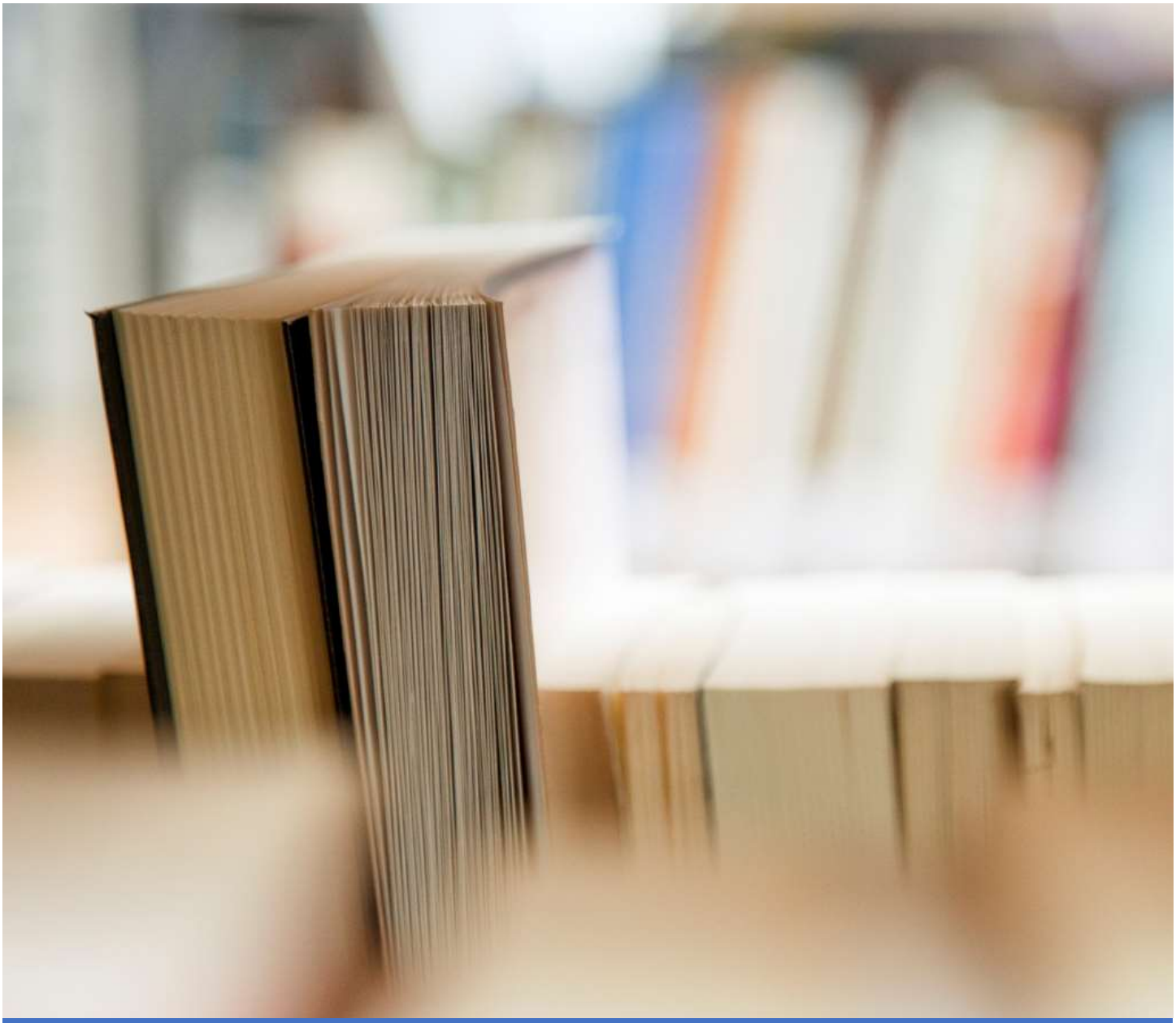

ABSTRACT BOOK

6th International Conference
SCIENTIFIC OUTLOOK OF SUSTAINABLE DEVELOPMENT GOALS

Women University Mardan East Canal Road Mardan IC-SOSDG-24

Women University Mardan

6th international Conference
(IC-SOSDG-2024)

ABSTRACT BOOK

6th International Conference

SCIENTIFIC OUTLOOK OF SUSTAINABLE DEVELOPMENT GOALS (IC-SOSDG-24)

15-16th January, 2024

PUBLISHER:
Women University Mardan
ISBN: 978-969-23721-14

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WOMEN UNIVERSITY MARDAN

Women University Mardan

6th international Conference
(IC-SOSDG-2024)

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Women University Mardan

6th international Conference
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Message of Vice Chancellor

Good morning and Assalam o alaikum

I welcome you all to the 6th International Conference on the **Scientific Outlook of Sustainable Development Goals**. I extend a heartfelt welcome to all of you who have joined us for this significant occasion. I am particularly delighted to welcome our chief guest Mr. Najeebullah Marwat, Minister for Science and Technology Khyber Pakhtunkhwa, the representatives of our collaborators Mr. Murtaza Noor, Advisor Comstech, and Dr. Saqib Nasir, Director P&D PSF, and Pastic. Equally, I extend a warm welcome to our distinguished International keynote speakers, Prof. Dr. Faiz Ahmad from Universiti Teknologi PETRONAS, Malaysia, Prof. Dr. Turan Ozturk from Istanbul Technical Universiy Turkey and Prof, Dr, Amir Habib from university of Hafr al Bati. I am grateful to our national keynote speakers Prof. Dr. Irshad Hussain from SBA School of Science and Engineering, LUMS, Dr. Arshad Hussain from Pak Austria Fachhochsule Institute of Applied Sciences and Technology, Haripur, and Dr. Anwar-Ul- Hassan Gilani, consultant Higher Education Commission of Pakistan. I also extend a very warm welcome to our participants and organizers of this 6th international conference.

As we have gathered today for the 6th International Conference on the Scientific Outlook of Sustainable Development Goals, I stand before you as a fellow advocate for a sustainable and equitable future. This conference is not merely a gathering; it is a collective effort to harness the power of science and innovation in meeting the challenges outlined by the Sustainable Development Goals (SDGs).

This conference, centered around the Sustainable Development Goals, reflects the shared commitment of our academic community to address critical global challenges. The SDGs, ranging from poverty eradication to climate action, encapsulate the aspirations for a better and more sustainable world. Scientific research and knowledge form the foundation upon which we can build a more sustainable future. As we delve into the scientific outlook of SDGs during this conference, let us recognize the role of science in shaping policies, influencing decision-making, and fostering sustainable practices. It is through scientific research and technological advancements that we can ensure no one is left in poverty, everyone has access to good health, and our planet thrives in a balanced ecosystem

Women University Mardan is convinced of administering high-quality education to its students. Taking into account the importance of educating women, Women University Mardan has always shown a keen interest in upholding education and empowering women through it. In connection to this motto, it has always prioritized research-based and scientific education. This conference is a testament to the diligent work of Women University Mardan in producing and representing educated and empowered women. Besides organizing and hosting various national and international seminars, conferences, and workshops, Women University Mardan enjoys the privilege of successfully running six HEC-recognized research journals in the fields of biological sciences, social sciences, arts and humanities, and Islamic and oriental studies. These research platforms act as unifying grounds where researchers, scholars, and practitioners converge to share knowledge, exchange ideas, and collaboratively seek solutions.

As scholars, researchers, and educators, our collective efforts can pave the way for innovative solutions and meaningful progress. Therefore, I encourage everyone here to actively engage in the conference, share knowledge, that will lead to impactful outcomes. Together, let us strive for a world where the principles of sustainable development guide our actions and decisions.

Thank you and God Bless you all.

Message of Chief Guest

Respected Vice Chancellor Women University Mardan Prof. Dr. Ghazala Yasmeen, our esteemed International and National keynote speakers, The whole organizing team of International Conference on‘Scientific Outlook on Sustainable Development Goals’ and dear participants, a very good morning to all of you. Today we are present here on the occasion of the opening ceremony of this conference of international essence.

Being the Minister of Science and Technology and IT, Government of Khyber Pakhtunkhwa, I take immense pride in Women University Mardan which has leaped forward in organizing an International Conference that encompasses various themes related to the fields of sciences to address the basic and advanced issues faced by our fellow beings and pointed by SDGs. It is a moment of pleasure for us to witness a university that has signed up to work on the importance of the SDGs forwarded by United Nations for securing a better future for humanity. In this connection, the sixth International Conference on ‘Scientific Outlook on Sustainable Development Goals’ will actas a unified platform that has brought together various scholars and scientists from Malaysia, Saudi Arabia and Turkey as well as national scholars to talk on the subject at hand. This conference will help in the adoption of certain steps that would prove instrumental in reducing poverty, hunger and other differences among the standards of living for human beings. The diverse themes that this conference carries comprise issues and trends that are much needed to be talked about.

Women University Mardan since its establishment in 2016 has put the importance of scientific and research based education on top of its list. Women University Mardan is benefaction for the daughters and mothers of Mardan for it is producing an educated lot of scholarswho would play their due role in conditioning the upcoming generations and would not settle for anything less than seeking quality education for them.

The Ministry Science and Technology, Khyber Pakhtunkhwa will take every possible stepin favoring this prestigious university and making it a hub of education and a haven for not only the women of Mardan but would try to uplift its standard to the mark where it can attract even foreign students. We will work together hand inhand to facilitate an efficient educational system in the best interest of the people of Pakistan. I pray we witness the forever dawn of this university.

Thank you, goodbye.

Message of Principal Organizer

As the host of the 6th International Conference, "Scientific Outlook of Sustainable Development Goals (IC-SOSDG-2024)," I have the great honor of extending a warm welcome to each and every one of you on January 15 and 16, 2024, in Islamabad, Pakistan. The goal of this conference is to compile best practices in order to accelerate SDG action.

Dr. Rakhshinda Sadiq
Assistant Professor/ Chairperson
Department of Biochemistry
Women University Mardan

Message of Dr. Hina Jabeen

Dear Colleagues,

I am writing to inform you about an exciting event that we are organizing - the SDGs Conference. As the Principal organizer, I am thrilled to invite you all to be a part of this important gathering that aims to create awareness and drive action towards achieving the Sustainable Development Goals.

The SDGs Conference will bring together experts, policymakers, researchers, and activists from around the world to discuss innovative strategies, share best practices, and collaborate on solutions for advancing the SDGs. Our ultimate goal is to catalyze transformative change and accelerate progress towards a more sustainable future.

During this conference, there will be engaging keynote speeches, panel discussions, workshops, and interactive sessions to encourage active participation and knowledge sharing. This will be an excellent platform to network, build partnerships, and learn from each other's experiences.

Hope you enjoy networking with experts, high profile people, and exploring opportunities for your future on this forum.

Best of Luck

Dr. Hina Jabeen
Assistant Professor/ Chairperson
Department of Biotechnology
Women University Mardan

As Principal Organizer, my warmest welcome to all International and National dignitaries and delegates for 6th International Conference; Scientific Outlook of Sustainable Development Goals (IC-SOSDG-2024). The overarching message that I wish to convey to is the immense importance of our collective efforts in addressing the challenges presented by the SDGs. The SDGs serve as a comprehensive blueprint for our world, aiming to tackle pressing issues such as poverty eradication, affordable & clean energy, climate change, health and well-being, education, and economic growth. These goals will shape the future of our planet and influence the lives of billions of people. It is crucial that we leverage the power of science to drive meaningful and impactful change.

At this conference, I am honored to have gathered a diverse and distinguished group of experts, researchers, policymakers, and practitioners who share a common commitment to advancing science in pursuit of sustainable development. We have curated a program that encompasses a wide range of topics related to scientific advancements, innovations and technological developments. Through thought-provoking presentations and engaging discussions, we hope to foster innovative solutions and inspire new partnerships that will help us make significant progress towards achieving the SDGs.

