain its structural integrity and performance under industry-relevant conditions.

Key words: Palladium(II) chloride, Nitrobenzene, Potato dextrose broth, Potato dextrose agar

**POSTER 8****A Pyrazole–Rhodamine–Based Dual-Mode Chemosensor for Bisulfate: Smartphone RGB Quantification, Paper Strip Sensing, and Reversible Logic Gate Operation****Yogita G. Nandaniya, Dr. Mrunal Ambasana**Department of Chemistry and Forensic Science, Bhakta Kavi Narsinh Mehta University,
Junagadh, (Gujarat), IndiaEmail of Corresponding Author: ynandaniya902@gmail.com**Abstract:**

A novel rhodamine–pyrazolone-based turn-on fluorescent chemosensor was designed and synthesized for the selective detection of hydrogen sulphate (HSO_4^-). The sensor was obtained through pyrazolone formation, followed by Vilsmeier–Haack formylation, rhodamine hydrazide formation, and final Schiff base condensation. Spectral studies revealed, upon addition of HSO_4^- , the probe exhibited a distinct colour change from colourless to pink with a new absorption maximum at 560 nm and strong fluorescence emission at 580 nm. The sensor demonstrated high selectivity over various competing anions and displayed a reversible OFF-ON response. It also functioned as a fluorescence-based INHIBIT logic gate using HSO_4^- and OH^- as chemical inputs.

When applied to the quantitative determination of Clopidogrel bisulphate in commercial pharmaceutical formulations, the proposed spectroscopic method exhibited excellent linearity over the concentration range of 2–6 $\mu\text{g mL}^{-1}$ ($R^2 = 0.995$), with LOD and LOQ values of 0.3 and 1.0 $\mu\text{g mL}^{-1}$, respectively. Furthermore, smartphone-assisted RGB image analysis demonstrated superior analytical performance, providing excellent linearity ($R^2 = 0.998$) and enabling rapid, accurate, and cost-effective quantification of Clopidogrel bisulphate.

Key words: Clopidogrel bisulphate, INHIBIT logic gate, OFF–ON sensing, Rhodamine-pyrazolone chemosensor, Selective detection

**POSTER 9****A Simple Derivatization-Based Spectrophotometric Method for the Rapid Estimation of Memantine Hydrochloride Using N,N-Dimethylaniline****Jayvant B. Babariya and Hardik L. Varu***Department of Chemistry, School of Science, Dr. Subhash University, Junagadh, 362001,
Gujarat, India.Email of Presenting Author: babariyajayvant1112@gmail.comEmail of Corresponding Author: hardikvaru5@gmail.com**Abstract:**

The present study focuses on the development and validation of a UV-Vis spectrophotometric method for the quantitative analysis of Memantine hydrochloride. Since Memantine (MMT) lacks significant UV absorbance, it was initially subjected to a conventional diazotization reaction, followed by coupling with N,N-dimethylaniline (DMA) at a controlled temperature of 2–5°C to facilitate derivatization. The resulting MMT-DMA derivative exhibited a distinct absorption maximum at 354 nm. Spectrophotometric measurements were performed by recording the spectrum over the wavelength range of 200–800 nm using a Shimadzu UV-1900 spectrophotometer. The proposed analytical method was subsequently validated for linearity, accuracy, precision, limit of detection (LOD), limit of quantification (LOQ), and robustness. In comparison with previously reported approaches, the developed method demonstrated several advantages, including rapid reaction, straightforward derivatization, and enhanced sensitivity. Furthermore, the method was effectively applied for the quantitative estimation of Memantine hydrochloride in marketed pharmaceutical formulations.

Key words: Memantine hydrochloride, diazotization reaction, UV-Visible spectrophotometric analysis, analytical validation

**POSTER 10****A Study of Pollinators from selected sites of Girnar sanctuary Junagadh,
Gujarat****Urvashi G. Bhatu, Hiteshkumar Parmar**

Department of Zoology, School of Science, Dr. Subhash University, Jungadh-362001

Email of Corresponding Author: bhatuuvashi25@gmail.com , phitesh649@gmail.com**Abstract:**

Pollinators are essential for plant reproduction, biodiversity, and ecosystem functioning. This study investigated pollinator abundance and plant–pollinator interactions across four selected sites of Girnar Sanctuary, Junagadh, Gujarat, India: Bordevi Range, Madavela, Itawa, and Paturan. Field observations were conducted from November 2025 to April 2026, documenting pollinator visitation, floral associations, and pollen deposition. Across 387 observations, we recorded 11 pollinator species interacting with 22 flowering-plant taxa. The overall mean pollinator abundance was 13.63 individuals per observation, with a standard deviation (SD) of 9.69. A one-way ANOVA revealed significant spatial variation in abundance across the sites ($F = 4.68$, $p = 0.0032$). Paturan exhibited the highest mean abundance (16.12, $SD = 9.52$), followed by Itawa (14.34, $SD = 9.93$), Bordevi Range (12.82, $SD = 9.75$), and Madavela (11.02, $SD = 8.84$). *Castalius rosimon* and *Euchrysops cnejus* exhibited broad floral associations, while *Zizina otis indica* showed strong associations with *Barleria prionitis*, *Blumea lacera*, and *Strobilanthes integrifolia*. *Cinnyris asiaticus* was the only avian pollinator recorded. These findings demonstrate spatial variation in pollinator abundance and highlight the importance of maintaining floral-resource diversity and habitat heterogeneity for conserving pollination networks in the Girnar landscape.

Key words: Pollinator diversity, Plant–pollinator interactions, Girnar Sanctuary, Floral specialization, Butterfly pollinators, Pollination ecology

**POSTER 11****An Azido-Functionalized Pyrazole–Chalcone Fluorescent Probe for Selective Iodide Ion Detection****Bhargavi V. Joshi, Dr. Rupal Joshi, Prof. Naval P. Kapuriya**Department of chemistry & Forensic science, Bhakta Kavi Narsinh Mehta University,
Junagadh, Gujarat, IndiaEmail of Corresponding Author: bjoshi21@gmail.com**Abstract:**

Present study disclosed the synthesis of iodide (I⁻) ion fluorescence sensor based on azido pyrazole-chalcone derivatives for selective detection of iodide ion in pure form. The azido pyrazole-chalcone derivatives were obtained from condensation reaction of 5-azido-3-methyl-1-phenyl-1H-pyrazole-4-carbaldehyde and various acetophenones under alkaline methanol. The developed fluorescence sensor compound 4A shown selective fluorospectrometric recognition of I⁻ via fluorescence TURN-OFF mechanism, while the various competitive anions (N₃⁻, BrO₃⁻, OH⁻, SO₃²⁻, CN⁻, Br⁻, NO₃⁻, CO₃²⁻, HPO₄⁻, CH₃COO⁻, SCN⁻ and NO₂⁻) did not led to any noticeable interference. The iodide ion showed linear correlation with fluorescence intensity of developed fluorescence sensor over the concentration range 7.5 to 37.5 mM. The correlation coefficient value of the method is 0.9906 with 2.5 mM detection limit of iodide ion. Further, azido pyrazole-chalcone 4A as sensor showed high Stokes shift and selectivity towards iodide anion. The decay study of 4A showed decreased lifetime in the presence of iodide ion which indicates dynamic quenching mechanism. The synthesized compound 4A was also capable to detect iodide ion in catalyst like KI and TBAI. The outcomes of the method showed that synthesized fluorescence sensor (4A) was selective and sensitive detector of iodide ion in aqueous solution.

Key words: Fluorescence sensor, Iodide ion, Azido pyrazole-chalcone derivatives

**POSTER 12****AN EFFICIENT METAL-FREE STRATEGY FOR THE SYNTHESIS OF 2-AROYL 7-AZAINDOLES VIA INTRAMOLECULAR DENITROGENATIVE CYCLIZATION**

Gautamkumar S. Makwana*, Apexaben B. Vainsh*, Chirag A. Chamakiya, Naval P. Kapuriya

Department of Chemistry and Forensic Science, Bhakta Kavi Narsinh Mehta University,
Gujarat, INDIA

Email of Corresponding Author : gsmakwana2605@gmail.com &
apexavainsh002@gmail.com

Abstract:

A simple and efficient metal-free approach to novel 2-aryl 7-azaindoles has been developed using 3-(tetrazolo[1,5-a]pyridin-8-yl)prop-2-en-1-one derivatives in Dowtherm A. The method features short reaction times, catalyst-free conditions, easy product isolation, and high yields, making it an attractive route for the synthesis of azaindole derivatives.

Key words: 7-Azaindoles, Denitrogenative annulation, Deep eutectic solvent, Dowtherm A, Metal-free synthesis

**POSTER 13****Analytical Performance Evaluation of Iodine Mediated Spectrophotometric
Evaluation of Remdesivir****Niralee J. Malviya and Hardik L. Varu***Department of Chemistry, School of Science, Dr. Subhash University, Junagadh, 362001,
Gujarat, IndiaEmail of Presenting Author: malviyanirali5@gmail.comEmail of Corresponding Author: hardikvaru5@gmail.com**Abstract:**

A simple, sensitive, and cost-effective spectrophotometric method was developed for the quantitative determination of remdesivir in pharmaceutical formulations using molecular iodine as a chromogenic reagent. The method is based on the interaction of molecular iodine (I_2) with the secondary amine (-NH) group of remdesivir, leading to the formation of a charge-transfer complex. The resulting complex exhibited a distinct hyperchromic response with a maximum absorption at 231 nm, which was used for quantitative analysis.

The proposed method was validated according to International Council for Harmonisation (ICH) guidelines. Good linearity was observed over the concentration range of 0.25–1.0 $\mu\text{g/mL}$, with a correlation coefficient (r^2) of 0.9997. The calculated limits of detection and quantification were 0.0165 and 0.0501 $\mu\text{g/mL}$, respectively. The method showed satisfactory precision, with mean recoveries of 99.39% and 99.33% for intra-day and inter-day studies, respectively. Accuracy studies provided mean recoveries ranging from 99.52% to 99.87%. In addition to conventional validation parameters, the reliability and analytical performance of the method were evaluated using the Analytical GREENness Metric (AGREE) related assessment tools RAPI and AMRI. The obtained RAPI and AMRI



scores of 90 and 84, respectively, indicated a high level of analytical reliability and suitability.

The developed method demonstrated good sensitivity, precision, accuracy, and robustness, and was successfully applied to the assay of remdesivir in pharmaceutical formulations. The proposed iodine-assisted spectrophotometric approach offers a straightforward alternative for routine analysis of remdesivir where simple and accessible analytical procedures are required.

Key words: Remdesivir; Molecular iodine; Spectrophotometry; Charge-transfer complex; Method validation; RAPI; AMRI.

**POSTER 14****Antimicrobial Activity of Secondary Metabolites from Mangrove Microbiota against *Acinetobacter baumannii*: Preliminary Screening and Characterization****Lancy R. Parmar**Department of Microbiology, School of Science, Dr. Subhash University, Junagadh,
362001, Gujarat, IndiaEmail of Corresponding Author: lancyparmar470@gmail.com**Abstract:**

The increasing prevalence of multidrug-resistant nosocomial pathogens, particularly *Acinetobacter baumannii*, presents an urgent global health challenge that necessitates the discovery of novel therapeutic agents. Mangrove ecosystems, characterized by high salinity, fluctuating oxygen levels and intense metabolic competition, harbor unique microbial communities capable of synthesizing specialized secondary metabolites, making them a promising yet underexplored reservoir for bioactive compound discovery. This study aims to isolate distinct microbial strains from selected mangrove micro-environments, extract their secondary metabolites and evaluate their potential antimicrobial efficacy against *Acinetobacter baumannii*. Microbial strains were isolated from sediment and rhizosphere samples gathered from designated mangrove sampling sites. Morphologically distinct isolates were cultured in liquid media to induce secondary metabolite production. The antimicrobial activity of the extracts against *Acinetobacter baumannii* was evaluated using the agar well diffusion method performed in triplicates, where crude secondary metabolites were loaded into wells cut into agar plates seeded with the test pathogen, followed by incubation to observe zones of inhibition. Preliminary agar well diffusion assays demonstrated distinct antimicrobial activity, with specific microbial isolates yielding prominent and reproducible clear zones of inhibition across triplicates against *Acinetobacter baumannii*. Notable consistency in inhibitory activity among replicates highlights the potent antagonistic capability of select mangrove-derived strains against the target pathogen. These initial findings demonstrate that mangrove-derived microbiota harbor functional secondary metabolites with meaningful antimicrobial activity against critical clinical pathogens.



Key words: Mangrove Microbiota; Secondary Metabolites; *Acinetobacter baumannii*; Agar Well Diffusion; Bioactive Compounds; Drug Discovery

**POSTER 15****Assessment of In Vitro, In Silico and Greenhouse studies of *Trichoderma* spp. with antagonistic properties****Sushama Sudhakaran and *Naga Rathna Supriya G.**

C. G. Bhakta Institute OF Biotechnology, Uka Tarsadia University, Bardoli, Gujarat

Email of Corresponding Author: rathnasupriya@utu.ac.in**Abstract:**

Trichoderma species are widely recognized for their potential due to their versatile metabolism that gives them the ability to control diverse phytopathogens through the production of hydrolytic enzymes, competition for space and nutrients, resistance induction in the host, antibiosis, and mycoparasitism, paving the way for formulating eco-friendly biofertilizers and biocontrol agents. In current research, screening of various parameters like antagonistic activity against common phytopathogens (*Alternaria alternata*, *Sclerotium* spp., *Colletotrichum gloeosporioides*, and *Fusarium oxysporum*), plant growth promoting abilities solubilisation of minerals like phosphate and potassium; nitrogen fixation ability; production of phytohormones such as ammonia, IAA and HCN, tolerance ability against common pesticides such as cypermethrin, mancozeb-carbandazim, bifenthrin and copper oxychloride for two *Trichoderma harzinamum* isolates *Trichoderma harzinamum* TD1 PX957582TD1 and *Trichoderma harzinamum* TD3 PZ017577) which were isolated from the tomato rhizosphere soil collected from Eklahare and Valvada, Valsad District, Gujarat. Based on % of inhibition of antagonistic activity against four phytopathogens, *Trichoderma harzinamum* TD1 demonstrated potential antifungal activity, in comparison with TD3 activity such as 80% and above against *Alternaria alternata* and *Colletotrichum gloeosporioides* and 61% against *Sclerotium* spp and *Fusarium oxysporum*. In terms of plant growth-promoting activities, TD3 was more potent, solubilized phosphate and potassium, nitrogen fixation, produced ammonia and siderophores, and synthesized IAA, while testing negative for HCN. Pesticide tolerance ability was demonstrated by both the isolates up to 1% conc v/v. This preliminary study has demonstrated that both the isolates had diversity in their activity and can be



further investigated for validation parameters and can be used as a biofertilizer and biocontrol agent.

Key words: Trichoderma, Biofertilizers, Mycoparasitism, Phytopathogens, IAA, Antibiosis, PGP

**POSTER 16****Bacterial Valorization of Shrimp Shell Waste into Chitin and Chitosan with Antibacterial Activity****Amit Gamit*, Kevin Vaiwala and Dhruti Amin**

C. G. Bhakta Institute of Biotechnology, Uka Tarsadia University, Gopal-Vidyanagar, Maliba Campus, Surat (Gujarat) 394350, India

E-mail of presenting author: amitgamit026@gmail.com

E-mail of corresponding author: dhrutsamin6189@gmail.com

Abstract:

Shrimp shell waste is a major seafood-processing by-product and a rich source of chitin, the second most abundant natural polysaccharide. Conventional chitin and chitosan extraction uses strong acids and alkalis, generating chemical effluents. This study investigated sequential bacterial fermentation for chitin extraction, followed by enzymatic deacetylation for chitosan production, using 5 g shrimp shell waste in 100 mL of fermentation medium. *Lactiplantibacillus plantarum* was used for demineralization, followed by *Bacillus subtilis* for deproteinization. During 10-day fermentation, *L. plantarum* produced 7.8 g/L lactic acid and achieved 32.5% demineralization by day 5. Subsequent *B. subtilis* treatment exhibited protease activity of 4.18 U/mL and achieved 30% deproteinization by day 4. The recovered chitin showed 76% recovery, 10% moisture, 5.5% ash, and 24.75% degree of deacetylation (DD). Enzymatic deacetylation using chitin deacetylase from *Achromobacter xylosoxidans* (2.24 U/mL) produced chitosan with 84.21% yield by day 4, 71% DD, 8% moisture, 1.8% ash, and 72% solubility in 1% acetic acid. FTIR confirmed conversion of chitin to chitosan through attenuation of characteristic amide I, amide II, and amide III bands with increased amino-group-associated absorption. Antibacterial evaluation showed that chitin produced inhibition zones of 8, 7, 16, 10, 11, and 12 mm, while chitosan produced 10, 4, 7, 4, 10, and 17 mm against *Escherichia coli*, *Pseudomonas aeruginosa*, *Pseudomonas mosselii*, *Bacillus subtilis*, *Bacillus cereus*, and *Bacillus licheniformis*, respectively. The highest activity was observed for chitin against *P. mosselii* (16 mm) and chitosan against *B. licheniformis* (17 mm). Scanning electron microscopy (SEM), X-ray diffraction (XRD), and nuclear



magnetic resonance (NMR) spectroscopy further supported the structural and morphological characteristics of the recovered polymers. Overall, sequential bacterial fermentation followed by enzymatic deacetylation provides a chemical-free route for recovering functional chitin and chitosan from shrimp shell waste.

Key words: *Lactiplantibacillus plantarum*; *Bacillus subtilis*; Enzymatic deacetylation; Chitin deacetylase; Biopolymer characterization.



POSTER 17

Chemo-Enzymatic Synthesis of Brivaracetam via Lipase-Catalyzed Desymmetrization

Sagar Chandrakant Dalsaniyaab, Dr. T. Kumaraguruab

^aDepartment of Organic Synthesis and Process Chemistry (OSPC),

CSIR-Indian Institute of Chemical Technology, Hyderabad 500 007, India.

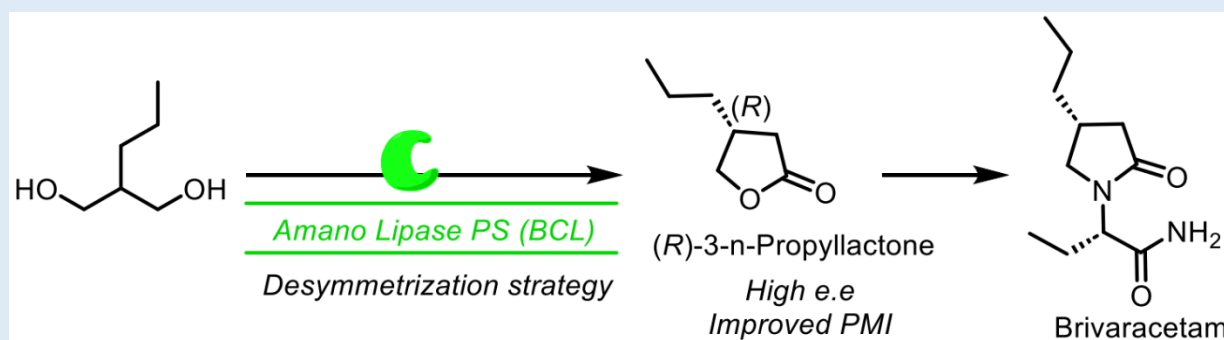
^bAcademy of Scientific and Innovative Research (AcSIR), Ghaziabad 201 002, India

Abstract:

Brivaracetam, a third-generation antiepileptic drug approved for focal seizures, requires two chiral building blocks for its synthesis, of which (*R*)-3-n-propyllactone is the primary costdetermining intermediate. Existing routes to this lactone rely on classical resolutions or multienzyme cascades that suffer from low yields, poor mass efficiency, and limited scalability. In this work, we report a scalable chemo-enzymatic route to (*R*)-3-n-propyllactone via lipasecatalyzed desymmetrization of the prochiral diol, 2-propylpropane-1,3-diol. Screening of a lipase library identified Burkholderia cepacia lipase (BCL) as the optimal biocatalyst, and reaction optimization in diisopropyl ether at -20 °C with vinyl acetate as acyl donor delivered the chiral mono-acetate in 83% isolated yield and 90% enantiomeric excess. The enzyme retained over 95% of its catalytic activity across five reaction cycles, demonstrating excellent recyclability. The mono acetate was converted to the target lactone through a concise threestep sequence (tosylation, cyanide displacement, and base-mediated lactonization), and its enantiopurity was further enriched to >99% e.e. via crystallization at the downstream amidealcohol stage, ultimately affording Brivaracetam with >99% chiral purity. Compared with a reported protease-mediated kinetic resolution route (overall yield 4–9%, PMI ~ 1428 kg/kg API), the present enzymatic desymmetrization strategy achieves a substantially higher overall yield (32.9%) and a lower process mass intensity ~275 kg/kg API, while avoiding hazardous bromination reagents and expensive chiral catalysts. This sustainable, cost efficient, and scalable route establishes enzymatic desymmetrization as a



commercially viable platform for producing key chiral intermediates for Brivaracetam.



Key words: Brivaracetam, chemo-enzymatic synthesis, lipase catalysis, enzymatic desymmetrization, (R)-3-n-propyllactone

References:

1. Schülé, A.; Merschaert, A.; Szczepaniak, C.; Maréchal, C.; Carly, N.; O'Rourke, J.; Ates, C. l. A biocatalytic route to the novel antiepileptic drug brivaracetam. Org. Process Res. Dev. 2016, 20, 1566-1575.
2. Ghosh, A.; Roy, S.; Kubeer, R. D.; Prasad, M. V. V. V.; Midya, R.; Mondal, A.; Haldar, A.; Yadaw, A. K.; Roy, S. A new cost-effective and scalable process for synthesizing pure brivaracetam. Patent WO/2021/260721, 2021.

**POSTER 18****Comparative Analysis of Soil Chemical Properties in Organic and Non-Organic
Mango farms of Bhavnagar and Amreli Districts****Vijay A. Khuman and Ranjan P. Kuvad**Department of Life Sciences, School of Science, Dr. Subhash University, Junagadh,
Gujarat, India**Abstract:**

Mangifera indica L. cv. Kesar is an economically important mango cultivar distinguished by its superior fruit quality, characteristic aroma, high sweetness and substantial commercial value. Soil physicochemical properties and nutrient availability play a critical role in orchard productivity, plant nutritional status and fruit quality; however, systematic assessments of soil fertility under contrasting management practices in Kesar mango orchards remain limited. The present study evaluated key soil chemical properties to assess nutrient availability and identify fertility constraints relevant to sustainable Kesar mango cultivation. Soil samples were collected from organic and non-organic orchards at Zadakala (Bhavnagar) and Ranipara, Dolti, Dedan and Vad (Amreli), Gujarat, India. Representative composite samples were collected from 0–45 cm soil depth following a systematic sampling procedure and analyzed for pH, electrical conductivity (EC), organic carbon (OC), macronutrients [phosphorus (P), potassium (K), sulfur (S)] and micronutrients [iron (Fe), zinc (Zn), manganese (Mn), boron (B) and copper (Cu)]. Soil pH remained relatively consistent (7.8–7.9), indicating neutral to slightly alkaline conditions, while EC values remained within the normal range across locations and management systems. Available S, B and Cu occurred at comparatively high levels across both organic and non-organic orchards. Organic management was associated with improved soil organic carbon, reaching 0.81% in Amreli, indicating enhanced soil carbon status under organic cultivation. In contrast, available P emerged as a widespread nutrient constraint, whereas available K was generally high across the evaluated orchards. Overall, the results indicate a distinct imbalance in soil nutrient availability, characterized primarily by P deficiency despite adequate-to-high levels of K, S and several



micronutrients. These findings emphasize the importance of site-specific and balanced nutrient management, particularly targeted P supplementation and maintenance of soil organic carbon, to improve soil fertility, nutrient-use efficiency and long-term sustainability of Kesar mango production.

**POSTER 19****Design And Synthesis of Novel Chromeno[2,3-D]Pyrimidine-Based Hybrids Bearing Secondary Alicyclic Amines as Potent Cytotoxic Agents: In Vitro, In Silico and ADMET Studies****Jignesh Hindocha* and Khushal Kapadiya**

Department of Chemistry, School of Science, RK University, Rajkot- 360 020, Gujarat-India.

Email of Corresponding Author: khushal.kapadiya@rku.ac.in**Abstract:**

A novel series of chromeno[2,3-d]pyrimidine-based hybrids incorporating secondary alicyclic amines was designed and synthesized as potential anti-breast cancer agents. The target compounds (8a-8j), integrating three pharmacologically relevant scaffolds—chromene, pyrimidine, and nitrogen-containing secondary amines—were prepared via a multistep synthetic strategy featuring solvent-free cyclization and catalyst-free nucleophilic substitution under mild reaction conditions. All synthesized compounds were evaluated for their in vitro cytotoxic activity against the MCF-7 human breast cancer cell line. Among the tested derivatives, compound 8a exhibited the highest potency, with an IC_{50} value of $12.70 \pm 0.11 \mu M$, demonstrating cytotoxic activity comparable to that of Sunitinib. Structure–activity relationship analysis revealed that small to moderately sized secondary alicyclic amines enhanced cytotoxic activity, whereas bulkier or conformationally restricted substituents resulted in reduced potency. Molecular docking studies against the EGFR kinase (PDB ID: 1M17) showed that compound 8a possessed the strongest binding affinity (-14.2 kcal/mol), supported by key hydrogen-bonding and hydrophobic interactions within the active site. Furthermore, in silico ADMET and drug-likeness analyses indicated favorable pharmacokinetic properties across the series, with compound 8a exhibiting promising absorption, aqueous solubility, and oral drug-likeness. Collectively, these findings identify compound 8a as a promising lead for the further development of chromeno[2,3-d]pyrimidine-based anticancer agents.

Key words: Chromeno[2,3-d]pyrimidine; Secondary alicyclic amines; EGFR; Molecular docking; Anticancer activity; ADMET.



**POSTER 20****Design and Synthesis of Novel Indole–Schiff Base–Triazole Hybrids as Potential α -Amylase and α -Glucosidase Inhibitors.****Shivali Dodiya*, Dr. Mayank Pandya**Center for Research and Development, Dr. Subhash University, Junagadh (362001),
Gujarat, India.Email of Corresponding Author: shivalidodiya@222gmail.com**Abstract:**

Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia and represents a major global health concern. Inhibition of carbohydrate-hydrolysing enzymes, particularly α -amylase and α -glucosidase, is considered an effective approach for controlling postprandial blood glucose levels. In the present study, a novel series of indole-based Schiff base–triazole derivatives was designed and synthesized as potential antidiabetic agents. The synthesized compounds were structurally characterized using techniques, including FT-IR, ^1H NMR, ^{13}C NMR, and mass spectrometry. The synthetic strategy involved the preparation of a triazole-based carbohydrazide followed by condensation with appropriately substituted indole aldehydes to afford the corresponding Schiff base derivatives. The synthesized compounds were evaluated for their in vitro α -amylase and α -glucosidase inhibitory activities using established enzymatic assays, with acarbose employed as the reference standard. Several derivatives demonstrated significant inhibitory activity against both enzymes, indicating that incorporation of indole, Schiff base, and triazole pharmacophores may contribute to enhanced enzyme inhibition. Structure–activity relationship analysis suggested that the nature and position of substituents on the aromatic ring influenced the inhibitory potential of the synthesized compounds. Molecular docking studies were additionally performed to investigate the possible binding interactions of the active compounds within the catalytic sites of α -amylase and α -glucosidase. The docking results supported the experimental findings and revealed favorable interactions with key amino acid residues. Overall, the obtained results demonstrate that indole-based Schiff



base–triazole derivatives represent promising lead structures for the development of new antidiabetic agents.

Key words: Indole; Schiff base; 1,2,3-Triazole; Antidiabetic activity; α -Amylase; α -Glucosidase; Enzyme inhibition; Molecular docking, DFT.

**POSTER 21****Design, Synthesis, Crystal Structure, Computational Investigations, and Dual Evaluation of Novel Pyrimidine-Triazole Hybrids as Potential Anti-Ovarian Cancer and Antibacterial Agents**

Prasann H. Jogia ^{a*}, Kaushal J. Agheda ^b, Kavan N. Andharia ^c, Gaurang G. Dubal ^d, Jayesh J. Modha ^a

^a Department of Chemistry, Maharshi Dayanand Science College, Porbandar, 360575, Gujarat, India

^b Department of Material Science, Sardar Patel University, Vallabh Vidhyanagar, 388120, Gujarat, India

^c Department of Bioscience, Saurashtra University, Rajkot, 360005, Gujarat, India

^d Department of Chemistry, School of Science, RK University, 360020, Rajkot, Gujarat, India

Email of Corresponding Author: prasannjogia@gmail.com

Abstract:

A novel series of triazole-functionalized pyrimidine hybrids (PAPMC-1–10) was engineered via efficient click chemistry pathways to evaluate their dual therapeutic potential. Single-crystal X-ray diffraction (SCXRD) analysis established that the compound PAPMC-1 crystallises in the triclinic system with space group $P\bar{1}$. Deconstruction of two-dimensional fingerprint plots from Hirshfeld surface analyses quantified the primary packing forces stabilizing the lattice, highlighting prominent, non-polar $H\cdots H$ interactions (39.1%) and highly directional $N\cdots H/H\cdots N$ hydrogen bonds (21.6%). Density Functional Theory (DFT) calculations executed at the B3LYP/6-31G(d,p) level optimized molecular geometries and mapped molecular electrostatic potentials (MEP) to corroborate the experimental structural data. In vitro anti-cancer screening via the Sulforhodamine B (SRB) assay against the human ovarian cancer cell line (SK-OV-3) demonstrated potential cytotoxicity, with three lead compounds (PAPMC-1, 2, and 3) exhibiting exceptional antiproliferative profiles at $GI_{50} = 2 \mu M$. Furthermore, antibacterial evaluations revealed valuable secondary protective utility, where PAPMC-2 and PAPMC-3 demonstrated a Minimum Inhibitory Concentration (MIC) of $32 \mu g/mL$ against various bacterial strains. Finally, in silico molecular docking simulations inside the active pocket of the cancer-specific receptor (PDB ID: 9IUT) mapped



robust amino acid coordination modes, establishing a strong logical correlation with the observed in vitro biological efficacy. Together, these structural, quantum chemical, and pharmacological results highlight the PAPMC series as highly promising scaffolds for multi-targeted therapeutic development.**Key words:** Pyrimidine-triazole hybrids, Ovarian cancer, Antibacterial activity, Single-crystal XRD, Hirshfeld surface & DFT, Molecular docking

**POSTER 22****Development of a Sunlight-Readable Dual-Mode Turn-On Chemosensor for Rapid and Selective Detection of Hg²⁺ and Zn²⁺****Bhoomi R. Khunti*, Dr. Mrunal Ambasana**Department of Chemistry and Forensic Science, Bhakta Kavi Narsinh Mehta University,
Junagadh, (Gujarat), India.Email of Corresponding Author: bhoomikhunti0304@gmail.com**Abstract:**

A sunlight-readable dual-mode turn-on chemosensor was developed for rapid and selective detection of Hg²⁺ and Zn²⁺ using UV-Vis, fluorescence, and visible colourimetric responses. The sensor exhibited a colourless-to-light-pink response with both ions and distinct fluorescence under 365 nm light, showing yellowish-green fluorescence for Hg²⁺ (λ_{em} = 552 nm; Stokes shift = 322 nm) and green fluorescence for Zn²⁺ (λ_{em} = 541 nm; Stokes shift = 311 nm). The absorption maximum at 230 nm shifted to 532 nm (Hg²⁺) and 530 nm (Zn²⁺). The sensor showed a 13% fluorescence quantum yield and excellent linearity by both UV-Vis and fluorescence methods ($R^2 \approx 0.99$). The LOD/LOQ values were 4/8 ppb for Hg²⁺ and 0.4/0.8 ppb for Zn²⁺, with a 1:2 sensor-to-metal stoichiometry for both ions. The sensor structure was confirmed by ¹H NMR and mass spectrometry, while IR spectroscopy confirmed Hg²⁺ binding. Reversible Hg²⁺/S²⁻ ON-OFF and Zn²⁺/EDTA ON-OFF switching was demonstrated, with the Zn²⁺/EDTA system maintaining four successive cycles. Thus, the developed sensor offers a sensitive, reversible, and visually accessible platform for rapid Hg²⁺ and Zn²⁺ detection.

Key words: Colorimetric detection; Dual-mode sensing; Fluorescence detection; Mercury (II); Sunlight-readable chemosensor; cyclic study

**POSTER 23****Efficient Synthesis of 1,5-Disubstituted Tetrazoles via TMS-N₃-Based Ugi Reaction: Anticancer Activity and ADME Evaluation****Hetal R. Ramani*, Ranjan C. Khunt**

Department of Chemistry, Saurashtra University, Rajkot.

Email of Corresponding Author: hetalramani1198@gmail.com**Abstract:**

An efficient Ugi-TMSN₃ four-component reaction has been developed for the one-pot synthesis of novel tetrazole derivatives under mild reaction conditions. The method utilizes aromatic aldehydes, aryl amines, cyclohexyl isocyanide, and TMS-N₃ to afford target compounds in high yields. Structures were confirmed by MS, IR, NMR. The synthesized compounds were evaluated for anticancer activity under the NCI-60 human tumor cell line panel, representing nine cancer types. In silico ADME studies indicated favorable pharmacokinetic properties, highlighting the potential of these tetrazole derivatives as promising bioactive scaffolds. This work demonstrates the utility of Ugi-MCR strategies in designing novel heterocyclic frameworks with promising pharmacological profiles.

Key words: Tetrazole derivatives, Ugi multicomponent reaction, TMS-N₃, anticancer activity, heterocyclic synthesis.

**POSTER 24****Endophytic Bacterial Consortia: A Sustainable Strategy for Drought-Resilient Pigeon Pea****Shivani Joshi*, Dharmesh Sherathia**

Department of Microbiology, School of Science, Dr. Subhash University, Junagadh, India-362001

Email of Corresponding Author: shivujoshi98@gmail.com**Abstract:**

Drought stress is a major abiotic constraint limiting crop growth and productivity, particularly under increasing water scarcity and climatic variability. Pigeon pea (*Cajanus cajan*) is an important pulse crop whose productivity is significantly affected by drought. Endophytic bacteria offer a promising and sustainable approach to improve plant growth and stress resilience through their plant-growth-promoting activities. However, the performance of individual strains may be inconsistent under field conditions, emphasizing the potential of compatible bacterial consortia. The present study aims to isolate and characterize beneficial endophytic bacteria from healthy pigeon pea plants and develop compatible bacterial consortia with plant-growth-promoting potential. Selected isolates will be screened for functional traits, identified through 16S rRNA sequencing, and evaluated for compatibility and synergistic effects. Promising consortia will be evaluated under controlled drought conditions and subsequently validated under field conditions. Plant growth, physiological responses, and yield-related parameters will be assessed. Metabolomic analysis will further explore drought-responsive biochemical changes and plant-microbe interactions. The study is expected to contribute to the development of sustainable microbial bio-inoculants for enhancing drought resilience and productivity of pigeon pea.

Key words: *Cajanus cajan*, Endophytic bacteria, Bacterial consortium, Drought stress, Plant-microbe interaction, Metabolomics.

**POSTER 25****Green One-Pot Synthesis of Novel Isoniazid Derivatives: Structural characterization and In Vitro Antimicrobial Screening****Krishnaraj N. Rana¹, Dr. Ketan C. Parmar^{1*}, Dr. Bhavesh M. Patel¹**¹Sir P. T Sarvajanik College of science, Surat.Email of Corresponding Author: krishnarajsinh24593@gmail.com**Abstract:**

A series of novel isoniazid derivatives was successfully developed and evaluated for their in vitro antibacterial and antifungal efficacy. Utilizing a green chemistry framework, a one-pot, solvent and catalyst-free condensation strategy between isoniazid and acyl chlorides was employed. This protocol ensures an efficient, mild, and sustainable pathway resulting in high chemical yields. Throughout this investigation, 16 distinct compounds were synthesized, highlighting derivatives INH-ac-4, INH-ac-7 and INH-ac-11. Structural elucidation of novel architecture was confirmed via FT-IR, ¹H NMR, ¹³C NMR and mass spectrometry techniques. Finally, the agar cup method was utilized to screen the microbial profile of these compounds, revealing their potential as prospective therapeutic agents.

Key words: Isoniazid, Acyl-chlorides, Condensation, Antimicrobial Activity.

**POSTER 26****Groebke–Blackburn–Bienaymé Multicomponent Synthesis of
CoumarinImidazole derivatives: Molecular Docking and Anticancer Evaluation****Utsav Jagad, Parth Manvar, Ranjan Khunt**

Department of Chemistry, Saurashtra University, Rajkot

Email of Corresponding Author: utsavjagad04@gmail.com**Abstract:**

Coumarin and imidazole are two privileged heterocyclic scaffolds possessing a broad spectrum of biological activities. In the present work, a series of coumarin-linked imidazole derivatives were synthesized through an efficient Groebke–Blackburn–Bienaymé multicomponent reaction. The synthesized compounds were characterized by various spectroscopic techniques including IR, ¹H NMR, ¹³C NMR, and Mass spectrometry evaluated by molecular docking against Hepatitis C Virus NS5B polymerase, followed by in vitro anticancer screening under the NCI-60 human cancer cell line program. Docking studies identified a compound as the most promising inhibitor due to favorable binding interactions within the NS5B active site. Selected compounds also demonstrated encouraging antiproliferative activity against various human cancer cell lines, indicating the potential of this molecular scaffold for further medicinal chemistry optimization.