I would like to express my heartfelt gratitude and special appreciation to our Honorable Vice Chancellor, all the organizers, sponsors, and partners for their commitment and superb drive to make this conference successful. Let us embark on this journey together, united by our shared commitment to science, sustainability, and the SDGs. May this conference serve as a catalyst for transformative action, paving the way for a more just, equitable and sustainable world.

Welcome, and I wish you all a fruitful and inspiring conference.

Dr. Naila Zubair
Assistant Professor/Chairperson
Department of Chemistry
Women University Mardan

Message by Dr. Monazza Serwar

As a principal organizer of the 6th International Conference on “Scientific Outlook of Sustainable Development Goals”, the journey was both challenging and rewarding. The primary objective was to bring together diverse stakeholders, fostering dialogue and collaboration to address pressing global issues outlined in the SDGs.

The conference opened with a keynote address emphasizing the urgency of achieving sustainable development. The interdisciplinary nature of the SDGs was a focal point, inspiring participants to break down silos and collaborate across sectors. Workshops and panel discussions facilitated in-depth conversations, providing a platform for experts, policymakers, and practitioners to share insights.

Ensuring inclusivity was paramount. The conference incorporated diverse voices, including those from marginalized communities, to enhance the richness of perspectives. This approach not only aligned with the ethos of the SDGs but also amplified the call for equity and justice in sustainable development efforts.

In terms of logistics, prioritizing sustainability was a guiding principle. From venue selection to catering, efforts were made to minimize the conference's environmental footprint. Digital platforms were leveraged for virtual participation, reducing the carbon footprint associated with travel.

The success of the conference was measured not only by the number of attendees but by the tangible outcomes. Collaborative initiatives were launched, partnerships formed, and commitments made towards achieving specific SDGs. The impact extended beyond the event, creating a ripple effect in communities and organizations worldwide.

Reflecting on this experience, it is evident that organizing a SDGs conference requires strategic planning, effective communication, and a commitment to the values embedded in the goals. The role of a principal organizer goes beyond logistics; it involves catalyzing a collective vision for a more sustainable and equitable future.

Dr. Monazza Serwar
Assistant Professor
Department of Chemistry
Women University Mardan

Acknowledgement

The conference organizing committee on Two-Day 6th International Conference, "Scientific Outlook of Sustainable Development Goals" held on 15-16th January 2024 want to extend its heartfelt gratitude for the invaluable contribution of the well re-known international/ national professors;

1. Prof. Dr. Turan Ozturk, Istanbul Technical University Turkey
2. Prof. Eng. Dr. Faiz Ahmad, Professor (Full) at Universiti Teknologi PETRONAS, Malaysia
3. Prof. Dr. Amir Habib, Department of Physics, University of Hafr al Batin, Saudi Arabia
4. Dr. Anwar-ul-Hassan Gilani, *PhD (Sydney)Pride of Performance, S.I.; H.I.*, Consultant, Higher Education Commission, Distinguished National Professor, Former Vice Chancellor, University of Haripur & Former Chairman, Pakistan Council for Science & Technology
5. Dr. Irshad Hussain (FRSC), Professor, Department Chair, Department of Chemistry & Chemical Engineering, SBA School of Science & Engineering, Lahore University of Management Sciences (LUMS), Lahore
6. Dr. Arshad Hussain, DEAN, Pak Austria Fachhochschule Institute of Applied Sciences & Technology, Haripur
7. Dr. Humaira Masood Siddiqi, Professor, Quaid-I-Azam University, Islamabad
8. Prof. Dr. *Naseem Iqbal*, Department Energy System Engineering USPCAS-E, National University of Sciences & Technology, Islamabad
9. Dr. Zaman Ashraf, Professor, Head of Department, Chemistry, Rawalpindi Women University, Rawalpindi
10. Dr. Saifullah, Chief Scientific Officer, National Centre for Physics, Islamabad
11. Dr. Lubna Rasheed, Associate Professor, Rawalpindi Women University, Rawalpindi

The unique perspective of the speakers added immense value to the overall success of the conference. Their involvement played a crucial role in making "Scientific Outlook of Sustainable Development Goals" a memorable and enriching experience for all.

We acknowledge their outstanding contribution in the conference & hope to have the pleasure of welcoming them as a speaker in our future events.

Further, we recognize the generous support and collaborative spirit of the Organization of Islamic Cooperation Standing Committee on Scientific and Technological Cooperation (COMSTECH), Islamabad & Pakistan Scientific & Technological Information Centre (PASTIC) for their sponsorship/collaboration that not only facilitated the realization of the objectives of the conference but also enhanced the quality of the event.

Thank you, all & Best Wishes.

Organizing Committee

- Chief Organizer
  Prof. Dr. Ghazala Yasmeen (Vice Chancellor)
- Principal Organizers
  - Dr. Monazza Serwar (Assistant professor, Department of Chemistry)
  - Dr. Naila Zubair (Assistant professor, Department of Chemistry)
  - Dr. Rakhshinda Sadiq (Assistant professor, Department of Biotechnology)
  - Dr. Hina Jabeen (Assistant professor, Department of Microbiology)
- Organizing Members
  - Dr. Neelum Zeb (Assistant professor, Department of Biotechnology)
  - Dr. Aisha Siddique (Assistant professor, Department of Microbiology)
  - Ms. Mariam Ahmed Mujtaba (Lecturer, Department of Biotechnology)
  - Ms. Tamana (Lecturer, Department of Chemistry)
  - Ms. Hoor Shumail (Lecturer, Department of Microbiology)

Conference Preface

An international conference is organized every year at Women University Mardan to cover a wide range of topics related to scientific advancements, innovation and technological developments in multidisciplinary areas to meet the sustainable development goals. This conference will invite presentations and discussion on the latest advancements & breakthrough in sciences & technology including Chemical & Materials science, Biological science, Food & Health Science, Computing & Numerical science exploring various opportunities for National and International collaborations, knowledge sharing, joint research projects and building partnerships between academia, industry, technologists and R & D organizations. The outcome of the conference will be translation of scientific knowledge to practical implications benefiting the society at large.

Steered SDGs

- No Poverty (SDG-1)
- Zero Hunger (SDG-2)
- Good Health & Well-being (SDG-3)
- Clean Water & Sanitation (SDG-6)
- Affordable & Clean energy (SDG-7)
- Industry, Innovation and Infrastructure (SDG-9)
- Climate Action (SDG-13)
- Partnership for Goals (SDG-17)

Conference Features

- Technical Session
- Poster Presentations

Mode of Conference

Hybrid

Women University Mardan

6th international Conference
(IC-SOSDG-2024)

Tentative Program

on

DAY-I

15th January, 2024 (Monday)

IMPORTANT NOTE:

*Delivery Module: The online link (Google Meet) to presentations will be shared with Participants via **ALL** WhatsApp groups. The participants may attend the presentation online from their workplace (No physical session).*

Online Technical Session-I ***2: 00 - 5: 00 PM***		
Presenter 1: Kifayat Ullah, Department of Chemistry, Kohat University of Science & Technology (KUST), **Title of Talk**: Synthesis and Characterization of Carboxymethyl Cellulose-Alginate Hydrogel for the Removal of Methylene Blue from Aqueous	2.00-2.10 PM	1
Presenter 2: Faheem Ullah, Kohat University of Science and Technology Kohat **Title of Talk:** Labeo rohita skin mucus antimicrobial activity against streptococcus pyogenes	2.10-2.20 PM	2
Presenter 3: Dr. Almas Abbasi, International Islamic University **Title of Talk:** AI-Driven Transformation of Water Management: A Holistic Approach to Addressing Challenges in Southeast Asia	2.20-2.30 PM	3
Presenter 4: Dr. Syeda Nadia Ahmad, University of Chakwal **Title of Talk:** Amelioration By Morus Nigra Fruit Extract On Testes, Seminiferous Tubules And Spermatic Cells By Chromium Induced Histopathologies In Mice	2.30-2.40 PM	4
Presenter 5: Hafsa Bibi, Kohat University of Science and Technology Kohat **Title of Talk:** Antibacterial activity of Gold fish mucus against Salmonella typhi	2.40-2.50 PM	5
Presenter 6: Maryam Almas, Kohat University of Science and Technology Kohat **Title of Talk:** Antibacterial activity of koi fish skin mucus against staphylococcus aureus	2.50-3.00 PM	6
Presenter 7: Dr. Moazama Batool, Government College Women University, Sialkot **Title of Talk:** Assessment of insecticides induced organ impairment in Cyprinus carpio through biochemical and histological analysis	3.00-3.10 PM	7
Presenter 8: Umme Habiba, University of Management & Technology **Title of Talk:** Harmonizing Science and Sustainability: Unveiling Innovative Approaches in the Pursuit of Global Development Goals	3.10-3.20 PM	8

Presenter 9: Dr. Qurat Ul Ain, Government College Women University, Sialkot **Title of Talk:** Histopathological alterations and oxidative stress associated with Chlorpyrifos and Bifenthrin in Hypophthalmichthys molitrix	3.20-3.30 PM	9
Presenter 10: Dr. Maryam Zain, The Women University Multan **Title of Talk:** Production of antibacterial and antifungal lotion by using CuO nanoparticles	3.30-3.40 PM	10
Presenter 11: Qasim Khan, Kohat University of Science and Technology Study Of Gram-Negative Bacterial Pathogens Associated with Infected Fish Skin	3.40-3.50 PM	11
Presenter 12: Prof. Dr. Shabnam Gull, Hira Bashir, Lahore College for Women University **Title of Talk:** Water Conservation Methods: A Study of Rain Water Harvesting	3.50-4.00 PM	12
Presenter 13: Dr. Mehnaz, Women University Mardan **Title of Talk:** Local Meshless Collocation Scheme Based of Radial Basis Functions for Numerical Solution of Space Fractional PDE	4.00-4.10 PM	13
Presenter 14: Rafia Rahman, Kohat University of Science and Technology **Title of Talk:** Molecular Analysis of Intellectua lDisability in Families From District Hangu.	4.10-4.20 PM	14
Presenter 15: Faiza Zulfiqar, Lahore University of Management Sciences **Title of Talk:** Electro-synthesis of Valuable Products by Coupling Energy-saving Anodic Alcohol Oxidation Reaction with Cathodic CO_2 Reduction Reaction	4.20-4.30 PM	15
Presenter 16: Dr. Huma Naqeeb, Department of Human Nutrition & Dietetics, Women University Mardan **Title of Talk:** Dietary Strategies for Metabolic Syndrome: A comprehensive review	4.30-4.40 PM	16
Presenter 17: Dr. Sumaira Saleem Akhtar, Department of Mathematics, Women University Mardan **Title of Talk:** Positive Energy Condition & Conservation Laws in Kantowski-Sachs Space time via Noether Symmetries	4.40-4.50 PM	17
Presenter 18: Dr. Muhammad Arshad, Department of Mathematics, Abbottabad University of Science & Technology **Title of Talk:** An efficient domain decomposition approach for Darcy flow with pressure dependent permeability	4.50-5.00 PM	18
Total	2.00-5.00 PM	**18**

Important Note: *E-Certificates will be distributed to all Online Presenters & Online Participants.*

Women University Mardan

6th international Conference
(IC-SOSDG-2024)

Tentative Program Layout

On

DAY-2

On 16th January, 2024 (Tuesday)

Program	**Time**
Participants to be Seated	8.30-9.00 AM
Guests Arrival	09.00 - 09.30 AM
Opening Ceremony: 09: 30 - 11.00 AM	
• Recitation	09.30 - 09.40 AM
• Nation Anthem of Pakistan and Turkey	09.40 - 09.50 AM
• Opening Remarks of Vice Chancellor	09.50-10.00 AM
• Remarks of Chief Guest	10.00-10.15
• Remarks of Keynote Speakers	10.15-10.45 AM
• Remarks of Principal Organizer	10.45-10.55 AM
Presentation of Souvenir & Group Photo	
Tea Break: 11.00-11.30 PM	
Technical Session-II & III (Parallel Sessions)	11: 30- 1: 30 PM
Technical Session-IV (Poster Session)	11.30- 3: 00 PM
Lunch & Prayer Break: 1.30-2.30 PM	
Technical Session-V & VI (Parallel Sessions)	2.30-.4:30 PM