Key words: Coumarin-Imidazole hybrids, GBB MCR, NS5B, Anticancer, NCI-60 cell line

**POSTER 27****Growth Dynamics, Biomass Allocation, and Carbon Sequestration Potential of
Aegle marmelos (L.) Corrêa under Site-Driven Variation in the Girnar
Protected Forest****Megha R. Chovatia and Ranjan P. Kuvad***Department of Botany and Zoology, School of Science, Dr. Subhash University, Junagadh,
Gujarat, IndiaEmail of Corresponding Author: chovatiyamegha@gmail.com**Abstract:**

Aegle marmelos (L.) Corrêa (Bael) is an ecologically and medicinally important tree widely distributed in the Indian subcontinent. This study assessed site-level variation in growth, biomass, and carbon sequestration of *A. marmelos* across three sites in the Girnar Protected Forest, Gujarat, India. A total of sixty trees were evaluated for DBH and height, and basal area, above-ground biomass (AGB), below-ground biomass (BGB), total biomass, carbon stock, and CO₂ sequestration were estimated using standard methods. Significant variation was observed among sites, with site one showing the highest carbon stock (250.68 kg C tree⁻¹) and CO₂ sequestration (919.16 kg CO₂ tree⁻¹), while site two showed intermediate values and site three recorded the lowest values. AGB contributed the major proportion of total biomass. The findings demonstrate considerable site-level variation in the growth and carbon-storage capacity of *A. marmelos*, providing a baseline for site-specific conservation and sustainable management of this valuable medicinal tree.

Key words: *Aegle marmelos* L. (Bael), Above-ground biomass (AGB), Below-ground biomass (BGB), Biomass allocation, Carbon sequestration, Girnar protected forest

**POSTER 28****In Vitro Compatibility Assessment of Indigenous PGPR with Nano-Urea: A Step Towards Next-Generation Biofertilizer Development****Jahanvi M. Parmar, Bansi H. Dabhi, Dharmesh N. Sherathia***Department of Microbiology, School of Science, Dr. Subhash University, Junagadh,
362001, Gujarat, India.Email of Corresponding Author: parmarjahanvi360@gmail.com**Abstract:**

The integration of plant growth-promoting rhizobacteria (PGPR) with nano-fertilizers represents a promising strategy for sustainable nutrient management and the development of next-generation biofertilizers. This study aimed to isolate indigenous rhizobacteria from the rhizosphere of *Sesamum indicum* (sesame) and evaluate their in vitro compatibility with IFFCO Nano-Urea. Rhizosphere soil samples were collected from healthy sesame plants at the early vegetative (non-flowering) and flowering stages from Navagam–Pedhavada, Gir Somnath District, Gujarat, India. Bacterial populations were enumerated using serial dilution and spread-plate techniques on Nutrient Agar and *Pseudomonas* Agar. A total of 33 bacterial isolates were successfully preserved from both growth stages, exhibiting diverse colony and Gram-staining characteristics. Selected isolates were screened for Nano-Urea compatibility using a liquid jar test and agar diffusion/cup-boring assay. The culturable bacterial population was higher during the flowering stage, reaching up to 6.00×10^8 CFU g⁻¹ soil on Nutrient Agar and 4.00×10^8 CFU g⁻¹ soil on *Pseudomonas* Agar. Most tested isolates retained visible growth following Nano-Urea exposure, indicating preliminary compatibility. The agar diffusion assay identified three isolates, PSN4, PS9, and PS18, showing inhibition zones of 4.75, 5.25, and 9.20 mm, respectively, and were classified as non-compatible under the assay conditions. The remaining tested isolates showed no detectable inhibition. These findings demonstrate the presence of diverse indigenous rhizobacteria associated with sesame and provide a preliminary basis for selecting Nano-Urea-compatible PGPR strains. Further biochemical, molecular, and quantitative viability studies will facilitate the identification of efficient strains and evaluation



of their potential for developing PGPR–Nano-Urea bioformulations for sustainable crop nutrition.

Key words: PGPR; *Sesamum indicum*; Nano-Urea; Compatibility; Rhizosphere bacteria; Biofertilizer; Sustainable agriculture.

**POSTER 29****Isolation and Characterization of a Mangrove Rhizosphere-Derived Actinobacterium with Multifaceted Stress Tolerance, Plant Growth-Promoting, Antifungal, and Salinity-Alleviating Potential in Sorghum bicolor****Dhruti H. Teraiya, and Sangeeta D. Gohel***

Department of Biosciences, Saurashtra University, Rajkot-360005, Gujarat (India)

Email of Corresponding Author: sangeetagoel@gmail.com**Abstract:**

Mangrove-associated actinobacteria represent a promising yet relatively underexplored source of microorganisms with diverse ecological and agricultural applications. In the present study, actinobacterial isolate GAM-A27 was recovered from the rhizosphere of mangrove vegetation collected from Guneri, Kutch, Gujarat, using a dry-heat pretreatment approach. The isolate was characterized based on morphological, biochemical, and molecular attributes and showed closest affiliation with *Nocardiosis synnemataformans* strain NBRC 102581, exhibiting 98.67% 16S rRNA gene sequence similarity. It revealed broad tolerance to multiple abiotic stresses, including salinity (0–15% NaCl), alkaline pH (7–11), drought stress (0–30% PEG 6000), and temperature stress (30–60°C). Further, the actinobacterial isolate displayed diverse hydrolytic enzyme production and plant growth-promoting traits, including amylase, cellulase, protease, and chitinase production, along with IAA, ammonia, phosphate solubilization, siderophore, and nitrogen fixation. The isolate also exhibited antagonistic activity against important phytopathogenic fungi, namely *Aspergillus niger*, *Fusarium oxysporum*, *Fusarium solani*, and *Aspergillus flavus*, showing inhibition in range of 40–54%. Its plant-beneficial potential was further evaluated using *Sorghum bicolor* seeds under increasing NaCl stress (0–0.3 M). GAM-A27 significantly improved seed germination, root and shoot development, and seedling vigor compared with uninoculated stressed controls. In pot experiments, GAM-A27 inoculation similarly enhanced plant growth and mitigated the adverse effects of salinity. Collectively, these findings highlight mangrove-derived actinobacterium as a promising multifunctional microbial resource for sustainable agriculture,



particularly for improving crop performance under saline and other abiotic stress conditions.

Key words: Mangrove-derived actinobacteria; Abiotic stress tolerance; Hydrolytic enzymes; Plant growth-promoting rhizobacteria; Antifungal activity; Salinity stress mitigation; *Sorghum bicolor*.

**POSTER 30****Isolation and Screening of Plant Growth-Promoting Rhizobacteria for Salinity and Drought Stress Tolerance****Ankita shihora*, Ami Naik**

C. G. Bhakta Institute of Biotechnology

Uka Tarsadia University, Bardoli, Gujarat, India

Email of Corresponding Author: ankitashihora221@gmail.com**Abstract:**

Soil salinization and recurrent drought are major abiotic constraints that reduce crop productivity and threaten sustainable agriculture. These challenges have increased interest in plant growth-promoting rhizobacteria (PGPR) as eco-friendly bio-inoculants for improving plant performance under environmental stress. In the present study, nine rhizospheric bacterial isolates (BS1–BS9), identified as members of *Bacillus*, *Pseudomonas*, *Delftia*, and *Rhodococcus*, were screened for selected plant growth-promoting traits associated with salinity and drought tolerance. The isolates were evaluated for ammonia production using Nessler's colorimetric test, siderophore production using the Chrome Azurol S (CAS) halo-zone assay, and indole-3-acetic acid (IAA) production using the Salkowski colorimetric method. Considerable variability was observed among the isolates. Ammonia production ranged from moderate to very strong, with BS3, BS7, and BS8 exhibiting the strongest activity. Siderophore production was detected in six isolates (BS1, BS2, BS6, BS7, BS8, and BS9), producing orange halo zones ranging from 1.5 to 5.8 cm, indicating differences in iron-chelation ability and potential nutrient acquisition under stress conditions. IAA production was also detected in several isolates, suggesting their potential contribution to auxin-mediated root development and improved water and nutrient uptake. Among the tested isolates, BS7 and BS8 showed the most promising combination of multiple plant growth promoting traits. These isolates may serve as potential candidates for further evaluation as stress-tolerant bio-inoculants. Molecular identification and in planta experiments under controlled salinity and drought conditions are required to confirm their effectiveness and practical agricultural potential.



Key words: Plant growth-promoting rhizobacteria (PGPR), salinity stress, drought tolerance, siderophore production, IAA production, ammonia production, sustainable agriculture.

**POSTER 31****LC-MS/MS Analysis of Primary and Secondary Metabolites in an Edible****Asclepiadaceae Plant****Apexa Vala*¹ and Jigna Tank²**

¹Department of Life Sciences, Bhakta Kavi Narsinh Mehta, University, Khadiya, Junagadh, Gujarat 362263.

²Department of Biosciences, Saurashtra University, Rajkot, Gujarat 360005.

Email of Corresponding Author: apexavala1@gmail.com

Abstract:

Telosma pallida (Roxb), commonly known as ‘Radarudi’ belongs to the Asclepiadaceae family and is a widely grown plant in Junagadh, Gujarat, India. It is widely known for its nutritional and medicinal value. Flowers and leaves are the edible part of the plant while leaf, root, stem and flower have considerable medicinal properties. Flowers are reported to have various nutrients like minerals, vitamin, protein, fibers, and are source of secondary metabolites and phenolic compounds. In the present study flower buds were subjected to secondary metabolite isolation using solvent extraction method. Further, chloroform and methanol extract of flower buds was injected to High resolution LC-MS/MS and various primary and secondary metabolites were identified. It was concluded from the studies that flower buds of *Tellosma pallida* are rich sources of primary and secondary metabolites such as fatty acids, sugars, nucleotides, aminoacids, carboxylic acids, phytohormones, alkaloids, phenols, saponins, coumarins, amines, terpenes, terpenoids and anthraquinones.

Key words: Secondary metabolites; HR-LC-MS/MS; Solvent extraction; Medicinal properties

**POSTER 32****Machine Learning and Supramolecular Docking-Assisted In-Silico Screening of Coformers for Pharmaceutical Cocrystal Development****Jay Mukesh Chudasama**Department of Pharmacy Sumandeep Vidyapeeth Deemed to be University Vadodara,
Gujarat, 391760.Email of Corresponding Author: jaymukesh00@gmail.com**Abstract:**

Poor aqueous solubility is a major challenge in pharmaceutical development and can limit the dissolution and bioavailability of orally administered drugs. Pharmaceutical cocrystallization is an effective crystal-engineering strategy for modifying physicochemical properties of active pharmaceutical ingredients without altering their covalent structure. However, conventional screening of numerous drug-coformer combinations is laborious, time-consuming, and resource-intensive. The present study aimed to develop an integrated computational workflow combining machine learning and supramolecular docking for rational screening and prioritization of potential pharmaceutical cocrystals.

A molecular descriptor-based dataset of drug-coformer combinations was used to develop a convolutional neural network (CNN) model for predicting the potential of cocrystal formation. Molecular and physicochemical descriptors representing drug-coformer compatibility included molecular similarity, molecular-weight difference, hydrogen-bond donor and acceptor characteristics, lipophilicity, and topological polar surface area. The developed model demonstrated high predictive performance, supporting its application for prioritizing promising coformers. Subsequently, supramolecular docking was employed to investigate drug-coformer interactions and identify probable supramolecular synthons, including hydrogen-bonding and other non-covalent interaction patterns associated with crystal formation.

The integrated computational approach provides a rapid and systematic strategy for reducing the experimental search space and selecting promising drug-coformer combinations for subsequent experimental validation. This workflow demonstrates the potential of combining artificial intelligence with computational



crystal engineering to accelerate pharmaceutical cocrystal discovery and the development of solid-state systems with improved solubility and bioavailability characteristics.

Key words: Pharmaceutical cocrystals; Machine learning; Convolutional neural network; In-silico screening; Supramolecular docking; Crystal engineering

**POSTER 33****Morpho-Anatomical Study of Some Selected Monocot Plants from the
Campus of Department of Life Sciences****Dhara D. Bambhaniya^{1*}, Jay B. Pandya², and Shailesh K. Mehta³**¹Department of Life Sciences, Bhakta Kavi Narsinh Mehta University, Junagadh.²Shrimad Rajchandra Vidyapeeth, Karajveri, Dharampur, Valsad (Affiliated to Veer Narmad
South Gujarat University, Surat).³Botany Department, Sir P. P. Institute of Science, Maharaja Krishnakumarsinhji
Bhavnagar University, Bhavnagar, Gujarat, Bharat.Email of Corresponding Author: bambhaniyadhara88709@gmail.com**Abstract:**

Monocotyledonous angiosperms exhibit pronounced structural diversity reflecting their ecological adaptations and phylogenetic relationships. Morphological and anatomical analyses are crucial for accurate species identification and understanding adaptive strategies. The present study investigates selected monocot taxa from the Department of Life Sciences campus to document diagnostic morpho-anatomical characters and assess their taxonomic and ecological significance.

Hand-sectioning techniques were used to prepare transverse sections of vegetative organs, which were examined microscopically. Comparative anatomical evaluation revealed adaptive syndromes associated with hydrophytic, helophytic, and xerophytic habitats. Key diagnostic traits included well-developed aerenchyma in hydrophytic species, thick-walled sclerenchyma and sclerenchymatous fibers in xerophytic species, and chlorenchyma arranged in a sunflower-type pattern. The epidermal layer typically consisted of small, rounded parenchyma cells covered by a cuticular layer. Hypodermal tissues varied between parenchymatous, sclerenchymatous, and chlorenchymatous types, correlating with differences in vascular bundle number and distribution.

Ground tissues exhibited irregularly shaped parenchymatous cells with variable vascular arrangements. The occurrence or absence of hollow pith regions served as an additional taxonomic marker. These internal structural traits, in conjunction with external morphology and habitat preferences, highlight the functional



significance of anatomical specialization in monocots. This integrative morpho-anatomical approach provides a robust framework for species identification, ecological interpretation, and systematic classification.

Key words: Monocotyledons, Morphological characters, Anatomical adaptation, Vascular bundle, Aerenchyma, Xerophyte, Hydrophyte, Helophyte, Taxonomy, Plant systematics.

**POSTER 34****Multifunctional Plant Growth-Promoting Bacterial Isolates: Evaluation of Direct and Indirect PGP Activities for Sustainable Agriculture****Haripriya Hingarajiya¹, Sangeeta Gohel^{1*}**

Department of Biosciences, Saurashtra University, Rajkot-360005, Gujarat, India

Email of Corresponding Author: sdgohel@sauuni.ac.in ; sangeetagohel@gmail.com**Abstract:**

Plant growth-promoting rhizobacteria (PGPR) constitute an environmentally safe option to chemical fertilizers and pesticides due to their ability to enhance plant growth, mineral nutrition, and antagonism against pathogens, thus promoting sustainable intensification of agriculture. However, systematic screening of region- and crop-specific bacterial isolates is essential to select highly active PGPR strains for sustainable crop cultivation. This study evaluated rhizospheric bacterial isolates for six PGP traits, including four direct mechanisms (IAA production, phosphate solubilization, nitrogen fixation, and ammonia production) and two indirect biocontrol traits (siderophore and HCN production). The standard qualitative and quantitative tests such as Salkowski colorimetric assay for IAA production, Pikovskaya agar for phosphate solubilization, nitrogen-free medium for biological nitrogen fixation, peptone water for ammonia production, CAS assay for siderophore production, and picrate assay for HCN production were used for the assessment of PGP activity of bacterial isolates. From all the tested isolates, Among the 10 isolates screened, two isolates exhibited the highest IAA production, with concentrations of 87.18 and 94.42 $\mu\text{g/mL}$, respectively; Phosphate solubilization and siderophore production were observed in 48.68% (37/76) and 43.42% (33/76) of the tested isolates, respectively. HCN production was observed in 72.73% (32/44) of the isolates tested. Isolates with multiple trait activities, especially those showing both direct and indirect trait activities, could be good candidates for biofertilizer and biopesticide development.

Key words: Plant growth-promoting rhizobacteria; Indole-3-acetic acid; Phosphate solubilization; Nitrogen fixation; Siderophore production; Biocontrol

**POSTER 35****Network Pharmacology and Molecular Docking-Guided Discovery of Antidiabetic Bioactives from *Costus pictus* D. Don for Nanoparticle-Based Delivery****Vansia Hirangi*, Ami Naik**

C.G.Bhakta institute of Biotechnology,

Uka Tarsadia University, Bardoli, Gujarat, India.

Email of Corresponding Author: hilariousvansia@gmail.com**Abstract:**

Type 2 Diabetes Mellitus (T2DM) affects over 589 million adults worldwide, with projections reaching 853 million by 2050, underscoring the urgent need for safer, more effective antidiabetic therapeutics beyond current options limited by side effects, poor bioavailability, and long-term complications. This study investigated *Costus pictus* D. Don, a medicinal plant rich in steroidal and triterpenoid bioactives, as a phytochemical source for polymeric nanoformulation-based antidiabetic delivery. Steroid-rich (22.34% phytosterols) and triterpenoid-rich (41.52% triterpenoids) fractions were extracted and standardized to pharmacopoeial physicochemical specifications, then characterized via LC–MS profiling, revealing ten bioactive metabolites: ursolic, oleanolic, and betulinic acids; β -amyrin; lupeol; β -sitosterol; stigmasterol; diosgenin; daucosterol; and stigmasterol glucoside. SwissADME-based pharmacokinetic screening indicated low gastrointestinal absorption for eight of ten compounds, reinforcing the rationale for nanoparticulate delivery to enhance bioavailability. Network pharmacology analysis, integrating SwissTargetPrediction, STRING protein–protein interaction mapping, and CytoHubba topological analysis, intersected 92 predicted compound targets with 19,373 T2DM-associated disease genes, identifying 90 shared targets and five core hub genes: AKT1, TNF, STAT3, CASP3, and TP53. Gene Ontology and KEGG pathway enrichment linked these hubs to the adipocytokine signaling, insulin resistance, AGE–RAGE diabetic complications, and TNF signaling pathways, converging mechanistically on restored insulin signaling, attenuated inflammatory cytokine cascades, and prevention of pancreatic β -cell apoptosis. Molecular docking and network pharmacology jointly reveal that key



phytochemicals — particularly betulinic acid, stigmasterol, and diosgenin — exert synergistic therapeutic effects by potently binding the critical disease targets AKT1 and TNF- α . Together, these findings support a network-pharmacology-guided, nanoformulation-enabled strategy for translating *Costus pictus* phytoconstituents into a mechanistically validated candidate for antidiabetic therapy.

Key words: *Costus pictus*; Diabetes Mellitus; LC–MS Metabolite Profiling; Network Pharmacology; Nanoformulation; Molecular Docking.



POSTER 36

Novel 4-(Pyrimidin-5-Yl)Benzaldehyde Based Acyloxy Amides Via Optimized Passerini Reaction: In Vitro Cox Inhibition and Computational Validation

Varsha Saini

Abstract:

Cyclooxygenase (COX) enzymes play a key role in the biosynthesis of prostaglandins that mediate pain and inflammation. The overexpression of COX-2 has been linked to several pathological conditions, including chronic inflammation and cancer. However, conventional nonsteroidal anti-inflammatory drugs (NSAIDs) often exhibit poor selectivity and cause gastrointestinal side effects, necessitating the design of safer and more selective COX-2 inhibitors. Methods: A series of α -acyloxy amides (4a-4j) were synthesized by reacting 4-(pyrimidin-5-yl)benzaldehyde, substituted benzoic acids, and tert-butyl isocyanide under optimized conditions. The synthesized compounds were characterized using IR, NMR, and mass spectrometry. In vitro COX-1 and COX-2 inhibition assays were performed using enzyme immunoassay kits, and molecular docking studies were conducted using the Schrödinger Glide XP module to validate binding affinities and interaction profiles. Results: All synthesized compounds were isolated in good yields (58–78%). The COX-1 inhibitory activity (IC_{50} = 11.30–41.05 μ M) and COX-2 inhibitory activity (IC_{50} = 2.01–10.01 μ M) revealed notable selectivity differences. Compounds 4d (pyrazine), 4b (4-ClPh), and 4j (4-I-Ph) exhibited the highest COX-2 potency with IC_{50} values of 3.11, 2.22, and 2.01 μ M, and selectivity indices (SI= 11.30, 5.75, and 7.01, respectively), closely comparable to celecoxib (SI= 18.15). In contrast, the most active COX-1 inhibitors were 4e (3-NO₂-Ph), 4b, and 4j with IC_{50} values of 11.30, 12.78, and 14.11 μ M, respectively. Molecular docking corroborated these findings, showing conserved hydrogen-bonding interactions with Arg120, Tyr355, and Ile517 residues in COX-1, and with Arg499, Phe504, and Ser516 in COX-2, along with hydrophobic and π - π stacking within the active channel. Overall, the combined biological activity, molecular docking, and balanced in silico ADMET assessment identified



compounds 4b, 4d, and 4j as the most promising lead candidates for the development of selective COX-2 inhibitors. Conclusions: The study demonstrates that pyrimidine-based α -acyloxy amides synthesized via an efficient Passerini reaction represent promising scaffolds for developing selective COX-2 inhibitors. Structural modification with halogen and heteroaryl substituents significantly enhances selectivity and potency, providing valuable insights for the rational design of new antiinflammatory agents

Key words:

**POSTER 37****Novel Barbituric Acid Piperidinium Salt Derivatives: Multi-Component Synthesis, Structural Characterization, And in Silico Evaluation****Vaishali D. Nandaniya*, Prof. Naval P. Kapuriya**Department of Chemistry and Forensic Science, Bhakta Kavi Narsinh Mehta University,
Junagadh, Gujarat, INDIAEmail of Corresponding Author: nandaniyavaishali993@gmail.com**Abstract:**

A series of barbituric acid piperidinium salt derivatives was synthesized through multicomponent one pot green domino reaction involving aromatic aldehydes, 4-hydroxycoumarin, 1,3-dicyclohexylbarbituric acid, and piperidine in methanol. The mechanism likely proceeds through an initial Knoevenagel condensation followed by intramolecular hydrogen bonding, resulting in the formation of piperidinium salts as the exclusive products. Piperidine acted as both, the reactant and the catalyst. The products were formed in good yields for different aldehydes containing electron withdrawing and electron donating groups. The reaction proceeded in mild conditions, in short reaction time and the products were isolated without the use of column chromatography. In silico predicted properties of compound 6a-m such as toxic and not follow the Lipinski rule. The products were confirmed by spectroscopic techniques such as FT-IR, MS and ¹H NMR.

Key words: 4- hydroxycoumarin, 1,3-dicyclohexylbarbituric acid, Knoevenagel condensation, piperidinium salts

**POSTER 38****Novel Coumarin-Pyrazole Hybrids as Potential Bioactive Agents****Rani J. Karmata, Dr. Savan R. Chothani, Dr. Rashmi B. Patel**Department of Chemistry and Forensic Sciences, Bhakta Kavi Narsinh Mehta University
Junagadh-362263, Gujarat, India.Email of Corresponding Author: ranikaramta13@gmail.com**Abstract:**

A new series of 2H-chromene-2-one incorporated pyrazole derivatives (P1–P10) was successfully synthesized through the cyclization reaction of enaminone, (E)-6-allyl-3-(3-(dimethylamino)acryloyl)-8-methoxy-2H-chromen-2-one (4), with various substituted phenyl hydrazine, affording the desired products in excellent yields. The structures of the synthesized compounds were elucidated and confirmed using spectroscopic techniques, including IR, ¹H NMR, ¹³C NMR, and elemental analysis. Furthermore, in silico evaluation of the synthesized derivatives was carried out to predict their drug-likeness, and toxicity profiles. The computational studies revealed that all compounds satisfy essential drug-likeness parameters and exhibit favourable safety profiles with low predicted toxicity. These findings suggest that the newly synthesized coumarin–pyrazole hybrids may serve as promising and safer potential Bioactive agents for further biological investigations.

Key words: Coumarin, 1,3,5-substituted pyrazoles, Cyclization reaction, drug-likeness, toxicity.

**POSTER 39****Purine Derivatives: Structural Diversity, Synthesis, and Biological Applications – A Review****Vishal Pathak *, Mayank K. Pandya**

Dr. Subhash University, Junagadh -362001, Gujarat, India

Email of Corresponding Author: vishalpathak263@gmail.com**Abstract:**

Purine derivatives have emerged as a cornerstone of modern drug discovery due to their structural similarity to naturally occurring nucleobases and their ability to interact with a wide range of biological targets. The purine ring system—composed of a fused imidazole and pyrimidine ring—is a privileged scaffold in medicinal chemistry, found in many FDA-approved drugs used to treat cancer, viral infections, autoimmune diseases, and parasitic infections. This poster highlights recent advances in the design, chemical synthesis, and pharmacological evaluation of purine-based therapeutics. Emphasis is placed on structure–activity relationship (SAR) studies that guide the rational modification of the purine nucleus at key positions (C2, C6, C8, and N9), optimizing their potency, selectivity, and pharmacokinetic profiles. Examples include 6-mercaptopurine and azathioprine (anticancer/immunosuppressive agents), acyclovir and tenofovir (antiviral agents), and emerging kinase inhibitors targeting oncogenic signaling pathways. Innovative synthetic methodologies—such as metal-catalyzed crosscoupling, microwave-assisted synthesis, and click chemistry—have expanded the chemical space around purines, enabling the rapid generation of analogs with diverse biological activities. In parallel, advances in computational drug design and molecular docking have facilitated the identification of novel purine-based ligands with high affinity and selectivity for nucleic acid-processing enzymes, kinases, and purine-binding receptors.

Key words: -

**POSTER 40****Pyrene aided dual mode fluorophore sensor for trace hydrazine detection in real environmental samples: Design, mechanism and DFT insights****Krishna R.Vastarpara*, Dinkal V. Kasundra, Paresh N. Patel**

Laboratory of Bio-Organic Chemistry, Tarsadia Institute of Chemical Science (TICS), Uka

Tarsadia University, Bardoli 394 350, Gujarat, India

Email of Corresponding Author: pareshn111@yahoo.com**Abstract:**

A sustainable approach to hydrazine detection is presented via the design and synthesis of eight novel fluorophores through Claisen–Schmidt condensation, catalysed by KOH and pyrrolidine under mild conditions. While KOH (2–3 h; 73–79%) afforded speedy catalyst, pyrrolidine (4–6 h; 83–89%) enabled efficient catalyst access to a diverse set of polynuclear aromatic scaffolds. The resulting fluorophores were fully characterized by NMR and HRMS, and their photophysical behaviours were systematically investigated in various solvents. A standout candidate, based on 1-Pyrenecarboxaldehyde, demonstrated exceptional promise as a dual-mode (colorimetric and fluorometric) sensor for hydrazine. The detection mechanism involves a hydrazine-induced cyclization event that disrupts π -conjugation and intramolecular charge transfer, triggering rapid optical changes visible to the naked eye. The sensor exhibited ultra-low detection limits ($0.33\ \mu\text{M}$ with $5\ \mu\text{M}$ 3d, i.e. (E)- 1,3-di(pyren-1-yl) prop-2-en-1-one), high selectivity, and robust performance against a wide range of interfering species and pH (4–10) variations. Real-world applicability was confirmed through successful detection of trace hydrazine ($1\text{--}5\ \mu\text{M}$) in environmental water, soil, and food samples. Furthermore, a low-cost, paper-based sensing platform was developed, enabling portable, equipment-free detection. This work showcases a practical and sustainable fluorophore design strategy for environmental toxin monitoring and paves the way for future field-deployable, green sensing technologies.

Key words: Pyrene, Fluorophore, Environmental, DFT, Hydrazine, Sensor

**POSTER 41****Pyrene tagged dual absorption-emission sensor for selective hydrazine detection in environmental matrices: Design, mechanism and DFT insights****Khushi D. Patel*, Dinkal V. Kasundra, Paresh N. Patel**

Laboratory of Bio-Organic Chemistry, Tarsadia Institute of Chemical Science (TICS),

Uka Tarsadia University, Bardoli- 394350 Gujarat, India

Email of Corresponding Author: khushipatel24720@gmail.com**Abstract:**

Hydrazine (N_2H_4) is a highly toxic and volatile compound widely used in aerospace, chemical manufacturing, and agriculture, making its sensitive and selective detection important for environmental and safety monitoring. In this study, a pyrene-tagged dual absorption-emission sensor (DAES 3h) was designed and synthesized for selective hydrazine detection in environmental matrices. The sensor exhibited a large Stokes shift of 364 nm, a low detection limit of 0.12 μM , and a high fluorescence quantum yield ($\Phi_f = 0.55$). DAES 3h showed a rapid response within 5 minutes, broad pH tolerance from 4-10, and excellent selectivity towards hydrazine in the presence of common interfering species. Mechanistic investigations using LC-MS, NMR, HRMS, and density functional theory (DFT) calculations established that hydrazine induces an irreversible cyclization of the sensor to form a 1H-pyrazoline product. This structural transformation disrupts intramolecular charge transfer, resulting in fluorescence quenching. The practical applicability of the sensor was demonstrated using tap water, river water, mineral water, and different soil matrices, providing recovery values of 84-105%. Furthermore, immobilization of DAES 3h on paper strips enabled the visible and fluorescent detection of hydrazine vapour, providing a simple approach for non-instrumental monitoring. Overall, the study demonstrates an efficient and practical optical sensing platform for hydrazine detection with potential applications in environmental monitoring and chemical safety.

Key words: Absorption-emission; DFT; Hydrazine; Pyrene; Environmental monitoring

**POSTER 42****Reconciling the Phenological Paradox: A Dual-Mechanism Framework
for Understanding Global Change Impacts on Biological Timing****Jenish Bamaniya* & B. A. Jadeja**

Department of Botany, Maharshi Dayanand Science College, Porbandar, Gujarat, India.

Email of Corresponding Author: bamaniyajenish101@gmail.com**Abstract:**

Phenology is the timing of seasonal biological events which serves as one of the most sensitive indicators of climate change, yet a fundamental paradox persists: phenological timing varies dramatically between neighbouring sites while shifting at nearly identical rates across continents. This review synthesizes 211 studies to resolve this contradiction through a dual-mechanism framework that distinguishes spatial baseline constraints from temporal trend convergence. Local factors like elevation gradients (2–4 days delay per 100 m), vegetation type (24–55 days range), genetic adaptation (heritability 0.13–0.76), and functional traits—that create persistent landscape heterogeneity. while shared physiological responses to regional climate signals drive synchronous year to year shifts. Critically, vegetation vs year interactions are nonsignificant ($p = 0.685$), confirming that communities with different baseline timings advance at indistinguishable rates. However, this framework is complicated by environmental and biological modulators like nitrogen deposition rewires climatic sensitivity, non-native species advance 1.8x faster than natives, and extreme events introduce nonlinear thresholds that break conventional patterns. Belowground processes decouple from aboveground dynamics, and trophic mismatches cascade through ecosystems. each day of asynchrony between bird arrival and prey emergence reduces breeding success by 3–7%. We identify critical frontiers that is autumn phenology remains poorly understood, belowground dynamics constitute a "black box," and genetic variation alone cannot guarantee evolutionary rescue. Our framework yields actionable recommendations for scientists, land managers, urban planners, and policymakers. As climate change accelerates, phenology offers a powerful lens for predicting ecological responses but the window for effective intervention is closing.



Key words: Phenological dynamics, Climate change impacts, Dual-mechanism framework, Phenological mismatch, Spatial heterogeneity, Temporal synchrony

**POSTER 43****Rhodamine-Ketone Conjugates: Synthesis, Characterization and
Analyte Sensing Evaluation****Chirag J. Bhut and Hardik L. Varu***Department of Chemistry, School of Science, Dr. Subhash University, Junagadh, 362001,
Gujarat, IndiaEmail of Corresponding Author: hardikvaru5@gmail.com**Abstract:**

Rhodamine-based molecular frameworks have attracted considerable attention as optical sensing platforms because their photophysical properties can be readily modified through structural functionalization. In this work, a series of five rhodamine-derived probes was developed by introducing different ketone-containing moieties into the rhodamine hydrazide framework. Maleic anhydride, phthalic anhydride, ninhydrin, benzoquinone, and dimedone were selected as the functionalizing units to examine how structural modification affects metal-ion and anion recognition. The synthesized derivatives were structurally confirmed using spectroscopic techniques and subsequently investigated for their optical sensing behaviour using visual colour changes, UV-visible absorption, and fluorescence measurements in a 50:50 (v/v) methanol-water medium.

The structural variation of the ketone moiety resulted in noticeable differences in analyte recognition and optical response. The synthesized probes showed selective responses toward a range of metal ions, including Al^{3+} , Ba^{2+} , Ca^{2+} , Co^{2+} , Cr^{3+} , Cu^{2+} , Hg^{2+} , Ni^{2+} , Pb^{2+} , Sn^{2+} , and Zn^{2+} , while CO_3^{2-} produced the only significant response among the investigated anions. Quantitative UV-visible titration studies provided good linear relationships, with R^2 values between 0.991 and 0.999 and detection limits in the 10^{-7} M range. In addition, the benzoquinone- and dimedone-functionalized probes displayed substantial fluorescence enhancement in the presence of their respective metal ions, resulting in detection limits at the nanomolar level (10^{-9} M). Job's plot analysis indicated a 1:1 interaction between the responsive probes and corresponding metal ions. A plausible sensing mechanism involving analyte-induced opening of the rhodamine spirolactam ring was proposed based on the observed spectroscopic changes. Overall, this study



demonstrates that modification of the ketone functionality provides an effective means of controlling the recognition and optical properties of rhodamine-based probes and offers a useful structural approach for developing selective and sensitive chemosensors for metal-ion detection.

Key words: Rhodamine derivatives; Chemosensors; Ketone functionalization; Metal-ion sensing; Anion sensing; Fluorescence detection; Colorimetric sensing.

**POSTER 44****Studies on arthropod fauna from selected sites of Vanthali Tehsil, Junagadh, Gujarat****Pooja Suresh Banbare**

Centre for Research & Development, Dr. Subhash University, Junagadh, Gujarat, India.

Email of Corresponding Author: Poojaumeshdesai@gmail.com**Abstract:**

Proposed work was conducted from June 2025 to June 2026 with concerning taxonomy, species diversity of arthropods at Vanthali Tehsil, Junagadh, Gujarat. For the collection of taxa a systematic grid- based sampling method was employed. A 250m x 250m grid generated in QGIS to ensure standardized and unbiased sampling across the study area. Sampling completed under total 54 visits, 1 visit per week. In total 108 grids, 540 quadrates (5 quadrate in 1 grid). 2 grids covered per visit. Sampling obtained in 2 hours during the morning (08:00 hrs to 10:00 hrs) and evening (16:00 hrs to 18:00 hrs). For the collection of arthropods, visual encounter, hand collection, sweeping net, umbrella beating methods were used on suitability. Overall, 2064 individuals of arthropods represent 16 orders, 74 families, 110 genera and 149 species. Maximum species diversity were recorded from Order Lepidoptera with (406 individuals, 35 species) followed by Order Araneae representing (329 individuals, 23 species) and Order Coleoptera representing (216 individuals, 18 species). Minimum species diversity were recorded from Order Odonata with (117 individuals, 09 species) which is followed by Order Polydesmida representing (32 individuals, 02 species) and Order Scolopendromorpha representing (25 individuals, 01 species). Most commonly used pesticides are fungicides, insecticides and herbicides to control the weeds and pest from study sites. It concludes that the possible such high level of occurrence of arthropods species within one year reveal that habitat structures of selected study area may be suitable for a diverse group of arthropods and environmental factors like climate, habitat structure, food availability, habitat stability, and anthropogenic activities having a huge impact on species richness and population of arthropods.

Key words: Arthropods, Species, Order, Grid, Pesticides, Vanthali.

**POSTER 45****Sustainable Heterocyclic Chemistry: Green Synthesis of N,O-Scaffolds for Cancer-Targeted Applications****Dharmesh Katariya, Ranjan Khunt***

Department of Chemistry, Saurashtra University Rajkot – 360005, India.

Email of Corresponding Author: drdkkatariya9395@yahoo.com**Abstract:**

Nitrogen- and oxygen-based heterocyclic scaffolds are of considerable interest in medicinal chemistry owing to their diverse biological activities and their important role in the development of potential anticancer therapeutics. The structural versatility of these privileged frameworks enables effective interactions with key biomolecular targets, including DNA and proteins, and may modulate critical cellular signaling processes associated with cancer progression. In the present work, a library of novel imidazo[1,2-a]pyridine–furan hybrid derivatives was efficiently constructed via the Groebke–Blackburn–Bienaymé multicomponent reaction. PEG-400 was employed as a greener reaction medium, while microwave irradiation facilitated the synthesis under mild and efficient conditions. The newly synthesized compounds were subsequently investigated for their in vitro anticancer activity using the NCI-60 human cancer cell-line panel. Several members of the synthesized series exhibited encouraging anticancer activity, highlighting the potential of the imidazo[1,2-a]pyridine–furan framework as a valuable scaffold for further optimization and development of novel anticancer candidates.

Key words: Imidazo[1,2-a]pyridine–furan hybrids; Groebke–Blackburn–Bienaymé reaction; Microwave-assisted synthesis; PEG-400; Anticancer activity; NCI-60 screening.