Important Note: *Certificates Distribution will be carried out at the end of each technical session.*

Women University Mardan

6th international Conference
(IC-SOSDG-2024)

Tentative Detailed Program

Program	**Time**	
Participants to be Seated	8 :00-9**:** 00 AM	
Guests Arrival	09**:**00 - 09**:**30 AM	
Opening Ceremony: 09: 30 - 10.30 AM		
Recitation	09**:**30-09**:**40 AM	
Nation Anthem of Pakistan and Turkey	09**:**40-09**:**.50 AM	
Opening Remarks of Vice Chancellor	09**:**50-10**:**00 AM	
Remarks of Chief Guest	10**:**00-10**:**15 AM	
Remarks of Keynote Speaker: Prof. Dr. Turan Ozturk	10:15 – 10:25 AM	
Remarks of Keynote Speaker: Dr. Irshad Hussain	10:25 – 10: 35 AM	
Remarks of Keynote Speaker: Dr. Arshad Hussain	10**:** 35 – 10**:** 45 AM	
Remarks of Principal Organizer: Dr. Rakhshinda Sadiq	10:45-10.55 AM	
Presentation of Souvenir & Group Photo		
Tea Break: 11.00-11.30 PM		
Technical Session-II & III (Parallel Sessions): 11.30-1.30 PM		
Technical Session-II (Hall-A)		***S. No.***
Session Chair: Prof. Dr. Humaira Masood Siddiqi **Session Co-Chair:** Prof. Dr. Naseem Iqbal		
Keynote Speaker-I: Prof. Dr. Turan Ozturk, The Scientific and Technological Research Souncil of Turkey – National Metrology Institute (TUBITAK – UME) **Title of Talk:** Thienothiophenes and dithienothiophenes for organic electronics and optoelectronics	11**:**30-12**:** 00 PM	1
Invited Speaker- I: Dr. Saifullah, Chief scientific officer, National Centre for Physics. **Title of Talk:** Man Made Materials-Manlike Properties	12**:**00 - 12: 20 PM	2
Invited Speaker-II: Prof, Dr. Humaira Masood Siddiqi, Department of Chemistry, Quaid-I-Azam University, Islamabad **Title of Talk:** Polyimides as functional materials towards sustainable development goals	12: 20 - 12: 40 PM	3
Keynote Speaker-II: Prof. Dr. Anwar-Ul-Hassan Gilani, Consultant, Higher Education Commission, H-9, Islamabad.	12: 40 - 1: 10 PM	4

Title of Talk: STI and three pillars of sustainable development		
Invited Speaker-III: Prof. Dr. Zaman Ashraf, Rawalpindi Women University, Rawalpindi. **Title of Talk:** Development of highly potent tyrosinase inhibitors	1: 10 - 1: 30 PM	5
Technical Session-III (Hall-B)		
Session Chair: Prof. Dr. Irshad Hussain		
Session Co-Chair: Prof. Dr. Arshad Hussain		
Keynote Speaker-III: Prof. Dr. Irshad Hussain, Lahore University of Management Sciences (LUMS) **Title of Talk:** Functional Nanomaterials - Tuning the Size and Surface Chemistry for Applications in Renewable Energy Technologies, Biomedical and Environmental Sciences	11:30-12: 00 PM	6
Keynote Speaker-IV: Prof. Dr. Arshad Hussain, Pak-Austria Fachhochschule, Haripur **Title of Talk:** Application of Membrane Technology for CO_2 capture.	12:00 - 12: 30 PM	7
Invited Speaker I: Prof. Dr. Naseem Iqbal U.S.-Pakistan Center for Advanced Studies in Energy (*USPCAS-E*) at the National University of Sciences and Technology. **Title of Talk**: MOF/ZIF Derived Heterostructured electrode materials for energy conversion and storage applications	12: 30 – 12: 50 PM	8
Invited Speaker-II: Dr. Hammad Majeed, UMT Sialkot Campus **Title of Talk:** Sustainable Textile Innovations for Climate Change Mitigation	12: 50- 1: 10 PM	9
Invited Speaker-III: Dr. Lubna Rasheed, Rawalpindi Women University, Rawalpindi **Title of Talk:** The Fluorescent Frontier in Ionic and molecular Sensing	1: 10 – 1: 30 PM	10
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Poster 1: Global Unity for Climate Action: A Focus on SDG-13 and COP-28 Shafiqat Rasool, International Islamic University Islamabad, (IIU)		
Poster II: Innovative Approaches to Galena Ore Processing for Silver, Gold & other Metals Extraction Dr. Sadia Mehmood & Fiza Malik Pak Austria fachhochschule (Institute of Applied Sciences and technology		
Poster III: An AI-Powered E-Stethoscope Singular Probe Solution for Comprehensive Cardiopulmonary Diagnostics Muhammad Hasan Masrur, Rana Talha Khalid, Khair Ul Wara Riphah International University (Lahore campus)		
Poster IV: Association of LFTs and RFTs with COVID susceptibility in IGRA positive subjects Sonia Bibi, Marium Ahmed Mujtaba, Muhammad Ishaq Javed and Sadia Saeed, PMAS Arid Agriculture University, Rawalpindi		
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Poster VI: Endophytic Fungi from Chlorophytum Comosum: Metabolites and Bioactivity against Multidrug Resistant Bacteria Saman Ali1, Abdul Rehman1, Muhammad Qasim1, Anwar Hussain2 Kohat University of Science and Technology (KUST)
Poster VII: Fabrication and characterization of gum arabic- and maltodextrin-based microcapsules containing polyunsaturated oils Sajeela Akram, Yiwen Bao, Masood Sadiq Butt, Rizwan Shukat, Arslan Afzal, Jen-Yi Huangb, University of Chakwal
Poster VIII: Isolation and Characterization of Fungi from the Rhizosphere and Bulk Soil of Zea Mays L. Abdullah, Abdul Wali Khan University Mardan
Poster IX: Need for an Explicit Health Policy by Low-and Middle-Income Countries for LTBI Management: a review Mariam Ahmed Mujtaba, Pranabashis Haldar, Matthew Richardson, Sadia Saeed, Women University Mardan
Poster X: Development of High-Performance Nanomaterials-based Gas Sensor for the Detection of Gases of Industrial Importance Naila Zubair*, Ayesha Ajmir, Aliba Faiz Department of Chemistry, Women University Mardan
Poster XI: Review on "Significance of sustainable climate action and influence on other sustainable development goals" Marwa Hidayat, Uzma, Parkha Ali, Rabia Riaz, Hina Jabeen, Rakhshinda Sadiq, Women University Mardan, Mardan, Khyber Pakhtunkhwa
Poster XII: Synthesis and Characterization of Nanosilica from Sandstone and Laterite Safeena Khattak, Abdul Wali Khan University Mardan
Poster XIII: Synthesis of magnetic Ag/GO-Fe_3O_4 nanocomposite for solid phase extraction of Tetracyclines Jawaria Anjum, Syeda Aliya Shehzadi, Muhammad Sajid, Muhammad Sajjad, Ayesha Siddique, Khizra Abdul jabbar International islamic university islamabad
Poster XIV: Synthesis of Monodispersed Fine particles of Zinc Oxide for in-Vitro Evaluation of Antibacterial activity Naila Zubair, Hira Zubair , Department of Chemistry, Women University Mardan
Poster XV: Use of protein-polysaccharides based delivery system for improve survival of probiotics Iqra Yasmin, Muhammad Saeed
Poster XVI: Responses of engineered biochars on Pb accumulation and plant growth in Brassica chinensis L. and Pennisetum polystachion L. in a co-planting system- a greenhouse study Muhammad Rizwan, Ghulam Murtaza, Zeeshan Ahmed , Qimei Lin, Xuejiao Chen, Imran Khan, Lijian Leng, Hailong Li, Central South University, Changsha, China
Poster XVII: Induction of Heat Stress Tolerance in Zea mays L. by using Endophytic Fungus Isolated from Selected Heat Tolerant Plants Uroosa Gulzar and Mamoona Rauf, Department of Botany, Abdul Wali Khan University Mardan
Lunch & Prayer Break: 1.30-2.30 PM
Technical Session-V & VI (Parallel Sessions): 2:30 - 4: 30 PM
Technical Session-V (Hall-A)
Session Chair: Prof. Dr. Anwar Hussain

Session Co-Chair: Dr. Saifullah		
Keynote Speaker-: Prof. Eng. Dr. Faiz Ahmad, Mechanical Engineering, Universiti Teknologi PETRONAS, Bandar Seri Iskandar, Perak, **(Online)** **Title of Talk:** Synthesis of Decorated GNPs Reinforced Copper Composites for Thermal Management of Smart Devices	2.30-2.50 PM	11
Invited Speaker-X : Prof. Dr. Amir Habib **(Online),** Department of Physics, University of Hafr al Bati **Title of Talk:** Hydrothermal Synthesis of Ni-In_2O_3 and rGO/Ni-In_2O_3 for Efficient Degradation of Methylene blue under Visible Light	2.50- 3.10 PM	12
Invited Speaker-VII: Prof, Dr. Anwar Hussain, Abdul Wali Khan University, Mardan **Title of Talk:** Microbial strategies for sustainable management of chromate stress in host plant	3: 10 – 3: 20 PM	13
Invited Speaker-VIII: Dr. Muhammad Inshad Khan, Principal Scientific Officer, Dr. A.Q. Khan Research Laboratories, Kahuta **Title of Talk:** Synthesis and Characterization of Oligoimide-Grafted Graphene Oxide-Epoxy Nanocomposites with Improved Thermal and Mechanical Properties	3: 20 – 3: 30 PM	14
Presenter: 1 Dr. Noshin Ilyas, PMAS Arid Agriculture University Rawalpindi **Title of Talk:** Engineering Crop Microbiomes and Designing Soil Amendments for Sustainable Crop Improvement Under Climatic Change Scenario	3: 30 – 3: 40 PM	15
Presenter: 2 Dr. Zia -ur Rehman Mashwani Department of Botany, PMAS Arid Agriculture University, Rawalpindi **Title of Talk**: From Stress to Success: How Selenium Nanoparticles Enhance Plant Resilience and Oil Bioactives in Sesame under Biotic Stress	3: 40 – 3: 50 PM	16
Presenter: 3 Dr. Sunniya Iftikhar, Higher Education Department. **Title of Talk**: Electron Donor Acceptor Double Cable Covalent Conjugates: Towards Improved Photovoltaic Devices and Accelerated Artificial Photosynthesis	3: 50 - 4: 00 PM	17
Presenter: 4 Dr. Riffat Parveen, Government College University Lahore **Title of Talk:** Exploring the Electronic Structure and Bonding in Actinide Complexes using DFT and Multi-configurational Methods (CASSCF).	4: 00 - 4: 10 PM	18
Presenter: 5 Dr. Afshan Majeed, University of Poonch Rawalakot, AJK **Title of Talk:** Enterobacter sp. AF-31 with multiple plant beneficial traits acts as growth enhancer of Helianthus annuus L. under reduced fertilizer input.	4: 10 - 4: 20 PM	19
Presenter: 6 Ayesha Siddique, International Islamic University **Title of Talk:** Molecular imprinted polymer – Pt Cu alloy nanoomposites for glucose sensing.	4: 20 - 4: 30 PM	20
Presenter: 7 Dr. Rakhshinda Sadiq, Women University Mardan **Title of Talk:** Achieving the Sustainable Development Goals through the utilization of nanotechnology	4: 30- 4:40 PM	21
Presenter: 8 Mariam Ahmed Mujtaba1 **Title of Talk:** Expression Profiling of candidate genes in blood and epidermal tissue of psoriatic patients.	4:40- 4: 50 PM	22