**POSTER 46****Synthesis and Analytical Characterization of N-Methylaniline and N-Nitrosodimethylamine as Model Compounds for Nitrosamine Impurity Profiling****Dharav Maru*, Dr. Nilesh Patel, Dr. Ajay Patel**

Research Scholar, Gujarat Technological University, Ahmedabad, Gujarat, India

Associate Professor, B. K. Mody Government Pharmacy College, Rajkot, Gujarat, India

Assistant Professor, B. K. Mody Government Pharmacy College, Rajkot, Gujarat, India

Email of Corresponding Author: dharavmaru.18@gmail.com**Abstract:**

Introduction: Nitrosamine impurities have emerged as a major concern in pharmaceutical manufacturing owing to their potential carcinogenicity and regulatory significance. Their formation during active pharmaceutical ingredient (API) synthesis, formulation, or storage necessitates reliable synthetic and analytical approaches for impurity identification and characterization. This study aimed to synthesize and characterize N-methylaniline (NMA) and N-nitrosodimethylamine (NDMA) as model compounds for nitrosamine impurity profiling.

Materials & Methods: NMA and NDMA were synthesized independently using their respective laboratory procedures. The synthesized compounds were purified and monitored by thin-layer chromatography (TLC). Structural and physicochemical characterization was carried out using TLC, boiling point determination, Fourier transform infrared (FTIR) spectroscopy, and mass spectrometry (MS).

Results & Discussion: TLC analysis confirmed the successful synthesis of NMA with a distinct chromatographic profile ($R_f = 0.78$). Independent synthesis of NDMA was also achieved and confirmed by chromatographic and spectroscopic analyses. The observed boiling point of NDMA (152–158 °C) was comparable with the reported value (151–153 °C), indicating satisfactory purity. FTIR spectra showed characteristic functional group absorptions, while MS confirmed the expected molecular ions of the synthesized compounds. These findings verified the successful synthesis and analytical characterization of NMA and NDMA,



demonstrating their applicability as model compounds for nitrosamine impurity studies.

Conclusion: The developed laboratory-scale synthesis and analytical characterization of NMA and NDMA provide a practical approach for preparing model compounds applicable to nitrosamine impurity profiling, analytical method development, and pharmaceutical quality assessment.

Key words: Nitrosamine impurities; N-Methylaniline; N-Nitrosodimethylamine; FT-IR spectroscopy; Mass spectrometry; Impurity profiling.

**POSTER 47****Synthesis and Anti-Tubercular Activity of Novel Furan-Based Triazole-Acrylamide Hybrids: Experimental and Computational Insights****Hiren Dedaniya and Khushal Kapadiya***

Department of Chemistry, School of Science, RK University, Rajkot 360020, Gujarat, India.

Email of Corresponding Author: khushal.kapadiya@rku.ac.in**Abstract:**

Tuberculosis (TB) continues to pose a major global health challenge, particularly due to the rise of multidrug-resistant strains, necessitating the search for novel chemotypes with improved efficacy. In this work, a series of furan-based triazole-acrylamide hybrids (8a –8j) were designed and synthesized via a three-step sequence involving amidation, aryl azide preparation, and Cu(I)-catalyzed azide-alkyne cycloaddition (CuAAC). The structures of the synthesized compounds were confirmed through spectroscopic analyses, including attached proton test (APT) NMR. Biological screening against *Mycobacterium tuberculosis* H37Rv revealed promising activity, with the 4-bromo derivative (8e) exhibiting the highest potency (minimum inhibitory concentration [MIC] = 1.25 $\mu\text{g mL}^{-1}$), followed by 4-CF₃ (8f, 3.12 $\mu\text{g mL}^{-1}$) and 4-F (8g, 6.25 $\mu\text{g mL}^{-1}$). Structure–activity relationship analysis highlighted the beneficial role of electron-withdrawing and polarizable substituents at the para position of the phenyl ring. Molecular docking studies demonstrated strong binding affinities (up to – 9.6 kcal mol^{–1} for 8e), correlating well with experimental MIC values, whereas density functional theory (DFT) analyses confirmed favorable electronic properties, including a narrow HOMO–LUMO gap and high softness for 8e, supporting its superior bioactivity.

Key words: antitubercular agents | attached proton test (APT) NMR | click chemistry | density functional theory | furan-triazole-acrylamide hybrids | molecular docking

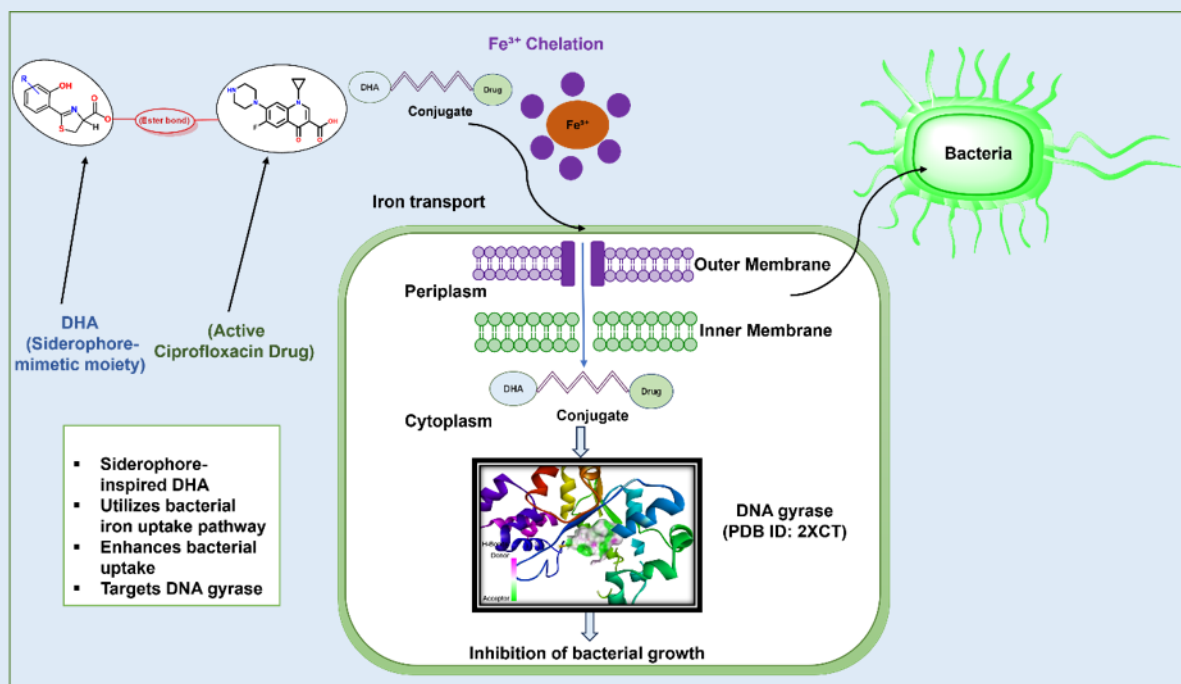
**POSTER 48****Synthesis of Siderophore-Inspired Dihydro-aeruginosic Acid-Based Ciprofloxacin Ester Conjugates as DNA Gyrase-Targeting Antibacterial Agents for Urinary Tract Infections****Dhara Vala^{*[a, b]}, Mayank Pandya^[a] and Pabitra B. Chatterjee^[b]**^[a] Centre for Research and Development, Dr. Subhash University, Junagadh, Gujarat
362001, India^[b] CSIR-Central Salt & Marine Chemicals Research Institute, Bhavnagar, Gujarat, India.**Abstract:**

In this study, we report the design and synthesis of novel dihydro-aeruginosic acid (DHA)-based ciprofloxacin ester conjugates using L- and D-cysteine-derived intermediates via a three-step synthetic procedure. The DHA intermediate was introduced as part of the structure representing bacterial iron-chelating systems, inspired by the structure of siderophores. All synthesized conjugates were characterized for their structural integrity and stereochemistry using standard spectroscopic techniques. Molecular docking studies against DNA gyrase (PDB ID: 2XCT) revealed favorable binding interactions with a binding energy range of -6.2 to -8.8 kcal/mol. In addition, 3a showed a better binding affinity than the ciprofloxacin standard drug, with several hydrogen bonding and π - π interactions in the active site. Antibacterial evaluation demonstrated moderate to good broad-spectrum activity against clinically relevant uropathogens, including *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Enterococcus faecalis*, and *Staphylococcus aureus*, with inhibition zones ranging from 18 to 29 mm. MIC studies showed that compounds 3a and 3f retained antibacterial activity following conjugation, with MIC values of 31.25 μ g/mL. In silico ADME analysis suggested that the increased molecular weight and polarity of the conjugates may influence membrane permeability and cellular uptake, resulting in higher MIC values for the conjugates than for ciprofloxacin. These observations may also be associated with the intracellular release behavior or prodrug-like properties of the ester conjugates. Overall, these findings demonstrate the potential of DHA-based ciprofloxacin ester conjugates as siderophore-inspired antibacterial agents and



provide a foundation for further optimization toward the development of novel drug derivatives for urinary tract infections

Key words: Urinary Tract Infection (UTI), Siderophore-Inspired Drug Conjugates, Dihydro aeruginosic Acid (DHA), Ciprofloxacin, Antibacterial Activity, Molecular Docking



**POSTER 49****Synthesis, Characterization and Biological Activity of Chalcone-Derived Pyrimidine Derivatives and Their Metal Complexes****M. L. Vala*, D. H. Jani**

Department of Chemistry, School of Science, Dr. Subhash University, Junagadh, Gujarat, India.

Email of Corresponding Author: valamanisha09@gmail.com**Abstract:**

Chalcone-derived heterocyclic compounds are widely studied because of their diverse structures and potential biological activities. In the present study, a series of pyrimidine derivatives were synthesized through the reaction of appropriately substituted chalcones with urea and thiourea. The synthesized heterocyclic derivatives were subsequently employed as ligands for the preparation of their corresponding transition-metal complexes under suitable reaction conditions. The synthesized ligands and metal complexes were characterized using appropriate analytical and spectroscopic techniques to elucidate their structural features and metal–ligand coordination behavior. The biological activity of the synthesized compounds and their metal complexes was evaluated against selected microbial strains to investigate their potential biological significance.

Key words: Chalcone, Metal complexes, Transition metals, Characterization, Biological activity.

**POSTER 50****Bacterial Cellulase: A Potential Industrial Biocatalyst****Ishita Purohit*, Dr. Dushyant Dudhagara**

Department of Life Sciences, Bhakta Kavi Narsinh Mehta University, Junagadh

Email of Corresponding Author: ishitapurohit17@gmail.com , drdushyant@bknmu.edu.in**Abstract:**

The escalating demand for sustainable, eco-friendly biocatalysts has intensified interest in bacterial cellulases, given their pivotal role in degrading cellulosic biomass into fermentable sugars for diverse industrial applications. This study outlines a sequential screening workflow to isolate bacterial strains exhibiting robust cellulase production. Primary screening used qualitative plate assays in which isolates were cultivated on cellulose-containing media; hydrolytic activity was inferred from clear-zone formation around colonies, indicating substrate degradation. Isolates showing clear hydrolytic activity were then evaluated quantitatively to identify the highest cellulase-producing candidates. This sequential, tiered screening approach enabled effective differentiation of isolates based on their relative enzymatic capabilities. The resulting bacterial cellulases find versatile applications across textile bio-polishing, bioethanol production from lignocellulosic biomass, paper and pulp deinking, and formulation of cellulase-based detergents, underscoring their promise as sustainable, industrially relevant biocatalysts.

Key words: Cellulase; Bacterial isolation and screening; Hydrolytic activity; Enzyme biosynthesis; Industrial applications

**POSTER 51*****Commiphora stocksiana* (Engl.) Engl.: An Integrated Review of Taxonomy, Phytochemistry, Biological Activities, Ethnomedicinal Significance and Conservation****Divyesh Manghani*, Jayesh Dhalani**

School of Science, RK University, Rajkot, Gujarat, India.

Email of Corresponding Author: Jayesh.dhalani@rku.ac.in**Abstract:**

Commiphora stocksiana (Engl.) Engl. is an endangered resin-bearing shrub or small tree of the family Burseraceae, distributed mainly across the arid and semi-arid regions of Pakistan and western India. Commonly known as “Mitha Guggul,” the species has notable ethnomedicinal importance but remains considerably less studied than the closely related *Commiphora wightii*, particularly in taxonomy, phytochemistry, pharmacology, molecular biology, and conservation. The species typically occurs on rocky or bouldery terrain, calcareous substrates, dry riverbeds, and tropical thorn vegetation. The IUCN Red List classifies *C. stocksiana* as Endangered, with an estimated area of occupancy of approximately 16 km² and a continuing decline in population, mainly associated with exploitation of its oleo-gum resin and habitat pressure. Early phytochemical studies reported β -sitosterol, cedrelone, and siderin from the roots. Recent HPLC–MS–QTOF metabolomic profiling has significantly expanded its known chemical diversity, tentatively identifying 61 metabolites from stem fractions, including flavonoid-, limonoid-, steroid-, and triterpenoid-related constituents. Importantly, E-guggulsterone was subsequently verified by HPLC in a petroleum-ether stem fraction. In contrast, an earlier HPLC study of gum-resin did not detect either E- or Z-guggulsterone, indicating that plant organ, geographical provenance, extraction conditions, and analytical methodology may strongly influence phytochemical detection. Biological evidence remains limited; ethanolic bark extract has demonstrated concentration-dependent phytotoxicity and oxidative stress induction in *Brassica napus*, whereas species-specific mammalian pharmacological efficacy, toxicity, and safety remain largely unexplored. Overall, this review integrates available evidence on taxonomy, morphology, distribution, ecology, ethnobotany,



phytochemistry, bioactivity, propagation, and conservation, and highlights the need for authenticated germplasm, quantitative metabolomics, structural confirmation, conservation genomics, pharmacological validation, toxicological assessment, sustainable harvesting, and cultivation strategies to support evidence-based medicinal development while ensuring the long-term survival of this threatened species.

Key words: *Commiphora stocksiana*; Mitha Guggul; Phytochemistry; HPLC-MS-QTOF; Ethnomedicinal uses; Conservation.

**POSTER 52****Exploration of Marine Fungi for Antimicrobial Potential against Multidrug-Resistant (MDR) Bacterial Pathogens****Gopal Balkrushnabhai Devmorari*, Ashok Kumar Bishoyi**

Department of Microbiology, Faculty of Science, Marwadi University, Rajkot, Gujarat, India

Email of Corresponding Author: gopaldevmorari456@gmail.com**Abstract:**

Antimicrobial resistance (AMR) is a growing global health challenge, creating an urgent need for new antimicrobial agents. Marine habitats harbor fungi capable of producing structurally diverse secondary metabolites with antimicrobial potential. However, the translation of marine-derived metabolites into clinically useful agents remains limited by insufficient pharmacological and toxicological evaluation, limited in vivo validation, production challenges, structural optimization, and regulatory barriers. These gaps highlight the need to explore under-investigated marine habitats for promising antimicrobial candidates. Therefore, the present study focuses on the isolation and screening of marine-associated fungi for antimicrobial activity. Marine samples were collected from two locations in Gujarat: Narara Reef, where five different sediment types were collected, and Mahuva, where 9 different samples were collected from mangroves, sea snails, and crabs. Overall, 56 fungal isolates were obtained from the collected samples and screened against five Gram-positive and three Gram-negative pathogenic bacterial strains to identify potential antimicrobial producers. Two fungal isolates namely F23 and F24, showed significant antibacterial activity against *Staphylococcus aureus*. Notably, isolate F23 also exhibited potential antibacterial activity against *Acinetobacter baumannii*, indicating its potential as a promising source of antimicrobial prosperity. These potential isolates will be further investigated through optimization of metabolite production, solvent extraction, purification, and structural characterization of bioactive compounds. This study establishes a foundation for systematic exploration of marine-associated fungi from Gujarat as a source of novel antimicrobial candidates and supports future efforts toward identifying metabolites with potential relevance to combating AMR. This approach integrates biodiversity exploration with



microbiological screening to prioritize active fungal strains for subsequent natural-product discovery and evaluation and development.

Key words: Marine-derived fungi; Antimicrobial activity; Antimicrobial resistance; Secondary metabolites; Multidrug-resistant bacteria.

**POSTER 53****Screening and Isolation of Polyhydroxybutyrate (PHB) Producing
Microorganisms from Marine Resources****Devanshi Acharya, Ranvijay Kumar, *Ashok Kumar Bishoyi**Department of microbiology, Faculty of science, Marwadi University, Rajkot, Gujarat,
India.

Abstract:**Background**

Polyhydroxybutyrate (PHB), a biodegradable polymer belonging to the polyhydroxyalkanoate family, is considered a promising alternative to conventional petroleum-based plastics. It is synthesized by many Gram-positive and Gram-negative bacteria under nutrient-limited conditions, mainly in the presence of excess carbon and limited nitrogen source. Marine habitats, particularly coastal sediments and host-associated environments, contain microorganisms with unique metabolic capabilities for PHB synthesis.

Methods

In this investigation, marine microorganisms were isolated from diverse samples collected from Narara Reef (Jamnagar), and Somnath Beach, Gujarat, India. The collected material included roots, leaves and sediment of mangroves as well as coral-associated sponge, algae, and sponge tissue. Samples were processed using surface sterilization, homogenization, serial dilution, and direct plating procedures. Isolation was carried out on four media (Zobell Marine Agar, Tryptic Soy Agar, Starch M-protein Agar, and Glycerol Asparagine Agar), depending on the target microbial group. A total of 140 morphologically distinct isolates were obtained. Primary PHB screening was carried out on minimal medium containing 3% dextrose using Sudan Black B, followed by secondary screening with Nile red fluorescence.

Results

Among 140 screened isolates, 27 showed dark blue intracellular granules under oil-immersion microscopy. Ten of the 27 Sudan Black B-positive isolates exhibited fluorescence under ultraviolet illumination in secondary screening, confirming



their potential for PHB accumulation. Gram-staining results indicated that all selected isolates were Gram-positive, mainly occurring as coccobacilli or rods.

Conclusion

These findings reveal that marine environments along the Gujarat coastline region harbour PHB producing bacteria. The selected isolates will be further examined by biochemical testing, 16S rRNA gene sequencing, quantitative PHB assays, extraction, and spectroscopic characterization.

Key words: Biodegradable, Marine sources, Polyhydroxybutyrate, Polymer, Production

**POSTER 54****NanoTechnology-Driven Catalysis for Sustainable Biodiesel Production:
Innovations and Future Perspectives****Bhavin G. Meriya and Siva Prasad Das***

Department of Chemistry, School of Science, RK University, Rajkot, Gujarat-3G0020, India

Email of Corresponding Author: siva.das@rku.ac.in**Abstract:**

Biodiesel is a clean and renewable fuel that can be used as an alternative to diesel. It can be made from vegetable oils, animal fats, and waste cooking oil. However, traditional methods of biodiesel production can take more time and may produce waste. Nanocatalysts can make the biodiesel production process faster and more efficient. They have a very small particle size and a large surface area, which helps the chemical reaction happen more effectively. Different nanocatalysts, such as metal oxide nanoparticles, magnetic nanoparticles, and nanocomposites, can be used for biodiesel production. This study focuses on the use of nanocatalysts to improve biodiesel production, especially from low-cost and waste oils. Important factors such as catalyst amount, temperature, reaction time, and alcohol-to-oil ratio can affect biodiesel yield. Nanocatalysts can also be separated and reused, which can reduce production cost and waste.

Overall, nanotechnology-based catalysts have good potential for producing clean, efficient, and sustainable biodiesel. Further research is needed to improve their stability, reduce cost, and make the process suitable for large-scale production.

Key words: Nanocatalysts, Biodiesel, Waste Cooking Oil, Transesterification, Nanotechnology, Renewable Energy, Green Chemistry.

**POSTER PRESENTATION – STUDENT****POSTER 55****Comprehensive RGB-W Evaluation of Analytical Methods for the
Quantification of Memantine Hydrochloride****Kishan Poshiya*, Niralee J. Malviya**Department of Chemistry, School of Science, Dr. Subhash University, Junagadh, 362001,
Gujarat, IndiaEmail of Corresponding Author: malviyanirali5@gmail.com**Abstract:**

The present investigation aimed to perform a comprehensive comparison of the green, blue, and red characteristics of previously reported analytical procedures used for the estimation of memantine hydrochloride in bulk materials, pharmaceutical dosage forms, and biological samples. A range of analytical approaches, including spectrophotometric, chromatographic, and electrochemical techniques, were critically examined with respect to their method development conditions, analytical characteristics, and validation performance. The integrated assessment identified reliable and sustainable methods while highlighting limitations and opportunities for developing greener analytical procedures.

Key words: Memantine Hydrochloride, RAPI, BAGI, AGREE, Analytical Methods

**POSTER 56****Enhancement of Biogas Production from Cattle Dung & Food Waste: A Comparative Analysis****Maheta Roshni Maheshbhai**

Department of Life Sciences, Bhakta Kavi Narsinh Mehta University, Junagadh

Email of Corresponding Author: roshnimaheta511@gmail.com**Abstract:**

The intensification of livestock production has led to significant environmental challenges associated with manure management, including greenhouse gas emissions and water pollution. Anaerobic digestion (AD) technology presents a sustainable solution by converting this waste into renewable biogas and nutrient-rich digestate. This study aimed to comparatively evaluate the biogas and methane production potential of three substrates: cattle dung, food waste, and their mixture (cattle dung & food waste) under continuous, mesophilic conditions ($38\pm1^\circ\text{C}$). The experiment utilized three continuously-stirred tank reactors (CSTRs), each fed daily with a specific manure type at a hydraulic retention time of 20 days. Key parameters monitored included daily biogas production, carbon dioxide content estimated using titration methods, and process stability indicators like pH and volatile fatty acids. Results indicated that mixed substrate (cattle dung & food waste) yielded the highest specific biogas production, attributable to its high protein and fat content. However, biogas from cattle manure exhibited the greatest methane concentration, consistently around 63%, indicating superior process stability due to a more balanced carbon-to-nitrogen ratio. The study concludes that all tested manures are viable substrates for anaerobic digestion, offering a pathway for sustainable waste valorization and renewable energy generation. To optimize the process, future research should focus on co-digestion strategies to balance nutrient profiles and enhance the economic viability of on-farm biogas plants, particularly for manures with challenging characteristics like poultry waste.

Key words: Biogas, Anaerobic Digestion, Co-digestion, Cattle Dung, Food Waste, Methane Production.

**POSTER 57****Exploration of potential phytochemicals and herbal formulations for its possible therapeutic potential on various types of cancer****Jeet Bhatt¹, Hiteshkumar Parmar², Shivani Joshi^{3*}**^{1,3}Department of Microbiology, School of Science, Dr. Subhash University, Junagadh, India²Department of Zoology, School of Science, Dr. Subhash University, Junagadh, IndiaEmail of Presenting Author: bhattjeet94@gmail.comEmail of Corresponding Author: phitesh649@gmail.com, shivujoshi98@gmail.com**Abstract:**

Among all the diseases prevailing in the world, cancer is emerging as one of the most horrific diseases. Cancer has been estimated as the second leading cause of death in humans. India recorded 3.9 million cases in 2016 and it will increase up to 9.6 million cases in 2019. The alarming increase in the global cancer death has fuelled the quest for new effective anti-tumor drugs from different natural products. Because there are many side effects in using chemotherapeutic drugs, especially drug resistance that appear in cancer chemotherapy. Several plant-derived alkaloids like Vinca alkaloid, Glycyterin, Daidzein etc. are leading drugs in the treatment of different types of cancer. Historically, it is proven that plants and their metabolites have great potential in the treatment of cancer. The novel bioactive compounds are obtained from many plants like Withania somnifera, Catharanthus roseus etc. are being studied as potential therapeutic agents because of their high activity and low toxicity. Cancer chemoprevention with natural phytochemical compounds is an emerging strategy to prevent, delay, or cure cancer.

Key words: Cancer, disease, Natural Phytochemical(s), Ayurveda, Nanomedicine, Withania somnifera

**POSTER 58****Green Synthesis of Silver Nanoparticles by Using *Azadirachta indica* and Nanoparticle-Embedded Bioplastic Synthesis Using Starch and Gelatin****Mirali Hirani, Bhakti Donga, Dharmesh Sherathia**School of Science, Dr. Subhash University, Junagadh – 362001, Gujarat, India

Abstract:

Silver nanoparticles (AgNPs) have attracted considerable attention because of their broad antimicrobial activity and diverse applications. The present study focused on the synthesis of silver nanoparticles using both chemical and green approaches and their incorporation into biodegradable plastic for potential food preservation. Silver nanoparticles were chemically synthesized using 1 mM silver nitrate and 1% trisodium citrate. Green synthesis was carried out using *Azadirachta indica* (neem) leaf extract as a reducing and stabilizing agent. Formation of nanoparticles was indicated by a visible colour change from pale yellow to brown and further characterized by UV–Visible spectroscopy. The antimicrobial activity of synthesized AgNPs was evaluated using an agar well/ditch method against *Escherichia coli*, *Bacillus* spp., *Pseudomonas* spp., and *Streptococcus* spp. Neem-mediated AgNPs demonstrated antimicrobial activity against the tested organisms, with inhibition zones of 0.4 cm against *E. coli* and 0.5 cm against both *Bacillus* spp. and *Pseudomonas* spp., while no inhibition was observed against *Streptococcus* spp. Furthermore, a biodegradable film was prepared using starch, gelatin, and glycerol, followed by incorporation of green-synthesized AgNPs. The nanoparticle-embedded bioplastic was subsequently used for food wrapping and shelf-life assessment, where no visible change in the wrapped food was observed during the reported assessment period. The study demonstrates the potential of neem-mediated AgNPs combined with starch–gelatin biodegradable films as an eco-friendly approach for antimicrobial packaging and reduction of conventional plastic pollution.

Key words: Silver nanoparticles; *Azadirachta indica*; Green synthesis; Antimicrobial activity; Biodegradable plastic; Starch; Gelatin; Food preservation

**POSTER 59****In Vitro Compatibility Assessment of Indigenous PGPR with Nano-Urea: A Step Towards Next-Generation Biofertilizer Development****Jahanvi M. Parmar, Bansi H. Dabhi, Dharmesh N. Sherathia***Department of Microbiology, School of Science, Dr. Subhash University, Junagadh,
362001, Gujarat, India.Email of Presenting Author: parmarjahanvi360@gmail.comEmail of Corresponding Author: dharmesh.microbio@gmail.com**Abstract:**

The integration of plant growth-promoting rhizobacteria (PGPR) with nano-fertilizers represents a promising strategy for sustainable nutrient management and the development of next-generation biofertilizers. This study aimed to isolate indigenous rhizobacteria from the rhizosphere of *Sesamum indicum* (sesame) and evaluate their in vitro compatibility with IFFCO Nano-Urea. Rhizosphere soil samples were collected from healthy sesame plants at the early vegetative (non-flowering) and flowering stages from Navagam–Pedhavada, Gir Somnath District, Gujarat, India. Bacterial populations were enumerated using serial dilution and spread-plate techniques on Nutrient Agar and *Pseudomonas* Agar. A total of 33 bacterial isolates were successfully preserved from both growth stages, exhibiting diverse colony and Gram-staining characteristics. Selected isolates were screened for Nano-Urea compatibility using a liquid jar test and agar diffusion/cup-boring assay. The culturable bacterial population was higher during the flowering stage, reaching up to 6.00×10^8 CFU g⁻¹ soil on Nutrient Agar and 4.00×10^8 CFU g⁻¹ soil on *Pseudomonas* Agar. Most tested isolates retained visible growth following Nano-Urea exposure, indicating preliminary compatibility. The agar diffusion assay identified three isolates, PSN4, PS9, and PS18, showing inhibition zones of 4.75, 5.25, and 9.20 mm, respectively, and were classified as non-compatible under the assay conditions. The remaining tested isolates showed no detectable inhibition. These findings demonstrate the presence of diverse indigenous rhizobacteria associated with sesame and provide a preliminary basis for selecting Nano-Urea-compatible PGPR strains. Further biochemical, molecular, and quantitative viability studies will facilitate the identification of efficient strains and evaluation



of their potential for developing PGPR–Nano-Urea bioformulations for sustainable crop nutrition.

Key words: PGPR; *Sesamum indicum*; Nano-Urea; Compatibility; Rhizosphere bacteria; Biofertilizer; Sustainable agriculture.

**POSTER 60****Isolation and Biochemical Characterization of Microorganisms from Diverse Soil and Water Samples of the Saurashtra Region, Gujarat, India****Sanjana M. Barad, Prit L. Vadher, Daya P. Bamaniya, Nisha V. Dodiya,
Bharvi H. Barad, Jahanvi M. Parmar***Department of Microbiology, School of Science, Dr. Subhash University, Junagadh,
362001, Gujarat, India.Email of Presenting Author: Sanjanabarad01@gmail.comEmail of Corresponding Author: parmarjahanvi360@gmail.com**Abstract:**

Soil and water ecosystems are important reservoirs of microbial diversity with significant ecological and biotechnological potential. The present study focused on the isolation and biochemical characterization of microorganisms from diverse soil and water samples collected from different locations of the Saurashtra region, Gujarat, India. Samples were collected aseptically from representative agricultural soils and water sources and processed using standard microbiological techniques. Microorganisms were isolated through serial dilution, and culture-based methods using suitable growth media. Purified isolates were characterized based on colony morphology, microscopic features, Gram staining, and biochemical profiles. The isolates exhibited considerable variation in morphological, staining, and biochemical characteristics, indicating diverse culturable microbial populations across the investigated environments. Comparative biochemical characterization enabled preliminary differentiation and grouping of bacterial isolates based on their phenotypic properties. The study provides baseline information on culturable microbial diversity in soil and water ecosystems of the Saurashtra region. The recovered microorganisms may have potential applications in sustainable agriculture, environmental biotechnology, bioremediation, and industrial microbiology. Further molecular identification and functional screening will facilitate assessment of their ecological and biotechnological potential.

Key words: Microbial diversity; Soil microbiology; Water microbiology; Biochemical characterization; Culturable microorganisms; Saurashtra region

**POSTER 61****Multistep approach for the synthesis of morpholine-pyridazine-oxazolidin-2-one hybrids: In silico and Anticancer study****Vinod Bhoge* and Khushal Kapadiya**

Department of Chemistry, School of Science, RK University, Rajkot 360052, Gujarat, India.

Email of Corresponding Author: khushal.kapadiya@rku.ac.in**Abstract:**

Morpholine, pyridazine, and oxazolidin-2-one scaffolds are well recognized for their diverse pharmacological activities and have attracted considerable interest in anticancer drug discovery. In the present study, a novel series of morpholine-pyridazine-oxazolidin-2-one hybrids was synthesized through a multistep synthetic approach and structurally characterized using standard spectroscopic techniques. The synthesized compounds were further evaluated through molecular docking and in silico ADMET studies to investigate their binding affinity and drug-likeness. Furthermore, the compounds were screened for their in vitro anticancer activity against selected human cancer cell lines. Several derivatives exhibited promising cytotoxic activity, supported by favorable binding interactions with the target protein and acceptable pharmacokinetic profiles. These findings suggest that morpholine-pyridazine-oxazolidin-2-one hybrids represent promising lead molecules for the development of novel anticancer agents.

Key words: Morpholine; Pyridazine; Oxazolidin-2-one; Multistep synthesis; Molecular docking; ADMET; Anticancer activity; Medicinal chemistry.

**POSTER 62****Sn²⁺ Sensing of an Anthranilic Acid–o-Phenylenediamine–Eosin Y Conjugate:
From Synthesis to a Highly Selective Chemosensor****Priyanshi V. Savaliya and Hardik L. Varu***Department of Chemistry, School of Science, Dr. Subhash University, Junagadh, 362001,
Gujarat, India.Email of Presenting Author: priyanshisavaliya30@gmail.comEmail of Corresponding Author: hardikvaru5@gmail.com**Abstract:**

A simple, efficient, and rapid approach was developed for the synthesis of a novel anthranilic acid–o-phenylenediamine–Eosin Y conjugate as a highly selective optical chemosensor for Sn²⁺ ions. The sensor was constructed through a two-step grinding strategy under mild conditions. In the first step, anthranilic acid and o-phenylenediamine (OPD) were reacted in the presence of a catalytic amount of HCl to afford the amide-based intermediate A. In the subsequent step, intermediate A was coupled with Eosin Y under similar grinding conditions to furnish the final conjugate in high yield. The structures of the synthesized intermediate and final sensor were characterised using FT-IR, mass, and ¹H/¹³C NMR spectroscopy.

The sensing performance of the synthesized conjugate was systematically investigated through optical studies. Remarkably, the sensor exhibited a highly selective response toward Sn²⁺ over a range of competing metal ions and anions, demonstrating its strong recognition capability. The influence of solvent composition and pH on the sensing response was evaluated to establish suitable conditions for Sn²⁺ detection. Competitive analyte experiments further confirmed the excellent selectivity of the probe, while reversibility studies demonstrated the potential for regeneration of the sensing response. Importantly, the practical applicability of the developed sensor was demonstrated through paper-strip-based visual detection of tin in a pharmaceutical sample, providing a simple and rapid approach for on-site screening. Overall, the proposed anthranilic acid–OPD–Eosin Y conjugate combines a facile, solvent-minimized synthesis with



pronounced Sn^{2+} selectivity and practical strip-based detection, highlighting its potential as a convenient analytical platform for tin monitoring.

Key words: Anthranilic acid; o-Phenylenediamine; Eosin Y; Sn^{2+} sensing; Chemosensor; Paper-strip detection; Pharmaceutical analysis.

**POSTER 63****Phytochemical Screening and TLC-Based Profiling of Secondary Metabolites
in *Azadirachta indica* L. Plantlets****Bhavini S. Bamania¹, Juhee D. Vaidya¹ and Ranjan P. Kuvad^{*1}**¹Department of Lifesciences, School of Science, Dr. Subhash University, Junagadh,
Gujarat, IndiaEmail of Corresponding Author: ranjan.kuvad@dsuni.ac.in**Abstract:**

The tree *Azadirachta indica* L. belongs to the family Meliaceae, is a multipurpose medicinal tree known for its insecticidal, antiseptic, antipyretic, and antiparasitic properties. The present study investigated the potential of young neem plantlets as a source of secondary metabolites. Seeds collected from a mature neem tree in the Junagadh region of Gujarat were germinated, and three to four weeks old plantlets were analysed. Leaf, stem, and root extracts were screened for alkaloids, flavonoids, terpenoids, phenolics, tannins, and steroids. Thin-layer chromatography (TLC) was further used to profile the detected compounds based on their retention factor (R_f) values. The results revealed a higher abundance of secondary metabolites in the leaf extract compared with stem and root extracts. The study demonstrates the potential of young neem plantlets as a valuable source of bioactive compounds with possible applications in pharmaceutical and biotechnological industries.

Key words: *Azadirachta indica*, Neem plantlets, Phytochemical screening, Secondary metabolites, TLC profiling, Bioactive compounds, Phytochemical analysis

**POSTER 64****Solvent-Free Microwave Cyclotrimerization of Enaminones using Reusable Amberlite IR-120H: An Efficient Route to 1,3,5-Trisubstituted Benzenes****Vimal C. Gohil*, Naval P. Kapuriya**Department of Chemistry and Forensic Science, Bhakta Kavi Narsinh Mehta University,
Junagadh-362263, Gujarat, IndiaEmail of Corresponding Author: gvimal026@gmail.com**Abstract:**

1,3,5-Trisubstituted benzenes are valuable aromatic scaffolds with applications in drug design, supramolecular chemistry, and advanced materials. Herein, we developed a rapid and sustainable microwave-assisted synthesis of 1,3,5-triarylbenzene derivatives through the cyclotrimerization of enaminones using Amberlite IR-120H as a heterogeneous acid catalyst. The solvent-free reaction efficiently afforded products 4a–n in 74–90% yields under optimized conditions of 120 °C for 30 min. The method showed broad substrate tolerance and was applicable to electron-donating, electron-withdrawing, heteroaryl, and naphthyl substrates. The products were characterized by FT-IR, ¹H NMR, and ESI-MS. Overall, this metal-free and solvent-free protocol offers an efficient, sustainable, and operationally simple approach to 1,3,5-trisubstituted benzene frameworks.

Key words: 1,3,5-Trisubstituted benzenes, microwave-assisted synthesis, cyclotrimerization, Amberlite IR-120H, Solvent free synthesis

**POSTER 65****Spatial and Seasonal Patterns of Rocky Intertidal Biodiversity and Population Ecology in Relation to Physico-Chemical Parameters at Veraval, Gujarat, India****Dhaval Mesiya and Pradip Kachhiya**

Department of Zoology and Botany, School of Science, Dr. Subhash University, Junagadh

Email of Presenting Author: dhaval.mesiya@gmail.comEmail of Corresponding Author: Pradip.kachhiya@dsuni.ac.in**Abstract:**

Rocky intertidal ecosystems are highly dynamic coastal habitats that support diverse assemblages of marine organisms and are shaped by tidal exposure, habitat heterogeneity, and seasonal environmental fluctuations. The present study investigated the biodiversity and population ecology of the rocky intertidal shore at Veraval, along the Saurashtra coast of Gujarat, India, from March 2025 to February 2026. The study area was stratified into four intertidal zones spray, upper littoral, middle littoral, and lower littoral zones. Biodiversity was assessed using 0.25m² quadrats, with ten quadrats sampled in each zone through random and zig-zag sampling. Population attributes, including density, abundance, and frequency, were evaluated along with selected seawater physico-chemical parameters. A total of 87 species of macrofauna and algae were recorded during the study, with Mollusca representing the most prominent group. Species composition, distribution, and abundance varied considerably across the intertidal gradient. The middle and lower littoral zones supported comparatively greater biodiversity and abundance, indicating the importance of habitat conditions and environmental stability in structuring intertidal communities. Seasonal variation in community patterns was also evident, with relatively higher diversity and evenness observed during the winter and post-monsoon periods. Water-quality parameters, including temperature, pH, salinity, dissolved oxygen, turbidity, total solids, and total dissolved solids, were assessed to examine their relationship with community distribution and ecological patterns. The study highlights the ecological significance of the Veraval rocky shore as an important reservoir of coastal biodiversity. The findings emphasize the need for long-term biodiversity



monitoring, protection of intertidal microhabitats, and conservation-oriented management strategies to maintain the ecological integrity and sustainability of coastal ecosystems along the Gujarat coast.