Technical Session-VI (Hall-B)		
Session Chair: Prof. Dr. Turan Ozturk		
Session Co-Chair: Prof. Dr. Zaman Ashraf		
Invited Speaker-X: Dr. Noman Aslam Khan, National University of Sciences & Technology, Islamabad **Title of Talk:** Comparative Study of Machine Learning Models for Plastic Waste Recycling	2.30- 2: 50 PM	23
Presenter 9: Dr. Akhtar Rasool1, Centre for Animal Sciences & Fisheries, University of Swat, Pakistan **Title of Talk:** Navigating Human-Wildlife Conflict through Case Studies of Fishes and Owls.	2: 50 – 3: 10 PM	24
Presenter: 10 Muhammad Ishaq Javed, PMAS-Arid Agriculture University Rawalpindi **Title of Talk:** Clinical study on risk factors of multidrug-resistant tuberculosis-a hospital-based study.	3: 10 – 3: 20 PM	25
Presenter: 11 Hassan Mehdi, University of Baltistan Skardu **Title of Talk:** Construction of AIE-Active Fluorophores based on Isobutylene Bis-naphthylamide Framework with Sensing Applications	3: 20 – 3:30 PM	26
Presenter: 12 Muhammad Numan, Quaid-i-Azam University Islamabad **Title of Talk**: Development and Characterization of Sustainable Nanocomposite Solid Polymer Electrolytes for Enhanced Li-ion Conductivity	3:30 – 3: 40 PM	27
Presenter: 13 Sayed Ali Raza Shah, Abdul Wali Khan University Mardan **Title of Talk**: Proteomic Analysis of *H. Pylori* isolated from gastric patient	3: 40 – 3: 50 PM	28
Presenter: 14 Muhammad Abubakar Habib, Department of Chemistry, Quaid-i-Azam University Islamabad **Title of Talk**: Rice Starch Based Green Solid-State Electrolyte: Fabrication, Characterization and Electrochemical Analysis	3: 50 – 4: 00 PM	29
Presenter: 15 Farziaa , Abdul Wali Khan University **Title of Talk**: Synthesis, characterization, Hirshfeld surface analysis, antioxidant and selective β-glucuronidase inhibitory studies of transition metal complexes of hydrazide-based Schiff base ligand.	4: 00 - 4: 10 PM	30
Presenter: 16 Dr. Rizwan Ullah, University of Peshawar. **Title of Talk**: Fabrication of Polyaniline/bismuth-doped Zinc Oxide (PANI/Bi–ZnO) Composite for Energy Storage.	4: 10 - 4: 20 PM	31
Presenter: 17 Ms. Faiza, Women University Mardan **Title of Talk:** Prevalence of Leishmania in the Eleven Districts of KPK, Pakistan	4.20-4.30 PM	32
Presenter: 18 Dr. Neelam Zeb, Women University Mardan **Title of Talk:** Production of thermostable endoglucanase (CMCASE) from super koji aspergillus oryzae M-60.	4: 30- 4:40 PM	33
Presenter: 18 Monazza Serwar, Women University Mardan **Title of Talk:** Conversion of Biowastes into energy storage materials	4:40- 4: 50 PM	34

LIST OF ABSTRACTS

DAY-I

15th January, 2024 (Monday)

Online Technical Session-I

SYNTHESIS AND CHARACTERIZATION OF CARBOXYMETHYL CELLULOSE-ALGINATE HYDROGEL FOR THE REMOVAL OF METHYLENE BLUE FROM AQUOUS SOLUTIONS

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A number of physical and chemical procedures for water purification have been proposed including photocatalysis, oxidation etc. Among these procedures, adsorption is regarded as one of the most effective techniques for the removal of dye because it is simple to use, productive and the adsorbent is recyclable. They form a flexible network of polymeric chains that facilitates solute entry into the network. According to the definition, hydrogels are cross-linked polymeric network systems that can absorb huge amount of water but cannot dissolve due to the presence of crosslinks in each polymer chain. Because of their polymeric nature. Alginates (ALG) are naturally occurring hydrophilic and colloidal polysaccharides derived from various brown algae species. Alginate is an excellent candidate for the preparation of hydrogel. Carboxymethylcellulose (CMC) is another polysaccharide. It is cellulosic, and when it comes into contact with watery media, it forms colloidal solutions. Despite their excellent characteristics the association of alginate (ALG) and Carboxymethyl Cellulose (CMC) in the development of new materials is a difficult task because of their high solubility in water. To overcome this constraint and increase their stability Epichlorohydrin (ECH) and other crosslinking agents are used. As a result, a film with better tensile strength and resistance to aqueous environments is obtained.Chemically cross-linked hydrogel will be generated using CMC-ALG as a polymeric framework and ECH as a crosslinker and it will be used as an adsorbing material to remove the methylene blue from wastewater. The use of CMC and ALG based hydrogels crosslinked with Epichlorohydrin (ECH) for the removal of methylene blue (MB) is still not reported. Carboxymethylcellulose-Alginate based hydrogel cross-linked with epichlorohydrin and characterize by FTIR and SEM analysis.

LABEO ROHITA SKIN MUCUS ANTIMICROBIAL ACTIVITY AGAINST STREPTOCOCCUS PYOGENES

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Fish is an essential food source that fulfills nutritional and economical needs. It also posses bioactive peptides and enzymes and is a rich source of proteins. As a result of inappropriate prescription practices and overuse of antibiotics, many bacteria developed strong drug-neutralizing resistance mechanisms. Presently these developed bacteria are causing severe and fatal bacterial infections. . To control these infections, a new approach is required. Therefore the current study was designed to characterize the Labeo rohita skin mucus and their antibacterial activity against drug resistant bacteria. In addition, antibacterial activity of skin mucus is suggested as a source of novel antimicrobial agent to search for new effective metabolites that can be used as alternative treatment. Agar well diffusion methods was used to test the antibacterial effects of L. rohita skin mucus extracts against selected human bacterial pathogen Streptococcus pyogenes. Significant antibacterial activity against pathogenic bacteria is demonstrated by the aqueous mucus extract of L. rohita. Skin mucus extract in three different concentrations (50 µL, 100 µL, and 150 µL) revealed zones of inhibition measuring 19 mm, 21.5 mm, and 24 mm respectively. The findings demonstrated that the highest zone of inhibition was observed when the concentration of mucus was increased. New antimicrobial treatments and environmental friendly solutions for different industries may result from continuous research and development in this field.

AI-DRIVEN TRANSFORMATION OF WATER MANAGEMENT: A HOLISTIC APPROACH TO ADDRESSING CHALLENGES IN SOUTHEAST ASIA

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Southeast Asia faces an array of intricate water management challenges that imperil the region's sustainability and growth across social, economic, and industrial dimensions. This study addresses pressing issues including uneven freshwater distribution, the impacts of climate change, rapid urbanization, and other multifaceted challenges such as water scarcity, pollution, flood management, cross-border water resource conflicts, climate change effects, sustainable development dilemmas, groundwater overexploitation, poor infrastructure, population growth pressures, and governance issues. To address these challenges comprehensively, the study poses the research question: How can Artificial Intelligence (AI) serve as an innovative and transformative solution to address the diverse water management challenges in Southeast Asia?

AMELIORATION BY MORUS NIGRA FRUIT EXTRACT ON TESTES, SEMINIFEROUS TUBULES AND SPERMATIC CELLS BY CHROMIUM INDUCED HISTOPATHOLOGIES IN MICE

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Histopathology of testes and histometery of seminiferous tubules and various spermatic cells against short-term hexavalent chromium Cr(VI), exposure and their ameliorations upon post treatment of Morus nigra fruit pulp extract (MnFPE) were studied in mice. There were 3 groups of animals each named as 1. Control (C) group: received free normal drinking water for 15 days; 2. Chromium (Cr VI) group: received hexavalent chromium Cr(VI) in drinking water for 10 days; 3. Chromium+Morus nigra (Cr VI+Mn) group: received hexavalent chromium Cr(VI) in drinking water for 10 days; additionally received 0.2mL MnFPE twice a day for next 5 days. The whole study duration was 15 days and treated animals of all groups were dissected at 16th day of study. Results show drastic pathological changes in testicular tissue on chromium Cr(VI) exposure like necrosis of interstitial tissues and its gradual replacement by fibrotic development. Rupture of basement membrane of various seminiferous tubules, extremely scanty and scattered spermatogonia, primary spermatocytes and dislodged spermatogenic cells (including spermatozoa and spermatids), increased number of clubs headed sperms & lack of tail in many of the dislodged parrot beak headed type spermatozoa in Cr(VI) treated group. Most of these pathological signs were recovered effectively in Cr(VI)+Mn group. Histometeric results give a strong evidence for the above mentioned histological results as it indicates gradual shrinkage of seminiferous tubule and significant loss of spermatogonia, primary spermatocytes; significant decrease in the relative abundance of parrot beak headed spermatozoa (25.65±7.05µm2) and significant increase in the club headed spermatozoa (25.05±4.53µm2) along with other parameteric variations related to CSA of the parrot beak headed sperm (0.10±0.004) and CSA of the club shaped headed sperm (0.101±0.01); tail length of parrot beak headed sperm (7.68±1.19) and tail length of club shaped headed sperm (6.43±1.30) and middle piece thickness of parrot beak headed sperm (0.07±0.006) and middle piece thickness of club shaped headed sperm (0.034±0.003) in Cr(VI) group than in control (39.57±7.58, 17.57±4.89, 0.11±0.005 & 0.106±0.009, 8.55±1.07 & 8.58±0.62, 0.08±0.003 & 0.098±0.004 respectively). Most of these micrometric alterations were found addressed in Cr(VI)+Mn group. Our findings suggest that MnFPE has got curative properties against histopathological and micrometric parameters explored in this study.

ANTIBACTERIAL ACTIVITY OF GOLD FISH MUCUS AGAINST SALMONELLA TYPHI

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Fish is an excellent source of animal protein, which play a key role in maintaining of good health. One of the most well-liked freshwater ornamental fish in all spheres of society is the carp fish often known as the gold fish (Carassius auratus), which has a significant commercial value. The S. typhi is a major cause of severe systemic diseases (SSD) in human population, which is an alarming health challenge for public. The most common infection caused by S. typhi is typhoid fever. Due to poor prescribing and overuse of antibiotics many bacterial strains have developed resistance mechanisms against different antibiotics which leads to harmful challenges in community. To overcome the challenges of antibiotics resistance, a unique solution is needed. The fish mucus suggest has immunological and antimicrobial activity against different pathogenic bacterial strains. To investigate the antimicrobial activity of goldfish epidermal mucus, agar well diffusion was performed. Two different mucus extract (crude and diluted) was used in three different concentrations (50 µL, 100 µL, 150µL). After interpretation of result, crude extract show zone of inhibition values (22mm, 24mm & 25mm), respectively. Diluted extract show ZOI values (16mm, 21mm & 22mm) respectively. The above results ensure that, crude extract is more effective which showed significantly higher ZOI values than diluted extract. The current study showed that, fish epidermal mucus that may be used as a novel antimicrobial agent in human against different bacterial infections e.g. S. typhi associated infection.

KEYWORDS: Fish, Gold fish, Mucus, Salmonella typhi, Antibacterial activity, Antibiotics.

ANTIBACTERIAL ACTIVITY OF KOI FISH SKIN MUCUS AGAINST STAPHYLOCOCCUS AUREUS

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The fish industry is one of the food industries with the fastest rate of growth in the world. The immune system of fish continuously protects the body from diseases and provides protection. The primary components of fishes innate immune system is their skin and mucus membrane, which actively fights against infectious agents from the moment of initial contact. Due to the presence of numerous antimicrobial proteins, fish mucus functions as a powerful mechanical, physiological and biochemical barrier. The antibacterial activity of mucus seems to be a promising target for the creation of novel therapeutics to cure different infections in both fish and humans. Koi fish (Cyprinus rubrofuscus) is a kind of freshwater fish that are particularly liked by people in general because of their attractive colored forms. It is well known that overuse of antibiotics and other antimicrobial drugs has several adverse effects, including the development of antibiotic-resistant bacterial strains which are harmful issues for humans, making some infections practically incurable. Globally, bacterial diseases are the most common cause of human deaths. Staphylococcus aureus is a one of the common bacterial pathogen that causes a various types of infectious diseases. The bactericidal activity of fish skin mucus extracts was determined using the agar well diffusion method. On each side of the well zone of inhibition (mm) was measured for the assessment of bactericidal effect of fish mucus. Different concentrations of crowd fish skin mucus (50µl, 100µl, and 150µl) were used and zone of inhibition was 20mm, 22mm, 24mm. The same concentrations of diluted skin mucus of fish was also used to check the antibacterial activity that give zone of inhibition and was 17mm, 20mm, 22mm. The result showed that crowd skin mucus extract has high antibacterial activity as compared to diluted extract against S. aureus.