Key words: Rocky shore; Intertidal ecology; Biodiversity; Population ecology; Mollusca; Veraval; Gujarat; Coastal ecosystem.

**POSTER 66****Ag-Modified CeO₂ Nanoparticles as an Efficient Photocatalyst for Congo Red Removal Under UV Irradiation****Maherin Jethava¹* and Sadaf Jethva²**¹Bahauddin Science College, Junagadh-362001, Gujarat, India²Institute of Forestry and Engineering, Estonian University of Life Sciences 51014 Tartu, EstoniaEmail of Corresponding Author: jethvamehrin7@gmail.com, Sadaf.jethva@emu.ee**Abstract:**

The increasing discharge of synthetic dyes into the environment has raised serious concerns due to their toxicity, persistence, and resistance to conventional wastewater treatment methods. In the present study, silver-modified cerium oxide (AgCeO₂) nanoparticles were synthesized and investigated as an efficient photocatalyst for the removal of Congo red (CR) dye from aqueous media under UV irradiation. The structural, morphological, and optical properties of the synthesized AgCeO₂ nanoparticles were systematically investigated using X-ray diffraction (XRD), scanning electron microscopy (SEM), Fourier-transform infrared (FTIR) spectroscopy, and UV–Vis spectroscopy. XRD analysis confirmed the formation of crystalline CeO₂ with a cubic fluorite structure, together with characteristic reflections corresponding to metallic Ag, confirming the formation of the AgCeO₂ nanocomposite. SEM analysis revealed the nanoscale morphology of the synthesized material, while FTIR spectroscopy provided information regarding chemical bonding and surface functional groups. UV–Vis spectroscopy revealed the optical characteristics of AgCeO₂ and its suitability for photocatalytic applications. The photocatalytic performance of AgCeO₂ nanoparticles was evaluated by monitoring Congo red degradation under UV irradiation. The AgCeO₂ photocatalyst exhibited enhanced degradation efficiency, demonstrating the beneficial role of Ag modification in improving photocatalytic activity. The enhanced performance can be attributed to the synergistic interaction between Ag and CeO₂, which promotes efficient separation and transfer of photogenerated charge carriers and facilitates the formation of reactive oxygen species responsible for dye degradation. The results demonstrate that AgCeO₂



nanoparticles are promising photocatalysts for removing Congo red from contaminated water under UV irradiation. Their enhanced photocatalytic activity, chemical stability, and facile synthesis make them attractive candidates for wastewater treatment and environmental remediation. Overall, AgCeO_2 nanomaterials show significant potential as efficient photocatalytic systems for the degradation of persistent organic pollutants in aqueous environments.

Key words: Photocatalysis, Congo red, Nanoparticles

**POSTER 67****AI And Genomics in Starter Culture Selection****Dhruvi Kanani, Kishan Vasoya, Shreya Amipara, Dharmesh Sherathia**Department of Vocational Education, Dr. Subhash University, Junagadh – 362001, Gujarat,
India**Abstract:**

Starter cultures are beneficial microorganisms essential for the production of fermented foods and beverages such as yogurt, cheese, kefir, fermented vegetables, and probiotic products. Conventional starter culture selection relies largely on laboratory-based screening, which can be time-consuming, labor-intensive, costly, and limited in the number of strains evaluated. The integration of Artificial Intelligence (AI) and genomic technologies provides a faster and data-driven approach for selecting and optimizing starter cultures for precision fermentation and functional food production.

Genomic approaches, including whole-genome sequencing, metagenomics, comparative genomics, transcriptomics, and functional genomic analysis, can identify microbial traits associated with probiotic activity, acid production, flavor development, vitamin synthesis, stress resistance, and food safety. AI and machine-learning models can integrate genomic, metabolic, and phenotypic datasets to predict fermentation performance, identify high-performing strains, optimize fermentation conditions, and support early detection of contamination. An AI- and genomics-guided workflow involving microbial isolation, genome sequencing, computational analysis, trait prediction, strain selection, and precision fermentation can accelerate the development of safe and efficient starter cultures. Integration of multi-omics approaches can further enhance understanding of microbial traits and fermentation behavior. Despite challenges related to computational requirements, data quality, cost, standardization, regulatory approval, and genomic database limitations, AI and genomics offer significant potential for improving fermentation efficiency, product quality, nutritional value, safety, and consistency. These technologies can contribute to the development of next-generation functional foods and smarter precision-fermentation systems.



Key words: Artificial Intelligence; Genomics; Starter Culture; Precision Fermentation; Machine Learning; Functional Foods; Metagenomics.

**POSTER 68****GREEN SYNTHESIS OF BIOETHANOL FROM RENEWABLE BIOMASS: RECENT ADVANCES AND SUSTAINABLE TECHNOLOGIES**

**Riya R. Karamata, Mital B. Gediya, Divyesh H. Varu, Vandit S. Dhola
Roshni changela**

Department of chemistry, school of science, Dr. Subhash University, Junagadh-362001

Email of Corresponding Author: riyakaramata@gmail.com

Abstract:

The escalating global energy demand and environmental concerns associated with fossil fuels necessitate the development of sustainable, eco-friendly energy alternatives. Bioethanol synthesized from renewable biomass offers a promising solution for waste valorization, greenhouse gas reduction, and enhanced energy security. This study provides a comprehensive overview of the green synthesis of bioethanol, highlighting modern pretreatment techniques, enzymatic hydrolysis, and fermentation pathways. Various lignocellulosic, sugar-rich, and starch-rich agricultural wastes—including sugarcane bagasse, rice straw, wheat straw, corn stover, fruit waste, potato waste, and banana waste—serve as potential feedstocks. Comparative yield evaluations indicate that high-starch and optimized lignocellulosic substrates produce substantial ethanol outputs ranging from 300 to 430 L/ton of dry biomass. To overcome traditional processing limitations, eco-friendly pretreatment methods such as biological agents, deep eutectic solvents (DES), ionic liquids (ILs), and steam explosion are employed to disrupt the lignin structure with minimal environmental impact. Subsequent enzymatic hydrolysis yields fermentable sugars, which are efficiently converted to ethanol by microbial strains like *Saccharomyces cerevisiae*, *Zymomonas mobilis*, *Pichia stipitis*, and genetically engineered constructs. Despite key challenges, including high enzyme costs, sugar inhibition, and distillation energy demands, advanced green technologies offer substantial environmental benefits. Integrating consolidated bioprocessing (CBP), biorefinery frameworks, and second-generation bioethanol strategies establishes a circular bioeconomy. Ultimately, bioethanol production transforms agricultural waste into clean fuel, fostering a sustainable, low-carbon future.



Key words: Bioethanol, Lignocellulosic Biomass, Green Pretreatment, Fermentation, Circular Bioeconomy, Sustainable Fuel

**POSTER 69****AI-Powered Metagenomics: Revolutionizing Food Microbiome Research****Simran M. Vasvani, Dhruvika R. Fadadu, Pushti R. Tanna, Jahanvi M. Parmar***Department of Microbiology, School of Science, Dr. Subhash University, Junagadh,
362001, Gujarat, India.Email of Presenting Author: simranvasvani2006@gmail.comEmail of Corresponding Author: parmarjahanvi360@gmail.com**Abstract:**

The food microbiome comprises a complex and dynamic community of microorganisms that play a crucial role in food safety, quality, fermentation, nutrition, and shelf life. Conventional culture-based approaches detect only a limited fraction of these microbial communities, restricting comprehensive assessment of food-associated microorganisms. AI-powered metagenomics integrates high-throughput sequencing with artificial intelligence (AI) and machine learning (ML) to enable rapid and comprehensive analysis of microbial communities directly from food samples. Metagenomic sequencing generates large-scale microbial and functional datasets, while AI-driven approaches facilitate microbial identification, community profiling, pattern recognition, prediction of microbial functions, and detection of potential foodborne pathogens. This integration provides valuable insights into microbial interactions, fermentation processes, spoilage, food quality, and safety. AI-powered metagenomics also supports the discovery of beneficial microorganisms, novel food-associated enzymes, probiotics, and microbiome-based strategies for sustainable food production. Furthermore, predictive models can assist in monitoring microbial changes during processing and storage, enabling early risk assessment and improved quality control. Thus, the convergence of AI and metagenomics represents a transformative approach to understanding the food microbiome and developing safer, healthier, higher-quality, and more sustainable food systems.

Key words: AI-powered metagenomics; Food microbiome; Machine learning; Microbial diversity; Food safety; Metagenomic sequencing



**POSTER 70****Biodegradable Polymers: A Green Solution to Plastic Pollution****Roshani Changela, Kashish Usadadiya, Bhumika Makvana**Department of Chemistry, School of Science, Dr. Subhash University, Junagadh.
362001 Gujarat, India.Email of Corresponding Author: roshanichangela318@gmail.com**Abstract:**

Background: Plastic pollution has become one of the most serious environmental challenges of the 21st century. Conventional plastics are non-biodegradable and persist in the environment for hundreds of years, causing harm to ecosystems and living organisms. Biodegradable polymers have emerged as a sustainable alternative because they can degrade naturally into harmless products under environmental conditions.

Methods: A review-based study was conducted using information collected from research articles, scientific databases, journals, and reputed websites. Different types of biodegradable polymers, their sources, properties, degradation mechanisms, and applications were studied. The environmental benefits and limitations were also evaluated.

Results: Biodegradable polymers such as polylactic acid (PLA), polyhydroxyalkanoates (PHA), starch-based polymers, and cellulose derivatives show significant potential to replace conventional plastics in packaging, agriculture, medical, and textile industries.

They reduce plastic waste accumulation and lower the carbon footprint. However, their high production cost, limited mechanical strength, and need for proper disposal conditions are some of the major limitations.

Conclusion: Biodegradable polymers are a promising and eco-friendly solution to reduce plastic pollution and support sustainable development. With further research, improvement in cost-effectiveness, and proper waste management, these polymers can play a crucial role in building a greener and cleaner future.

Key words: Biodegradable polymers, plastic pollution, sustainability, polylactic acid, environment, green solution.

**POSTER 71****Comparative Development of Biodegradable Films from Fruit Peel Waste****Dev N. Chauhan, Priyanshi V. Savaliya, Hardik L. Varu***

Department of Chemistry, School of Science, Dr. Subhash University, Junagadh, 362001,
Gujarat, India.

Email of Presenting Author: chauhannilesh16274@gmail.com

Email of Corresponding Author: hardikvaru5@gmail.com

Abstract:

This study aims to develop and compare biodegradable films using fruit peel waste. Starch will serve as the primary film-forming material, while glycerol will be added as a plasticizer to improve flexibility. Orange-peel-based and banana-peel-based films will be prepared separately and compared with a starch–glycerol film used as a control. The films will be evaluated for film formation, water absorption, stability under different pH conditions, and biodegradation in soil. Their physical properties and degradation behaviour will be compared to determine the relative suitability of each fruit-peel formulation for biodegradable material development. The study also seeks to demonstrate a simple and sustainable method for converting commonly available fruit waste into a potentially useful alternative to conventional plastic. By utilizing agricultural and household waste, this work may contribute to waste reduction, resource recovery, and the development of environmentally friendly packaging materials.

Key words: Biodegradable films, Fruit-peel waste, Orange peel, Banana peel, Starch, Glycerol.

**POSTER 72****Comparative Study of New Age Antidiabetic Drug and Their Effectiveness as well as Working Mechanism****Vasudha Vaghasiya, Naz Shahmadar, Dharitri Thummar, Anjali Naliyadhara, Kanan Babariya**

Government Science College, Bagasara: Saurashtra University, Rajkot

Abstract:

Medicinal chemistry plays an important role in developing modern medicines by modifying molecules to improve their stability, activity, and duration of action. Among recent peptide-based medicines, semaglutide is an important example of how chemical modification can improve the properties of a naturally occurring biological molecule. Semaglutide is a modified peptide analogue of glucagon-like peptide-1 (GLP-1) and acts mainly by activating the GLP-1 receptor. Specific structural modifications, including amino-acid changes and a fatty-acid-derived side chain, improve its stability and promote albumin binding, contributing to prolonged biological activity.

This poster focuses on the chemistry, molecular structure, and mechanism of action of semaglutide, with particular attention to peptide bonds, structural modifications, receptor interaction, and the relationship between molecular structure and biological activity. It further explores tirzepatide, a dual GIP/GLP-1 receptor agonist, and retatrutide, an investigational triple GIP/GLP-1/glucagon receptor agonist. Research on these dual- and triple-receptor agonists has shown promising results, with multiple beneficial metabolic effects related to blood-glucose regulation and weight management.

The development of these multi-receptor agonists opens an exciting pathway for future research in medicinal chemistry. Similar dual- or triple-receptor agonist or antagonist strategies may potentially be explored for other diseases, where targeting multiple complementary biological pathways could improve therapeutic effectiveness and disease management. Such approaches may contribute to the development of more effective medicines and better management of complex diseases.



Overall, semaglutide, tirzepatide, and retatrutide demonstrate how organic chemistry, peptide chemistry, biochemistry, and pharmacology can work together to advance modern drug discovery and create new possibilities for future therapeutic development.

Key words: Semaglutide; Tirzepatide; Retatrutide; Peptide Chemistry; GLP-1; Medicinal Chemistry

**POSTER 73****Eco-Friendly Remediation of Heavy Metal Contaminants from Wastewater Using Chemically Modified Agricultural Biomass: An Analytical Adsorption Study****Rinkal Sondarva***

Bahauddin Science College, Junagadh

Email of Corresponding Author: rinkalsondarva35@gmail.com**Abstract:**

Heavy metal pollution in industrial wastewater presents a significant environmental threat. Conventional remediation techniques are costly and produce secondary chemical sludge. This study evaluates the efficacy of chemically modified agricultural wastes—specifically banana peels, spent coffee grounds, and citric acid- functionalized biomass—as sustainable bio-adsorbents for heavy metal removal.

Comparative analytical review reveals that citric acid modification functionalizes the biomass surface with active carboxyl ($-\text{COOH}$) and hydroxyl ($-\text{OH}$) groups. These negatively charged functional groups significantly enhance electrostatic attraction and ion exchange with toxic metal ions, including Lead (Pb^{2+}), Cadmium (Cd^{2+}), and Copper (Cu^{2+}). Optimal adsorption performance is observed under mild conditions (pH 5–6). Chemical functionalization substantially increases removal capacity compared to untreated raw biomass.

This comparative study highlights a zero-cost, circular economy approach, transforming agricultural by-products into effective water purification materials following green chemistry principles.

Key words: Bio-adsorption, Heavy Metals, Chemically Modified Biomass, Citric Acid, Wastewater Remediation, Sustainability

**POSTER 74****Effect of Various Edible Coatings on Climacteric Fruits of Gujarat****Riya Bipinbhai Viroja, Dhanvi Nagajanhai Antroliya, Krisha Pareshbhai Jalu and Parth Hareshkumar Gohel**

Abstract:

The objective of the study was to evaluate the potential of four different edible coatings, namely coating A – Aloe vera gel + Honey, coating B – Aloe vera gel + Tulsi, coating C – Marigold flower extract + Guar gum + Neem oil + Aloe vera gel, and coating D – CMC (Carboxymethylcellulose), for extending the shelf life of fruits such as Papaya, Banana, and Tomato. The brushing technique was used to apply coatings A, B, and C on the fruits, whereas for coating D, the fruits were dipped in CMC solution for 2 minutes. Weight loss, colour changes, and shelf life of both treated and untreated fruits were recorded. The fruits treated with edible coatings showed a considerable delay in weight loss, colour change, and reduction in shelf life compared to the uncoated fruits. In comparison with the respective controls, all the coatings showed a positive effect on the fruits. Among all the treatments, coating C – Marigold flower extract + Guar gum + Neem oil + Aloe vera gel showed the best results compared to the other three coatings. The study suggests that coating A – Aloe vera gel + Honey, coating B – Aloe vera gel + Tulsi, coating C – Marigold flower extract + Guar gum + Neem oil + Aloe vera gel, and coating D – CMC (Carboxymethylcellulose) are useful for extending the shelf life and maintaining the quality of fruits. These coatings can be highly beneficial to farmers as they are cost-effective and can be easily obtained from natural sources, being prepared from natural plant extracts.

**POSTER 75****From Waste to Wealth: Production of Biodegradable Plastics****Bansi Ghava, Kajal Parmar, Aarti Damor, Meera Kanjariya, Asmita Rathod**

Government Science College, Bagasara – 365440, Gujarat.

Abstract:

The increasing accumulation of conventional plastic waste has become a major environmental concern due to its poor biodegradability and long persistence in the environment. Converting renewable and waste materials into biodegradable plastics offers a sustainable approach to reduce plastic pollution while utilizing low-value waste resources. Agricultural residues such as rice straw, wheat straw, sugarcane bagasse, corn residues, fruit peels and other biomass can serve as sources of starch, cellulose, lignocellulose and other biopolymers for bioplastic production. These materials can be processed through suitable physical, chemical or biological methods to obtain biodegradable plastic materials. Starch-based plastics, polylactic acid (PLA), polyhydroxyalkanoates (PHAs) and cellulose-based materials are promising examples with applications in packaging, agriculture, food containers and biomedical fields. The laboratory preparation of starch-based bioplastic using starch, water and glycerol as a plasticizer demonstrates a simple and low-cost approach suitable for undergraduate-level study. The approach also provides an opportunity to develop low-cost, value-added products from locally available biomass. By combining green chemistry with waste utilization, biodegradable plastics can contribute to cleaner production, sustainable resource management and a circular economy. Thus, converting agricultural waste into biodegradable plastics represents an environmentally friendly strategy for reducing dependence on petroleum-based plastics and promoting a cleaner and more sustainable future. This study highlights the potential of locally available agricultural waste as an economical and sustainable raw material for developing eco-friendly alternatives to conventional plastics.