Keywords: Koi Fish, Skin mucus, Staphylococcus aureus, Antibacterial activity.

ASSESSMENT OF INSECTICIDES INDUCED ORGAN IMPAIRMENT IN CYPRINUS CARPIO THROUGH BIOCHEMICAL AND HISTOLOGICAL ANALYSIS

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Current study was designed to assess insecticides induced organ impairment in Cyprinus carpio. For this, fish were exposed to chlorpyrifos (CPF), bifenthrin (BF) and mixture (CPF + BF). The 96-hour LC50 of CPF, BF and CPF+BF was 14.85µgL-1, 4.38µgL-1 and 1.90µgL-1 respectively determined by Probit analysis method. During sub-lethal experiment, fish were treated with 1/3rd of LC50 of CPF, BF and mixture (CPF+BF) for 30 days. Results of biochemical analysis of liver and kidney showed reduction in antioxidant activity of superoxide dismutase, peroxidase and catalase while increase in T-bars enzyme in exposed fish organs with more prominent change in BF and mixture (CPF+BF). Similarly, insecticides caused DNA damage in liver and kidney in term of reduced head length and %DNA in head, while, increased tail length, %DNA in tail and tail moment in exposed fish organs. Histological analysis of liver, kidney and reproductive organs in experimental groups showed various pathological alterations in tissues of respective organs. Liver cells showed shrinkage of nuclei, formation of vacuoles in cytoplasm and necrosis. Enhanced space among Bowman's and glomerulus capsule and degeneration of urinary tubules of kidney were observed. In testis, decreased spermatozoa and increased interstitial spaces were observed, while in ovaries, increased follicle diameter, elevation in the number of atretic follicles and cytoplasmic clumping were detected. Hence, it was concluded that CPF and BF have the capability to cause organ impairment with more toxic effects of mixture (CPF+BF) exposed C. carpio through generation of oxidative stress, DNA damage and disrupting histological architecture.

HARMONIZING SCIENCE AND SUSTAINABILITY: UNVEILING INNOVATIVE APPROACHES IN THE PURSUIT OF GLOBAL DEVELOPMENT GOALS

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This presentation is going to explore the Scientific Outlook of Sustainable Development Goals (SOSDG) at the International Conference, focusing on the vital intersection of science and sustainability. Facing unprecedented global challenges, our research delves into innovative methodologies that integrate scientific advancements to address issues ranging from climate change to socio-economic inequalities. Our interdisciplinary study examines cutting-edge contributions that offer insights into achieving Sustainable Development Goals (SDGs). From advanced technologies to data-driven analyses, we showcase the pivotal role of science in shaping policies and practices fostering global sustainable development. Key topics include renewable energy, biodiversity conservation, climate resilience, and social equity. We unveil the relationships between scientific research and actionable strategies, emphasizing the urgency of collaboration for global sustainability. The presentation features case studies and success stories, illustrating tangible outcomes from integrating scientific perspectives into development initiatives. Identifying challenges and proposing innovative solutions, our research aims to inspire stakeholders towards a more sustainable future. Our exploration underscores the indispensable role of scientific inquiry in realizing the ambitions outlined in the SDGs. Through this presentation, we invite researchers, policymakers, and practitioners to engage in a dialogue that propels us collectively towards a more sustainable, equitable, and resilient world.

HISTOPATHOLOGICAL ALTERATIONS AND OXIDATIVE STRESS ASSOCIATED WITH CHLORPYRIFOS AND BIFENTHRIN IN HYPOPHTHALMICHTHYS MOLITRIX

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Current research was performed to find out LC50 of chlorpyrifos (CPF), bifenthrin (BF) and their mixture (CPF+BF) for Hypophthalamychthys molitrix (Silver carp) as well as to evaluate the toxicological effects of sublethal exposure. The 96 hours LC50 of CPF, BF and their mixture (CPF+BF) were evaluated as 11.2 µgL-1, 4.7 µgL-1, and 0.8 µgL-1 respectively by using Probit analysis method. Sublethal concentrations (1/3rd of LC50) of CPF, BF and CPF+BF were evaluated for organ impairment. Physico-chemical parameters were checked on daily basis. Results of antioxidant enzymes status in liver, kidney, gills, muscles and testis showed reduced level of superoxide dismutase, catalase and peroxidase while increased activity of TBARS was noted in treatment groups. Additionally, insecticide exposure caused DNA damage in the cells of liver, kidney and testis causing reduced %DNA in head and head length, while increased %DNA in tail along with tail length. Histological analysis of various organs including liver, kidney and testis showed disrupted architecture of the respective organs. Histological alterations including pyknosis and karyolysis of hepatocytes, focal necrosis and damaged hepatocytes in liver; thickened membrane of Bowman's capsule, degeneration of glomerulus capsule and disintegration of convoluted tubules in kidney were noted. Insecticide exposed fish testis exhibited reduced spermatocytes numbers with arrested spermatogenesis. Hence, it was concluded that selected insecticide have potential to cause organ impairment with more prominent changes in bifenthrin and mixture treated fish through generation of oxidative stress, nuclear abnormalities and histological alterations in H. molitrix.

PRODUCTION OF ANTIBACTERIAL AND ANTIFUNGAL LOTION BY USING CUO NANOPARTICLES

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Green nanochemistry diverted the attention of researchers and many industrial fields, in recent years, towards the low cost, less toxic and environment friendly approaches for synthesizing nanoparticles. Antimicrobial potentials of metal oxides and metal oxides nanoparticles replaced the traditional healing therapies and antibiotics. In this research Nano copper oxide; was produced from ginger and garlic extract by using Green Nanochemistry. The generated nanoparticles were characterized by Uv-Vis spectrophotometry and FTIR techniques which confirmed the synthesis of nanoparticles. Uv-Vis spectra showed the peaks at 314nm of Nano copper oxide particle. FTIR spectra of CuO showed peaks for many reducing and capping agents necessary for nanoparticle synthesis. 0.5mg/ml stock solutions of both nanoparticles was made and three different percentages 2%, 4% and 6% were introduced into lotion. Antimicrobial testing of metal oxide nanoparticle stock solution and metal oxide nanoparticles containing lotion was done by agar well diffusion method. Copper oxide nanoparticles showed better antimicrobial properties than magnesium oxide nanoparticles, comparatively, against E.coli and S.aureus. This research introduced a lotion packed with green synthesized nanoparticles, with CuONPs. The products showed effective antibacterial activities and this lotion is promising for using it commercially and ecofriendly.

STUDY OF GRAM-NEGATIVE BACTERIAL PATHOGENS ASSOCIATED WITH INFECTED FISH SKIN

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Fish is an excellent supplier of vitamins, minerals, omega-3 fatty acids, and high-quality protein. Around the world fish industries and fishing are important economic sectors. Fish infected with pathogenic bacteria may occur high mortality rates which directly translate to lower yields and consequently financial loss for fish farmers. Many of the fish pathogenic bacteria is Aeromonasand Flavobacterium. Therefore the present study was design to identify and characterize pathogenic bacteria related to Labeorohita. Samples were collected from the three different district of Khyber Pakhtunkhwa, Pakistan (Bannu, Peshawar, Kohat) Based on their morphological differentiation a total of 12 bacterial isolates were purified on nutrient agar media. For initial identification gram staining were performed which shows that eight bacterial isolates were Gram negative while four were Gram positive. In addition, biochemical characterizations were performed through API 20E kit many of this tests are showing positive results to urease, citrate, indole, vogseproskauer, H2S, ONPG, ADH, of the isolates which shows most of the characteristics of the isolated bacteria were similar to Aeromonasand Flavobacterium. The study provide to investigate the specific type of bacteria responsible for fish disease and understanding the host bacterial interaction.

WATER CONSERVATION METHODS: A STUDY OF RAINWATER HARVESTING

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We live on a planet named Earth, which is mostly covered in water with a tiny amount of land divided into regions known as continents. Just 3% of the water on Earth is fresh water, despite the vast volume of water available. Merely 1.2% of it may be utilized for drinking, with the remaining being buried deep into the earth or trapped in ice caps, glaciers, and permafrost. The majority of the water we consume is obtained from rivers and streams. The quantity of drinkable water is getting dangerously low due to water pollution, overpopulation, and climate change. If the international community does not pay attention to save this water, there may be a shortage of water that could endanger human existence. Rainwater harvesting is one of the techniques and strategies utilized in this regard to conserve water. The process of gathering and preserving rainwater that falls on roofs and other surfaces is known as rainwater harvesting. By using this collected rainwater for domestic chores, toilet flushing, plant irrigation, and other uses, it lessens reliance on conventional water sources. This study aims to assimilate various techniques for conservation of rainfall in order to store potable water and also provide suggestions for rainwater gathering techniques that conserve water.

LOCAL MESHLESS COLLOCATION SCHEME BASED OF RADIAL BASIS FUNCTIONS FOR NUMERICAL SOLUTION OF SPACE FRACTIONAL PDE

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In this work, numerical simulation of multi term space fractional PDE is evaluated by using radial basis functions. Caputo and Riemann-Liouville definitions are used to evaluate the fractional derivatives of radial basis functions. Local radial basis functions are used to obtain accurate and stable solution the problem. Accuracy of the method is judged by using double mesh procedure. Numerical solutions are plotted for different fractional orders to show the effect of introducing fractionality.

MOLECULAR ANALYSIS OF INTELLECTUAL DISABILITY IN FAMILIES FROM DISTRICT HANGU

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Background: Intellectual disability (ID) is a disorder defined as incomplete or arrested mental development which is characterized by the decline of functions at each stage of development. The deteriorated functions include cognitive behavior, socialization and environmental adaptation. A person with an ID has an IQ below 70. ID is divided into four types based on the severity of disability i.e. mild ID (IQ 55-69), moderate ID (IQ 36-51), severe ID (IQ 20-35), and profound ID (IQ <20). Prevalence: In Pakistan, 2017 census reported that 0.48% of the total population has an ID . The prevalence of ID is about 1-3% worldwide. People with intellectual disability have other diseases like epilepsy, intestinal problem; heart diseases, skeletal disorder and diabetes. Thus, there is a high mortality rate in people of ID with death rates two to four times higher and life expectancy two decades shorter. Methodology: family with ID patient was selected for this research. Blood samples were collected from parents, normal and affected individuals. DNA is extracted. Whole exome and sanger sequencing was done. Results: Filtration process of variants revealed three missense mutations in genes, UBAP2, GNE, INPP4B and two splice site mutation PCLO and ARFGAP3.) Results confirm the segregation of gene UBAP2 and GNE at NM-018449.4(p. pro610ser) and NM-001128227.3(p.Tyr187His).

ELECTRO-SYNTHESIS OF VALUABLE PRODUCTS BY COUPLING ENERGY-SAVING ANODIC ALCOHOL OXIDATION REACTION WITH CATHODIC CO_2 REDUCTION REACTION

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The growing concerns about the energy crises and escalating global warming have given rise to a range of environmental and social problems, sparking widespread attention. Electrochemical reduction of CO_2 (CO2RR) into value-added chemicals powered by renewable energy is an attractive strategy to tackle CO_2 emissions challenge and to achieve intermittent energy storage. In the conventional CO_2 electrolyzer, oxygen evolution reaction (OER) is typically employed as the anodic reaction, however, OER is both thermodynamically and kinetically unfavorable, with other drawbacks related to the reaction properties. Therefore, finding a thermodynamically more advantageous reaction as a substitute for OER is of great importance, especially if it can generate value-added chemicals at significantly reduced potentials. Keeping this in mind, we have reported a general and effective strategy for the concurrent electrochemical conversion of carbon dioxide at the cathode and alcohol oxidation (methanol, ethanol and benzyl alcohol) at the anode to some identical value-added products (formate, acetate and benzoate) with remarkably low electricity consumption while using non-precious metal catalysts. We have developed 3D porous electrodes using a simple, ultrafast hydrogen bubbles templating electrodeposition method to combine CO2RR with selective alcohol oxidation reactions for the synthesis of valuable products.

DAY-2

On 16th January, 2024 (Tuesday)

Technical Session-II

THIENOTHIOPHENES AND DITHIENOTHIOPHENES FOR ORGANIC ELECTRONICS AND OPTOELECTRONICS

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&
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The heterocycles thienothiophenes (TT) and dithienothiophenes (DTT) possess two and three fused thiophenes, respectively, which are electron rich molecules [1-3]. As the orientations of the rings vary depending on the location of the sulfur atom, four and six isomers for TTs and DTTs can be depicted, respectively. They are particularly important as building blocks for numerous electronic and optical applications such as thin film transistors (OTFTs), light emitting diodes (OLED), photovoltaic cells, energy storage, electrochromic devices and sensors.

POLYIMIDES AS FUNCTIONAL MATERIALS TOWARDS SUSTAINABLE DEVELOPMENT GOALS

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The Sustainable Development Goals (SDGs) are a set of 17 global goals adopted by the United Nations to achieve a better and more sustainable future for all 1 . They cover various aspects of socio-economic and environmental challenges, such as poverty, health, education, energy, climate, and biodiversity. Polyimides (PIs) are a class of functional polymers that have high thermal stability, mechanical strength, and chemical resistance. They have been widely used in various fields, such as aerospace, electronics, biomedicine and renewable energy sources 2 . Polyimides can play a role in advancing some of these goals, such as: Affordable and clean energy (SDG 7), Industry, innovation, and infrastructure (SDG 9), Responsible consumption and production (SDG 12) and Climate action (SDG 13). The structure of the polyimide may be designed in view of their future applications by adding heteroatom, heterocyclic cores, hydrophilic moieties and/or flexible segments, imparting special properties to the resulting polymer which could be enhanced by adding different additives 3-5. The presentation will thus revolve around the design, synthesis and characterization of different polyimides and/or their composites in view of their probable application to attain some of the goals mentioned above/previously.

STI AND THREE PILLARS OF SUSTAINABLE DEVELOPMENT

Prof. Anwar-ul-Hassan Gilani H.I, S.I.
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Fellow, Pakistan Academy of Sciences, Constitution Avenue, Islamabad

Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Nations are heavily dependent on each other to achieve Sustainable Development Goals (SDGs). In September 2015, the UN member states approved an ambitious agenda to address the poverty, the pursuit of equity and the protection of the planet in the form of 17 SDGs, which are mostly interdependent. We all wish to have good quality of life, which is heavily dependent on different indicators such as Physical and mental health, Access to education, Freedom of expression, Clean and secure living environment and Sound economics but what about a situation when: We are healthy, but we are poor and don't have access to education? OR We have a secure income, but the air that we breath is unclean and there is no freedom of expression OR We have freedom of expression, with clean/safe environment but we can't feed our family? Obviously, we need to have all of these things, only then we can say that we are having a good quality of life. There are different approaches that how the three dimensions of sustainable development (economic, environmental, and Social) relate to each other, whether they are pillars on the same level or three rather different but closely linked dimensions of sustainable development. One popular approach is that: the environment is the necessary basis for sustainable development, the economy is the tool to achieve sustainable development and the good life for all (the social dimension) is the target of sustainable development. Current situation is that the emphasis remained on the Economic, while, the other two pillars (Environmental and Social) remained ignored but it is now eventually realized that the goal should be the balanced integration of all three dimensions. The role of Science, Technology and Innovation (STI) is well stablished in the economic development and use of STI is beginning to play role in solving environmental issues, but to address social component, following principles of our religion, Islam is
the key to address SDGs in totality.

DEVELOPMENT OF HIGHLY POTENT TYROSINASE INHIBITORS

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Tyrosinase is a copper containing enzyme catalyzes the oxidation reaction which convert tyrosine into melanin through a multi step pathway. The over expression of tyrosinase results in a number of hyper pigmentation disorders. The present describe the development of highly Potent tyrosinase inhibitors.

Technical Session-III

FUNCTIONAL NANOMATERIALS "TUNING THE SIZE AND SURFACE CHEMISTRY FOR APPLICATIONS IN RENEWABLE ENERGY TECHNOLOGIES, BIOMEDICAL AND ENVIRONMENTAL SCIENCES

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The unique chemical and physical properties of nanoscale materials have triggered enormous scientific interest to explore their potential applications in biomedical sciences, energy technologies, agriculture, environment, catalysis and industry etc. The chemical and physical properties of metal/ metal oxide nanoparticles can generally be tuned by controlling their size, shape and surface chemistry. In this regard, we have developed several reproducible protocols based on chemical reduction and precipitation approach to prepare functionalized metal/metal oxide nanoparticles from subnanometer to over 100 nm in aqueous/organic media with a decent control over their size, shape, and surface chemistry. Many of these metal nanoparticles have been used as building blocks to design/synthesize new nanostructured materials with tunable nanoscale features using template-based and template-less strategies. The functionalized metal/metal oxide nanoparticles/nanoclusters possess interesting optical, recognition and catalytic/bio-catalytic properties and currently we are focusing on the applications of these nanoparticles and nanocomposites in biomedical sciences (i.e., bio-sensing especially bacterial detection, bio-imaging, drug delivery, multidrug resistance), environmental remediation (detection and removal of organic/inorganic pollutants from water, CO oxidation, and CO2 capture and conversion) and renewable energy technologies (mainly H2 production & storage and electrode materials for batteries). This talk would, therefore, be an overview of interdisciplinary research activities of Functional Nanomaterials Group at LUMS to synthesize customized inorganic/organic nanoparticles with tunable size and surface chemistry, and their composites having unique chemical and physical properties, and subsequent applications in biomedical sciences, environment, catalysis and renewable energy technologies.

APPLICATION OF MEMBRANE TECHNOLOGY FOR CO_2 CAPTURE

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Gas separation using polymeric membranes is considered as one of the feasible technique due to easy scale up and least requirements in terms of energy, maintenance, and cost. Pure or modified polymeric membranes are utilized to separate CO2 from natural gas, biogas and are being considered for flue gases as well. Membrane separation processes are economically competitive and have become more attractive than conventional processes like adsorption and absorption. The competitiveness of polymers or their blends used for membrane separation processes lies in the permeability, selectivity, cost, durability, ease of synthesis and fabrication. A major breakthrough is development of mixed matrix membranes (MMMs) in which different fillers are incorporated in polymers to enhance their performance. Particles like metal organic frameworks (MOFs), zeolites, TiO2 nanoparticles, silica, CNTs have been successfully incorporated. In this work, a general overview of membrane technology and its applications for CO2 capture will be presented.

THE FLUORESCENT FRONTIER IN IONIC AND MOLECULAR SENSING

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The importance of fluorescent sensors lies in their remarkable detection capabilities, offering a versatile and sensitive means of identifying specific substances in various applications. The study investigates the dynamic realm of molecular recognition using fluorescence as a focal point. Tailored molecules, carefully constructed for their sensing prowess, play a pivotal role as we explore the intricate interplay between fluorescence and molecular recognition. The research navigates through inventive methodologies and applications employed to detect both ionic species and specific molecules.

SUSTAINABLE TEXTILE INNOVATIONS FOR CLIMATE CHANGE MITIGATION

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As the global community grapples with the profound impacts of climate change, the textile industry stands at the intersection of environmental responsibility and innovation. The pivotal role of sustainable chemistry in shaping the future of textiles is unavoidable in the current era. Delving into the challenges posed by climate change, extensive research and technological advancements are required that promise to revolutionize the textile landscape. The environmental footprint of traditional textile production processes, emphasizing the urgent need for sustainable alternatives like the reduction of greenhouse gas emissions, water conservation, and the responsible use of resources. The discussion will then pivot towards the transformative potential of cutting-edge chemistry in fostering sustainability within the textile industry. Drawing on recent research, innovative approaches to eco-friendly fiber development, novel dyeing and printing techniques, and the integration of circular economy principles along with intelligent manufacturing. By exploring the synergy between chemistry and sustainable textile practices, attendees will gain insights into the promising solutions that mitigate environmental impact while meeting the demands of a rapidly evolving market. The address will touch upon the importance of interdisciplinary collaboration between chemists, engineers, and industry leaders in driving systemic change. By fostering a holistic approach to sustainable textile development, we all need to contribute actively to the global movement towards climate-resilient and environmentally conscious textile manufacturing. The current state and prospects of sustainable textiles, positioning chemistry as a catalyst for transformative change will surely about to perform well in Industry 5.0 and 6.0 and we need to play our role in advancing sustainable practices within the textile industry, contributing to a greener and more resilient future.

NAVIGATING HUMAN-WILDLIFE CONFLICT THROUGH CASE STUDIES OF FISHES AND OWLS

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Human-wildlife conflict (HWC) represents a complex intersection between human activities and the natural environment, often resulting in detrimental consequences for both parties involved. In this scenario, two case studies were done first on fish diversity and their habitat destruction. The second case study was on owlâ€™s diversity decline due to urbanization. The aquatic ecosystem, home to many fish species, has become a battleground for resource competition and survival. Increasing human activities such as overfishing, habitat degradation, and pollution have intensified the conflict between traditional fishing communities and aquatic wildlife. In this study, the diversity of fishes was explored in the River Swat. Moreover, the water quality, outbreak of bacterial and fungal diseases in fish, and dumping of home and industrial wastes in freshwater effects were studied on the fish biodiversity. The nocturnal realm inhabited by owls poses a different set of challenges. As urbanization expands and landscapes transform, the habitats of these birds of prey are encroached upon, leading to heightened conflicts with human populations. This case study focused on the owlâ€™s diversity in District Swat and District Shangla, their habitats and their conflict with humans in the form of urbanization and deforestation. The study investigates the factors contributing to this conflict, including habitat loss, prey availability, and the perceived threat to domestic

animals. The lessons learned from these case studies can inform broader conservation efforts and policies, fostering a more harmonious coexistence between human communities and wildlife.

Technical Session-IV (Posters)

GLOBAL UNITY FOR CLIMATE ACTION: A FOCUS ON SDG-13 AND COP-28

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Global Unity for Climate Action: A Focus on SDG-13 and COP-28" presents an insightful examination of the intertwined dynamics between Sustainable Development Goal 13 (SDG-13) and the 28th Conference of the Parties (COP-28) in the global pursuit of climate action. This paper underscores the pivotal role of SDG-13 as a catalyst for fostering international cooperation and sets the stage for collaborative endeavors, particularly within the framework of COP-28. The abstract initiates by illuminating the urgency of addressing climate change through a comprehensive lens, emphasizing the integrated approach encapsulated by SDG-13. It explores how SDG-13 serves as a guiding beacon for nations, encouraging them to forge alliances and commit to collective action in the face of climate-related challenges. The discussion delves into the significance of COP-28 as a platform where the principles of SDG-13 are translated into actionable policies and agreements. Furthermore, the abstract examines the anticipated outcomes of COP-28 and their alignment with the goals of SDG-13. It assesses the potential for COP-28 to serve as a catalyst for enhanced global unity in climate action, catalyzing innovative solutions, financial commitments, and strengthened international cooperation. The paper also addresses the challenges inherent in bridging diverse perspectives and interests to achieve a unified approach to climate mitigation and adaptation. In conclusion, "Global Unity for Climate Action: A Focus on SDG-13 and COP-28" advocates for an integrated strategy that leverages the principles of SDG-13 within the international policy framework of COP-28. It underscores the pivotal role of these initiatives in achieving meaningful progress toward a sustainable and resilient global future.