Key words: Biodegradable Plastics, Agricultural Waste, Starch, Sustainable Development, Circular Economy, Biopolymers



**POSTER 76****Microbial Biofertilizers: Advancing Soil Health, Crop Productivity, and Environmental Protection****Barad Kruti, Madhavi Joshi***

Shri D. M. Barad Science College, Ghunsiya (Gir), 362150

Email of Presenting Author: jagdishbarad5325@gmail.comEmail of Corresponding Author: joshimadhavi35@gmail.com**Abstract:**

The intensive use of chemical fertilizers and continuous nutrient extraction have contributed to soil degradation, nutrient imbalance, loss of native microbial communities, soil acidification, nitrate leaching, groundwater contamination, and increased greenhouse gas emissions. These challenges highlight the need for sustainable and biologically driven approaches to nutrient management. Microbial biofertilizers offer an eco-friendly alternative by utilizing beneficial microorganisms that enhance nutrient availability and promote plant growth. Important groups include nitrogen-fixing microorganisms such as *Rhizobium*, *Azotobacter*, and *Azospirillum*; phosphorus-solubilizing and mobilizing microorganisms such as *Bacillus* and *Aspergillus*; potassium and zinc solubilizers such as *Frateruria aurantia*; and plant growth-promoting rhizobacteria (PGPR) such as *Pseudomonas* and *Bacillus subtilis*. Compared with chemical and traditional biofertilizers, advanced microbial biofertilizers can provide targeted nutrient delivery, rapid root colonization, improved nutrient-use efficiency, and greater environmental sustainability. Advanced formulations involving high-density microbial consortia, stabilizing agents, improved carriers, and encapsulation technologies can further enhance shelf life, stability, and field performance. The integration of microbial biofertilizers into modern agriculture can improve soil health, support crop productivity, reduce dependence on chemical fertilizers, and contribute to sustainable and regenerative farming. Future developments should focus on crop- and soil-specific formulations, microbiome engineering, nanotechnology, and multi-strain microbial consortia for precision nutrient management.



Key words: Microbial biofertilizers; Plant growth-promoting rhizobacteria (PGPR); Soil health; Sustainable agriculture; Nutrient solubilization; Nitrogen fixation; Crop productivity;

**POSTER 77****mRNA Vaccines: Revolutionizing Modern Medicine
From Genetic Blueprint to Global Protection****Ishana Parmar, Avni Nandaniya and Dharmesh Sherathia**

School of Vocational Education, Dr. Subhash University, Junagadh, Gujarat, India

Email of Corresponding Author: ishanaparmar3@gmail.com,avniavninandaniya26@gmail.com**Abstract:**

mRNA vaccines represent a transformative platform in modern medicine, using messenger RNA to instruct human cells to produce specific antigens and stimulate an immune response without introducing live pathogens. This poster presents the mechanism, applications, advantages, challenges, and future potential of mRNA vaccine technology. The process begins with identification and synthesis of the gene sequence encoding a target antigen, followed by encapsulation of mRNA within lipid nanoparticles (LNPs) for protection and cellular delivery. Following cellular entry, mRNA is released into the cytoplasm, where it is translated into viral proteins (antigens). These antigens activate the immune system, resulting in antibody production and formation of memory cells for long-lasting protection.

Key advantages include rapid vaccine design and development, high efficacy, absence of live virus, adaptability to emerging variants, and scalable production. Applications highlighted include COVID-19, influenza, Zika virus, cancer immunotherapy, and personalized therapeutic vaccines. Despite these benefits, challenges such as cold-chain requirements, emerging variants, production costs, public hesitancy, misinformation, and the need for continuous research remain. The development workflow includes antigen selection, mRNA synthesis, LNP formulation, preclinical testing, clinical trials, regulatory approval, mass production, and vaccination. Future perspectives include universal vaccines, self-amplifying mRNA, AI- and genomics-assisted vaccine design, therapeutic cancer vaccines, and improved global accessibility. Overall, mRNA technology provides a rapid, flexible, and powerful platform for advancing vaccinology and future biomedical applications.



Key words: mRNA vaccines; lipid nanoparticles; antigen; immune response; COVID-19; vaccinology; biotechnology; cancer immunotherapy; personalized medicine.

**POSTER 78****Probiotic-Derived Postbiotics: Emerging Applications in Human Health****Janhavi H. Parmar, Bansi V. Zala ,Bindu B. Raigar***Department of Microbiology, School of Science, Dr. Subhash University, Junagadh,
362001, Gujarat, India.Email of Presenting Author: janhaviparmar8@gmail.comEmail of Corresponding Author: Zalab727@gmail.com**Abstract:**

Postbiotics are non-viable microbial preparations and their bioactive components that provide health benefits without containing live microorganisms. They include short-chain fatty acids (SCFAs), cell-wall components, proteins, peptides, exopolysaccharides (EPS), enzymes, and other microbial metabolites.

This poster highlights the production, mechanisms of action, health benefits, and emerging applications of probiotic-derived postbiotics. They can be produced through optimized probiotic cultivation, cell separation, controlled inactivation, and subsequent recovery and purification of bioactive components. These compounds can modulate immune responses, strengthen intestinal barrier function, inhibit pathogens, reduce inflammation, and support metabolic health. Compared with live probiotics, postbiotics offer advantages such as greater stability, easier storage and transportation, standardized composition, and reduced concerns associated with administration of live microorganisms. Their potential applications extend to functional foods and beverages, nutraceuticals, pharmaceuticals, cosmeceuticals, and animal health.

However, challenges including standardization, characterization, bioavailability, dosage determination, and regulatory acceptance need to be addressed. Future advances in targeted delivery, identification of bioactive molecules, personalized therapies, and precision nutrition could further expand their clinical potential. Overall, postbiotics represent a promising next-generation, stable, and versatile approach for promoting human health beyond the live microbe.

Key words: Postbiotics; Probiotics; SCFAs; Bioactive metabolites; Exopolysaccharides; Gut health; Immunomodulation; Precision nutrition.

**POSTER 79****Spatial Distribution and Pathogen Load of Urban Pigeons (*Columba livia*): An Ecological Approach to Public Health****Abhijitsingh Kamalia*, Sneha Vegda, Dharmee Doshi, Geera Vala, Urvashi Bhatu**

Department of Zoology and Botany, School of Science, Dr. Subhash University, Junagadh-362001.

Email of Corresponding Author: abhijitchess916@gmail.com , vegdasneha194@gmail.com , dhyey.jee123@gmail.com , geeravala7@gmail.com , bhatuuvashi25@gmail.com**Abstract:**

Urban pigeons (*Columba livia*) are widespread in Indian cities and may act as reservoirs or carriers of pathogens relevant to public health. This proposed five-month study will investigate the spatial distribution, abundance, and pathogen load of urban pigeons in Junagadh city, Gujarat. Different urban habitats, including markets, religious sites, public gardens, residential areas, food-waste locations, and transport hubs, will be surveyed to identify pigeon congregation hotspots. Pigeon abundance and site characteristics such as food availability, waste accumulation, human activity, water sources, and building structure will be recorded and mapped using geographic information system tools. Fresh droppings and, where ethically and legally permitted, suitable biological samples will be collected for laboratory screening of selected bacterial, fungal, and parasitic pathogens. The study will assess associations between pigeon density, environmental conditions, and pathogen occurrence. The findings are expected to provide baseline information on potential pigeon-associated public-health risks in Junagadh and help identify priority sites for waste management, sanitation, public awareness, and urban wildlife-health monitoring.

Key words: Urban pigeons; *Columba livia*; Pathogen load; Spatial distribution; Public health; Junagadh city.

**POSTER 80****Sustainable Treatment of Dye-Contaminated Water Using Spent Tea Waste as a Low-Cost Bio adsorbent****Namrata R. Lakhyani, Fazila Y. Pathan and Megha R. Chovatia**Department of Microbiology, School of Science, Dr. Subhash University, Junagadh,
Gujarat, IndiaEmail of Presenting Author: namratalakhyani29@gmail.com and fazilapathan47@gmail.com**Abstract:**

The discharge of synthetic dyes into aquatic environments is an important environmental concern due to their intense colour and persistence in water. Adsorption using inexpensive biomass-derived materials offers a simple and potentially sustainable approach for dye removal. Spent tea leaves are an abundant household waste material that can be converted into a value-added bioadsorbent. The present study investigates the potential of spent tea waste for the removal of a model synthetic dye from aqueous solution. Spent tea leaves were washed, dried, powdered and used as the adsorbent material. Batch adsorption experiments were designed to investigate the influence of adsorbent dose and contact time under controlled conditions. The residual dye concentration was determined using spectrophotometric/colorimetric analysis, and dye removal efficiency was calculated. The study provides an accessible approach for evaluating the environmental utility of a commonly discarded biomass residue. The proposed waste-to-value strategy connects household waste management with sustainable environmental remediation and may provide a basis for further investigation of plant-derived materials for low-cost water-treatment applications.

Key words: Spent tea waste, bioadsorbent, dye removal, adsorption, waste valorization, sustainable remediation.

**POSTER 81****Synthesis, Characterization, and In Vitro Antimicrobial and Antitubercular Evaluation of Novel Quinoline-Bearing Pyrazolo[3,4-d] pyrimidine Derivatives****Dr. P. M. Singala, Dr. N. M. Panchani, Hetvi B. Chavda**Bahauddin Government Science College, Junagadh

Abstract:

A series of novel pyrazolo[3,4-d] pyrimidine derivatives bearing a quinoline moiety was synthesized and evaluated for their in vitro antimicrobial and antitubercular activities. The target compounds (PMS 601–610) were prepared through a multistep synthetic route involving the preparation of substituted quinoline intermediates, carbohydrazide formation, pyrazolone cyclization, and subsequent condensation with aromatic aldehydes and guanidine hydrochloride. The synthesized compounds were spectroscopically characterized to confirming the proposed structures. The derivatives were evaluated against selected Gram-positive bacteria (*Staphylococcus aureus* and *Streptococcus pyogenes*), Gram-negative bacteria (*Escherichia coli* and *Pseudomonas aeruginosa*), and fungal strains (*Candida albicans*, *Aspergillus niger*, and *Aspergillus clavatus*) using the minimum inhibitory concentration method. Several compounds demonstrated appreciable antimicrobial activity, with PMS 610 showing the most promising broad-spectrum activity. The compounds were further screened against *Mycobacterium tuberculosis* H37Rv, where PMS 610 exhibited the highest inhibition (94%) among the synthesized derivatives.

Key words: pyrazolo[3,4-d]pyrimidine, quinoline, carbohydrazide, guanidine hydrochloride antimicrobial activity

**POSTER 82****Valorization of Potato Peel Waste into Biodegradable Bioplastic Film: A Sustainable Approach to Food-Waste Utilization****Yukti J. Katariya, Hijara I. Hala and Megha R. Chovatia**Department of Botany and Zoology, School of Science, Dr. Subhash University, Junagadh,
Gujarat, IndiaEmail of Corresponding Author: yuktikataririya920@gmail.com and halahiju5@gmail.com**Abstract:**

The increasing accumulation of petroleum-based plastic waste has created a need for biodegradable alternatives derived from renewable resources. At the same time, potato peels are generated in large quantities as household and food-processing waste and are often discarded despite containing starch and other plant-derived polymers. The present study explores the potential of potato peel waste as a raw material for the preparation of biodegradable bioplastic film. Washed and dried potato peels were processed into powder and incorporated into a film-forming formulation containing different concentrations of glycerol as a plasticizer. The prepared films were evaluated for selected physical properties, including thickness, flexibility and water absorption, along with their biodegradation under soil conditions. Variation in glycerol concentration was considered to determine its influence on film characteristics and degradation behaviour. The study aims to demonstrate a simple and low-cost waste-to-value approach for converting potato peel into a potentially biodegradable material. This approach highlights the potential of food waste valorization in supporting sustainable material development, reducing dependence on conventional plastics and promoting principles of circular bioeconomy.

Key words: Potato peel waste, bioplastic, glycerol, biodegradation, waste valorization, circular bioeconomy

**POSTER 83****Green Chemistry & Sustainability: A Path Towards a Greener Future****Ritu Odedra, Shivani Odedra, Hirva Kumbhani, Ruhi Karangiya**Department of Chemistry, School of Science, Dr. Subhash University, Junagadh.
362001 Gujarat, India.Email of Corresponding Author: reeee261l@gmail.com**Abstract:**

Background: Environmental pollution, climate change, and depletion of natural resources are major challenges of the 21st century. Conventional chemical processes often generate hazardous waste, consume large amounts of energy, and use toxic substances. Green chemistry has emerged as an effective approach to reduce these environmental impacts by designing safer and more sustainable chemical processes and products.

Methods: A review-based study was conducted using information collected from research articles, scientific databases, journals, and reputed websites. The principles of green chemistry, sustainable chemical processes, renewable resources, safer solvents, energy-efficient reactions, and waste reduction strategies were studied. Their environmental benefits and practical applications were also evaluated.

Results: Green chemistry approaches such as waste prevention, atom economy, use of renewable feedstocks, catalysis, safer solvents, and energy-efficient processes can significantly reduce pollution and resource consumption. These approaches have important applications in pharmaceuticals, polymers, agriculture, energy, and industrial manufacturing. However, high initial costs, technological limitations, and the need for improved infrastructure remain some of the major challenges.

Conclusion: Green chemistry provides a promising pathway toward sustainable development by minimizing hazardous substances, reducing waste, conserving energy, and protecting natural resources. With continued research, technological advancement, and proper implementation, green chemistry can play a crucial role in creating a cleaner, safer, and more sustainable future.



Key words: Green chemistry, sustainability, renewable resources, waste reduction, green technology, environment

**POSTER 84****Influence of Physicochemical Parameters on the Distribution of Culturable Marine Bacteria along the Gujarat Coast, India****Riya Gami and Pradip Kachhiya**

Dr. Subhash University Junagadh Gujarat

Email of Presenting Author: Gamiriya026@gmail.comEmail of Corresponding Author: Pradip.kachhiya@dsuni.ac.in**Abstract:**

Marine environments are constantly changing ecosystems where environmental factors significantly influence the growth and spread of microorganisms. Marine bacteria are crucial parts of coastal areas and play key roles in nutrient recycling, breaking down organic materials, and maintaining the health of the ecosystem. This study seeks to explore how certain physical and chemical factors affect the distribution of bacteria that can be grown in the lab along the selected site of Gujarat coast in India. Water samples will be gathered from various coastal sites that show different environmental settings. At each site, important physical and chemical properties such as water temperature, salt concentration, acidity level, oxygen content, and water clarity will be measured. Marine bacteria that can be cultured will be separated and counted using typical microbiology methods. Techniques like serial dilution and spread plating will be applied with suitable marine growth media, and the number of bacteria will be reported as colony-forming units per millilitre (CFU/mL). The connection between these environmental factors and the number of bacteria will be examined using correlation analysis. Additionally, regression analysis will be used to find out which environmental factors might affect changes in bacterial abundance and where they are found. This research is expected to offer foundational insights into how the quality of coastal waters relates to populations of culturable marine bacteria. The results could support efforts to monitor marine ecosystems, evaluate coastal conditions, and guide future research on microbial diversity in the coastal areas of Gujarat.

Key words: Marine bacteria, Gujarat coast, Physicochemical parameters, Culturable bacteria, CFU/mL, Coastal ecosystem, Water quality

**POSTER 85****Carbon Footprint and How to Reduce it****Krishna Patoliya, manavar hetsavi and suva hemanshi, Chirag Bhut**

Department of Chemistry, Dr. Subhash University, Junagadh

Email of Corresponding Author: Krishna.patoliya4125@gmail.com**Abstract:**

Traditional climate strategies focus on long-term emissions targets, neglecting cumulative CO₂ emissions and often limiting their scope to territorial emissions. Additionally, individual citizens struggle to connect with community targets. This study addresses these issues by computing a comprehensive carbon footprint pathway that, as a main contribution, can be easily personalized and associated with common carbon footprint calculators. This approach innovatively leverages inverted “S-shaped” patterns based on logistic functions that, unlike common linear patterns, have been documented as relevant for diffusion mechanisms of social or ecological transformations. One challenge lies in efficiently aligning the carbon footprint figures, expressed in CO₂eq, with IPCC’s +2 °C carbon budgets, expressed in CO₂-only. This work first retrieves the current share of CO₂-only footprint and then defines two mitigation pathways: one focusing solely on CO₂ emissions and one addressing residual GHGs. Except for initial and final emission levels, both targeted pathways are defined by the same logistic function, based on the assumed intrinsic link between CO₂ and the other GHGs. As final targets, the CO₂-only pathway considers the common net-zero emission goal while the second pathway considers a level of 1 tCO₂eq/year per capita of unmitigated non-CO₂ emissions, in alignment with IPCC’s latest assumptions and anticipated population growth. Besides the new +2 °C compatible suggested pathways, developing this method for France and Wallonia has also revealed that they should reach territorial (nature-based) carbon uptake of at least three times their current levels, necessitating deep land-use changes in their policies (implementing intensive urban vegetation, alternative agriculture techniques, etc.).

Key words: carbon budget; carbon footprint; greenhouse gases; territorial absorption; nationally determined contributions; imported emissions; carbon uptake; energy transition; mitigation pathways; SDG; climate action.

**POSTER 86****Comparative Evaluation of Flower Extracts for Natural pH Indicator
Development****Bhakti B. Bhuva, Sakshi N. Naghrea, Riya M. Der, Vishakha D. Barad,
Megha R. Chovatia**Department of Lifesciences, School of Science, Dr. Subhash University, Junagadh,
Gujarat, IndiaEmail of Corresponding Author: bhaktibhuva75@gmail.com**Abstract:**

Natural plant pigments have attracted attention as simple and eco-friendly alternatives to synthetic chemical indicators. In this study, flower extracts were explored for their ability to act as natural pH indicators. Pigments were obtained from selected flowers using a simple water-based extraction method and tested with different acidic, neutral, and alkaline solutions. The colour changes produced by the extracts were observed and compared with the pH of the respective solutions. The flower extracts showed noticeable changes in colour under different pH conditions, mainly due to the presence of naturally occurring anthocyanin pigments. The experiment demonstrates that commonly available flowers can be used to prepare a simple, inexpensive, and biodegradable pH indicator. This approach can be useful for basic acid–base testing, laboratory demonstrations, and science education. The study also highlights the potential of using easily available plant materials as sustainable alternatives to conventional synthetic indicators.

Key words: Natural indicator, Flower extract, Anthocyanins, pH, Green chemistry

**POSTER 87****Utilization of Rice-Washing Water as a Low-Cost Plant-Based Nutrient
Supplement for Early Seedling Growth****Charmi P. Vaghera, Sandhya D. Ambaliya, Riya M. Makawana and Megha
R. Chovatia**Department of Lifesciences, School of Science, Dr. Subhash University, Junagadh,
Gujarat, IndiaEmail of Corresponding Author: charmivaghera@gmail.com, sandhyaambaliya73@gmail.com
and riyamakwana822@gmail.com**Abstract:**

Rice washing generates considerable quantities of nutrient-containing wastewater that are commonly discarded without further utilization. This readily available household by-product contains soluble organic and mineral components that may influence plant growth. The present study explores the potential of rice-washing water as a low-cost supplementary resource for early plant development. Rice-washing water is collected and applied at different concentrations to a rapidly germinating plant species, with distilled water used as the control. Seed germination and early seedling growth are evaluated through parameters including germination percentage, root length, shoot length and seedling biomass. Comparative assessment of different treatment concentrations is used to determine whether rice-washing water has a concentration-dependent influence on early plant development. The study presents a simple approach for converting a commonly discarded household wastewater stream into a potentially useful plant-growth resource. This work highlights the importance of household wastewater reuse and supports sustainable, low-cost approaches to plant cultivation within the broader framework of resource recovery and circular bioeconomy.

Key words: Rice-washing water, seed germination, seedling growth, wastewater reuse, plant growth, sustainability, circular bioeconomy



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