INNOVATIVE APPROACHES TO GALENA ORE PROCESSING FOR SILVER, GOLD & OTHER METALS EXTRACTION

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Metals are important in our everyday life. Pakistan contains vast mineral and other natural resources some are being utilized is various industries but most of minerals resources are waiting for their utilization and developments.Pakistan has high potential of minerals/rocks like indigenous iron, copper, gold-silver, lead, zinc, barite, chromite,, radioactive minerals, coal and oil etc. For centuries, extracting metals has been a costly and environmentally taxing process.Challenges of sustainable development, particularly 'living within limited infinity' have urged scientific community to develop innovative processes that integrate into complex technology and reduce ecological disturbances.Various hydro-metallurgical and pyrometallurgical approaches have been reported for efficient metal recovery from ores. This research critically analyses the technical feasibility of conventional practices for metal recovery and suggests that conventional processes may not meet the industrial feasibility because of secondary pollution possibilities and high economics. Hence, emerging trends in the field of metal extraction have been discussed, to the best of our knowledge. It is believed that this research may provide an insight to look into novel technologies. Pakistan is now an important gold-silver producer in the world. The nature of Silver and Gold production is briefly reviewed and the hydro-metallurgy extraction is considered. Cyanidation and recovery is the primary and proven treatment process. The use of cyanide has generated environmental

concerns because of its toxicity and therefore research on alternative Silver, Gold and other metals recovery processes using non-toxic reagents is considered. The future prospect for hydro-metallurgical recovery is indicated.

AN AI-POWERED E-STETHOSCOPE SINGULAR PROBE SOLUTION FOR COMPREHENSIVE CARDIOPULMONARY DIAGNOSTICS

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Current diagnostic methodologies for cardiac and respiratory assessments exhibit inefficiencies. These inefficiencies are exacerbated by the fragmentation of tools, methods, techniques, and protocols used for each specific disease and its associated physiological parameters. As an alternative to fragmented disease-specific tools, this research advocates for a unified singular probe electronic stethoscope solution. It computes heart rate and respiratory rate rapidly with advanced signal processing (peak detection, frequency analysis). Furthermore, by harnessing Support Vector Machine learning, the device achieves robust classification capabilities for identifying respiratory afflictions (COPD, asthma, pneumonia, etc.) and cardiac anomalies (arrhythmias, myocardial infarction, CVDs, etc.). This is done through precise analysis of Phonocardiogram (PCG) data extracted from heart sounds using Long Short-Term Memory Variational Autoencoder (LSTM-VAE). Additionally, the innovative application of Convolutional Neural Networks (CNN) facilitates blood pressure estimation from Korotkoff sounds. The consolidated output, displayed conveniently on a screen, ensures rapid and comprehensive analysis, promising unparalleled efficiency in early disease detection. This unified probe transcends traditional limitations, paving the way for streamlined and efficient diagnostic frameworks in cardiac and respiratory sound analysis. Beyond real-time diagnostics, the accumulated data enables nuanced categorization through big data analysis techniques, thereby refining healthcare strategies for optimal patient outcomes. Aligned with Sustainable Development Goals SDG-3 (Good Health & Well-being) and SDG-9 (Industry, Innovation, and Infrastructure), our pioneering device heralds a transformative era in healthcare. By elevating standards for initial analysis and continuous monitoring, the solution contributes to the broader goals of improving healthcare accessibility, innovation, and overall well-being.

ASSOCIATION OF LFTS AND RFTS WITH COVID SUSCEPTIBILITY IN IGRA POSITIVE SUBJECTS

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COVID-19 is viral pneumonia originated in Wuhan, China in 2019. It is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It is a novel virus of coronavirus family. The virus spread throughout world in the form of pandemic and public health emergency was declared by WHO in Jan 2020. People with underlying pathological conditions such as Tuberculosis are more susceptible to COVID-19 resulting in worsening of condition and more rapid development of symptoms, severe pneumonia and increase in death rate. Tuberculosis is highly contagious disease, caused by Mycobacterium Tuberculosis, that mostly affects lungs and is the common cause of death worldwide. TB is more common in underdeveloped nations such as Pakistan and is linked to lack or resources, awareness and infrastructure for disease control. This study was conducted to investigate tuberculosis as risk factor for COVID. Findings of our study support the fact that TB patients are more susceptible to COVID-19. We found Haemoglobin, uric acid, urea, creatinine, bilirubin, Alkaline Phosphatase (ALP) and potassium ions as biochemical

markers significantly associated with COVID-19 infection. These biomarkers can be used as diagnostic markers for COVID in IGRA positive subjects.

ENDOPHYTIC BACTERIA FROM EUPHORBIA MILLI: METABOLITES AND RESPONSE TO MULTI-DRUG RESISTANT BACTERIA

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Background: Multidrug-resistant bacteria (MDR) represent a grave public health concern, necessitating the pursuit of novel antimicrobial solutions. Endophytic bacteria residing within medicinal plants have garnered attention for their capacity to synthesize bioactive compounds capable of inhibiting MDR bacterial pathogens. Aim and Objectives: This study aimed to isolate and characterize endophytic bacteria from Euphorbia milii leaves, evaluate their potential for secondary metabolite production, and assess their antimicrobial efficacy against MDR bacterial strains, including extended-spectrum β-lactamase producing Escherichia coli, methicillin-resistant Staphylococcus aureus (MRSA), and carbapenem-resistant Klebsiella pneumoniae. Methodology: Endophytic bacteria were isolated from E. milii using leaf fragments and leaf extract cultured on agar plates. Secondary metabolites were extracted from endophytic bacteria, and optimization experiments were conducted to refine production conditions, including pH, temperature, incubation duration, and growth media with different carbon and nitrogen content. Characterization involved the use of FTIR and GC-MS techniques. The antimicrobial potential of these metabolites against MDR bacterial strains was assessed through in vitro assays. Results: Microscopic examination and biochemical tests identified four distinct endophytic bacterial species within E. milii are Klebsiella oxytoca, Pseudomonas aeruginosa, Acinetobacter lwoffii and Acinetobacter baumanii. Optimization experiments revealed that at PH 7, temperature 35°C the Klebsiella oxytoca, Pseudomonas aeruginosa and at PH 9, temperature of 40°C Acinetobacter spp and a two week incubation period, and growth media with 2% carbon and 1.5% (w/v) nitrogen content are the optimal conditions for effective metabolite production. In vitro assays demonstrated that these metabolites exhibited substantial antimicrobial activity against MDR pathogens, using ampicillin, erythromycin and cefoxitin as control. FTIR analysis indicated characteristic functional group peaks, while GC-MS analysis identified specific compounds within the metabolite mixture. Conclusion: This study underscores the potential of endophytic bacteria residing in E. milii as producers of potent bioactive compounds with remarkable antimicrobial properties against MDR bacterial strains. These findings emphasize the promising role of plant endophytes as sustainable and environmentally friendly sources of novel antimicrobial agents, addressing the escalating threat posed by MDR bacteria in healthcare settings.

Keywords: Endophytic Bacteria; Metabolites; Optimization; FTIR & GCMS analysis; Multidrug-Resistant bacteria; In vitro assay

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DEVELOPMENT OF HIGH PERFORMANCE NANOMATERIALS-BASED GAS SENSOR FOR THE DETECTION OF GASES OF INDUSTRIAL IMPORTANCE

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Uniform and novel morphologies of various ZnO nanostructures were fabricated by using very simple, economic and environmentally friendly approach. The fabricated nanostructures were characterized by SEM, XRD, FT-IR and BET. Selected systems were then employed for the development of gas sensors for the detection of gases of environmental concern. The synthesized nanostructures displayed superior and reproducible performance with shortest detection time at room temperature, not reported earlier in the

literature. High performance of the sensors was attributed to the unique morphologies and remarkable uniformity in shape and size of the synthesized nano structures. It was concluded that the synthesized powders possess great potential for the fabrication of ammonia gas sensor for such industrial environments, where ammonia is a matter of concern for the industrial workers.

ENDOPHYTIC FUNGI FROM CHLOROPHYTUM COMOSUM: METABOLITES AND BIOACTIVITY AGAINST MULTIDRUG RESISTANT BACTERIA

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Background: Multidrug-resistant (MDR) bacteria pose a global health crisis, demanding innovative strategies to combat antibiotic resistance. Endophytic microorganisms residing within plants have emerged as promising sources of bioactive metabolites, including antimicrobial agents. Aim and Objectives: This study aimed to isolate fungal endophytes from Chlorophytum comosum roots and utilize their metabolites against MDR bacterial strains, including Pseudomonas, Escherichia coli, and Staphylococcus aureus. Additionally, optimization of conditions for maximal metabolite production by these endophytic fungi was pursued. Methodology: After isolating pure fungal endophyte cultures, key parameters for metabolite production were systematically optimized. These parameters included pH levels (acidic, neutral, and alkaline), temperatures (25°C to 45°C), and incubation periods (3 to 5 days). Nutrient composition was fine-tuned by reducing Luria Broth components, lowering carbon and nitrogen sources from 50% to 25% and 70% to 35%, respectively. Secondary metabolites were extracted using ethyl acetate and characterized using Fourier Transform Infrared (FTIR) spectroscopy and Gas Chromatography Mass Spectrometry (GC-MS) analysis. Results: Distinct extracts from diverse endophytic fungi in C. comosum roots exhibited optimal antimicrobial activity at 25°C, pH 7, and a 5-day incubation period. Extract-1 displayed potent antibacterial activity against MDR strains with 100% carbon and nitrogen sources. However, reducing these sources to 25% and 50% led to a loss of antibacterial activity. Extract-2, from two fungal strains, exhibited reduced antibacterial activity under the same conditions. Conversely, Extract-3 maintained consistent antibacterial activity across varying carbon and nitrogen concentrations. FTIR analysis revealed distinctive spectral signatures in endophytic fungi metabolites, indicating diverse chemical functionalities. GC-MS identified various bioactive compounds within these metabolites, highlighting their potential as antimicrobial agents and pharmaceutical leads. Conclusion: Endophytic fungi within C. comosum hold promise as sources of valuable antimicrobial metabolites. Optimizing growth conditions plays a critical role in enhancing metabolite production, offering promising avenues for future research against MDR bacterial infections.

Keywords: Endophytic fungi; Chlorophytum comosum; Antimicrobial metabolites; Multidrug-resistant bacteria; Metabolite optimization; Bioactive compounds

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NEED FOR AN EXPLICIT HEALTH POLICY BY LOW-AND MIDDLE-INCOME COUNTRIES FOR LTBI MANAGEMENT: A REVIEW

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Tuberculosis (TB) arises from pre-existing asymptomatic TB (LTBI) in 90% of cases, implying that effective LTBI management is needed for a TB-free world. Low-incidence countries have designed LTBI management policies in accordance with WHO recommendations. However, in high-incidence countries, there is a high level of discrepancy in policy design and its execution on real grounds owing to resource restrictions and challenges in active TB management. In this review, we have documented the WHO recommendations and policy guidelines designed and implemented by high-income as well as low-and

middle-income countries (LMICs) and highlighted the gaps in national policies of LMICs with respect to LTBI management and overall disease control and advocate the adoption of LTBI management guidelines in national policies of LMICs.

Keywords: LTBI, Recommended Guidelines, Global Scenario, Local Determinants

FABRICATION AND CHARACTERIZATION OF GUM ARABIC- AND MALTODEXTRIN-BASED MICROCAPSULES CONTAINING POLYUNSATURATED OILS

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Polyunsaturated oils have various health-promoting effects, however, they are highly prone to oxidation. Encapsulation using biopolymers is one of the most effective strategies to enhance oil stability. This research examined the potential of gum arabic and maltodextrin for microencapsulation of omega-3 rich oils, aiming to enhance encapsulation efficiency and stability of encapsulated oil. We encapsulated fish and flaxseed oils by emulsification-spray drying. Spray-dried microcapsules were prepared by oil-in-water emulsions consisting of 10 wt% oil and 30 wt% biopolymer (gum arabic, maltodextrin, or their mixture). Results showed that both microcapsules were spherical in shape with surface shrinkage, and exhibited amorphous structures. Gum arabic-based microcapsules had higher encapsulation efficiency as well as better storage stability for both types of oil. Flaxseed oil microcapsules generally had higher oxidative stability regardless of the type of wall material.Through a comprehensive characterization of the physical and chemical properties of the emulsions and resulting microcapsules, we proved gum arabic to be a more effective wall material for polyunsaturated oil microencapsulation, especially flaxseed oil. This study provides a promising approach to stabilize oils which are susceptible to deterioration, and facilitates their wider uses as food and nutraceutical products.

ISOLATION AND CHARACTERIZATION OF FUNGI FROM THE RHIZOSPHERE AND BULK SOIL OF ZEA MAYS L.

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Plant growth promoting rhizospereic fungi (PGPRF) are beneficial fungi that colonies the rhizosphere, which is the soil area directly around plant roots. These fungi interact with plants in a mutualistic way, providing a variety of growth promoting effects. They promote plant growth and development by a variety of methods, including nutrient solubilization, hormone synthesis, disease suppression, and stress tolerance induction. Bulk soil inhabiting fungi can also influence plant development indirectly through a number of processes, including nutrient cycling, organic matter degradation, and disease control. These fungi improve nutrient availability and soil structure, which can benefit plant development and health. During current study we isolated 9 fungi or which five strains were isolated from the rhizospherec soil of Zea mays L. while the remaining strains were isolated from the bulk soil of Zea mays L. The rhizosphere and bulk soil fungal strains were screen on Zea mays L. seedling in plastic pots containing 300 g autoclaved soil. Association of isolates to the host plants, increased biomass production was recorded in term of root length 33% shoot length 17% and fresh weight 36% dry weight 51% as well as chlorophyll 67% contents. On the other hand, the isolates modulated the production of IAA 46%, GA 30% and nutritional quality as well as boosting the growth of the Zea mays L. Both the rhizosphere and bulk fungi colonized with roots of Zea mays L. The result revealed that the rhizosphere and bulk fungi have the potential to promote Zea mays L. growth. The isolates have potential application as a cost effective and environmentally friendly solution for

use. The fungal strains didn't influence each other growth when grown side by side on agar plate. It had concluded that both the fungi can be used as bio-inoculant in combination for plant growth and development. Seeds and fungi interaction conformed that the seedling roots move toward the fungus and allow the fungus to colonize on it. And also enhance the seedling growth and development. Fungal filtrate and seeds of Zea mays L. Interaction conformed that the seedling roots move toward the fungal filtrate.

REVIEW ON "SIGNIFICANCE OF SUSTAINABLE CLIMATE ACTION AND INFLUENCE ON OTHER SUSTAINABLE DEVELOPMENT GOALS"

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Climate Action, one of the thirteen Sustainable Development Goals looks to influence all other SDGs because the climate action works to transform the existing environment into a green and revolutionized environment. The primary objective of climate change/action is to take urgent steps to combat the adverse impacts of climate change. It recognises that climate change is a global challenge that requires immediate attention and concerted efforts from governments, businesses, communities, and individuals worldwide. Climate action permeates a number of SDGs and also influences them in a significant way. Based on the need to considering significance of climate action as one of the central SDGs, the current review study beautifully depicts a connection between climate action and the other SDGs. It also reports on a survey involving experts from 61 countries. The findings suggest that even though climate change impacts, particularly extreme weather events, are known to disproportionally affect poorer and minority's communities, the synergies among related goals and climate justice seem to receive less attention. The poster concludes by describing some of the means via which synergies between climate action and other SDGs may be achieved.

SYNTHESIS AND CHARACTERIZATION OF NANOSILICA FROM SANDSTONE AND LATERITE

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Silica nanoparticles have valuable applications in various fields like catalysis, bio medics, biological imaging, chromatography, and as fillers in composite and binding materials for achieving good properties in aggressive environments. Sand stone, kaolinite clay, bentonite clay and laterite clay are the potential raw materials for nano-silica as they contain sufficient amounts of silica. As alumina is also present in all kinds of clay, its removal becomes very important. Calcination is a critical step for the effective removal of alumina because it increases its solubility in acidic media. In our research work, nano silica particles were synthesized from sand stone and laterite. Alumina, iron oxide and sulfur content in the precursor were removed using thermal treatment followed by acid treatment. Nano silica samples were obtained using the sol-gel method. Optimization was carried out for the degree of thermal treatment of starting materials while different alkalis were used and maximum yield, high purity and good nano sized particles were produced. The main chemicals used were sodium hydroxide, potassium hydroxide, methanol and hydrochloric acid. The obtained spherical, agglomerated and amorphous nano silica samples were studied using X-ray florescence (XRF), Fourier transform infrared (FTIR), X-ray diffraction (XRD), Scanning electron microscopy (SEM) and Transmission electron microscopy (TEM).

SYNTHESIS OF MAGNETIC AG/GO-FE_3O_4 NANOCOMPOSITE FOR SOLID PHASE EXTRACTION OF TETRACYCLINES

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Antibiotics are frequently used as growth boosters in animal husbandry. Tetracyclines (TCNs) are among the antibiotics utilized largely compared to other antibiotics. The foodstuff obtained from these animals contains residues of TCNs which cause acute complications for human health such as allergic reactions, gastrointestinal problems, inhibition of bone, tooth mineralization, headache, and liver damage. Thus, monitoring of tetracyclines is paramount, especially in the feedstuff. In the present study, an unprecedented Azadirachta indica assisted magnetic Ag/GO-Fe3O4 nanocomposite was synthesized and used for the residual extraction of chlortetracycline (CTC) and oxytetracycline (OTC) in the milk samples in an expectation that this bio-based Ag/GO-Fe3O4 nanocomposite will provide more adsorption capacity towards oxytetracycline and chlortetracycline due to increased porosity, surface to volume ratio and interaction sites. The interaction between Ag/GO-Fe3O4 nanocomposite and tetracyclines can be π-π interaction, hydrogen bonding, electrostatic interaction and π-cation interactions. The Ag/GO-Fe3O4 was synthesized by using Azadirachta indica leaves extract and was characterized by X-Ray Diffraction (XRD), Scanning Electron Microscope (SEM), FTIR, and Vibrating Sample Magnetometer (VSM) analysis. After magnetic solid phase extraction (MSPE) of OTC and CTC, quantification was carried out by HPLC-UV. OTC and CTC showed an intense absorption band in a range of 250-300 nm in neutral and acidic conditions due to the presence of chromophore groups such as C=O and -OH etc. Statistical analysis was done by measuring the limit of detection (LOD), the limit of quantification (LOQ), correlation coefficient, intraday and inter-day precision. Different factors that affected the adsorption capacity of the adsorbent were studied like pH, temperature, amount of nanocomposite, and time. The inter-day and intra-day precision were calculated for oxytetracycline (4 and 6%) and chlortetracycline (3 and 4%) respectively. The limit of detection and quantification for oxytetracycline was 0.5 and 1.5 μg L−1 and for chlortetracycline was 0.2 and 0.6 μg L−1 respectively and percentage extraction was 94-96%

SYNTHESIS OF MONODISPERSED FINE PARTICLES OF ZINC OXIDE FOR IN-VITRO EVALUATION OF ANTIBACTERIAL ACTIVITY

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Monodispersed fine particles of zinc oxide with novel morphologies were fabricated by using very simple and economically feasible routes. In order to obtain particles of uniform morphological features, the precipitation conditions were optimized, especially with respect to composition of the reactant mixtures and reaction temperature. Selected batches of synthesized powders were analyzed by SEM, FT-IR, XRD, TG/DTA. Similarly, selected batches of the fabricated zinc oxide were then employed for in-vitro evaluation of antibacterial activity against various pathogenic bacterial strains. Our synthesized particles demonstrated promising antibacterial activity as compared to commercial ZnO. The present study suggests that the application of our synthesized ZnO particles as antibacterial agent in biomedical side may be effective at inhibiting certain pathogens.

USE OF PROTEIN-POLYSACCHARIDES BASED DELIVERY SYSTEM FOR IMPROVE SURVIVAL OF PROBIOTICS

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Nowadays, consumers are more interested towards the diet and health benefit of a product. Probiotics products are being introduced in the market due to health-boosting effects. Probiotics are living microorganisms that ingested in sufficient quantity; benefit the health of the consumer. They provide certain health benefits by improving immune system and inhibiting the growth of pathogenic bacteria in the human body. The main challenge is the survival and viability of probiotics because they lose their viability during gastric transit and storage. *Lactobacillus plantarum* is well known probiotic known to date. Currently research focused on the interaction of protein-polysaccharide interaction and their stability under different environmental conditions. This field opens new horizon to study the texture, behavior and microstructure. The aim of current research was to develop protein-polysaccharide based matrix in different combination to improve survival and viability during gastric transit. Therefore, *Lactobacillus plantarum* (Lp-05) was chosen for microencapsulation with Soy Protein Isolate (SPI) and CMC. T_5 (3% SPI + 1.5% CMC) showed maximum encapsulation efficiency >80% as compared to other combinations. The survival and viability of encapsulated *Lactobacillus plantarum* (Lp-05) was investigated through their resistance to simulated gastric juice (SGJ), tolerance to bile salt, release profile in simulated intestinal fluid (SIF) and storage stability during 30 days at 4 °C. The survival rate of free and encapsulated probiotic was 10^4 Log CFU/ml and 10^9 Log CFU/ml, respectively. The viable count was significantly higher than non-encapsulated probiotics in simulated gastric juice. The complex of protein-polysaccharides based encapsulates showed maximum viability of probiotics as compared to others. So, protein-polysaccharides in combination is one of the effective encapsulating material for targeted delivery of bioactive compounds.
Keywords: probiotic, protein, survival, encapsulation efficiency, storage stability

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RESPONSES OF ENGINEERED BIOCHARS ON PB ACCUMULATION AND PLANT GROWTH IN BRASSICA CHINENSIS L. AND PENNISETUM POLYSTACHION L. IN A CO-PLANTING SYSTEM- A GREENHOUSE STUDY

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This greenhouse study investigated the efficacy of engineered biochars in a vegetable-hyperaccumulator intercropping system for lead (Pb) remediation in contaminated soil. Four biochar types, including pristine rape-straw biochar (BC), steam-exploded BC (BCSE), KMnO4-modified BC (BCMn), and hydroxyapatite-modified BC (BCHA), were examined alongside two plant species, Brassica chinensis L. (Pakchoi; PC) and Pennisetum polystachion L. (Mission grass; MG), with and without root separation. Engineered biochar, particularly BCMn and BCHA, significantly raised soil pH, reducing Pb availability and solubility. Extractable Pb levels (via TCLP and CaCl2) decreased by 32.7%-33.9% and 48.5%-53.5%, respectively. In PC, Pb concentrations dropped by 66.3%-76.5% (shoots) and 336.2%-369.1% (roots), reflecting the synergy of intercropping and engineered biochar immobilization. Conversely, MG exhibited a Pb concentration decrease of only 22.4%-30.9% (shoots) and 9.8%-18.6% (roots), highlighting MG's hyperaccumulation. Furthermore, engineered biochar and intercropping enhanced plant growth, photosynthetic pigment levels, and gas exchange attributes by mitigating oxidative stress and enhancing antioxidant enzyme activities. In summary, engineered biochar amendments effectively reduced Pb levels

in the edible part of vegetable crops within an intercropping system, offering both theoretical insights and practical evidence for food safety and soil remediation simultaneously.

INDUCTION OF HEAT STRESS TOLERANCE IN ZEA MAYS L. BY USING ENDOPHYTIC FUNGUS ISOLATED FROM SELECTED HEAT TOLERANT PLANTS

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Maize (Zea mays L.) is important cash crop growing worldwide for their rich starch, proteins, fats and fiber seeds and major food source but at Global climate in the form of earth temperature, on the other hand, is a constant danger to this vital crop. The world's tropical zones are the most sensitive to rising temperatures since their plants are already stressed by the heat. As the temperature rises over its typical level, more water is lost, resulting in a physiological drought and a decline in the quality and amount of water. Fungal endophytes are used by researchers to generate biotic and abiotic tolerant plants. Present study deals with five different heat tolerant and growth-enhancing endophytic fungi. The endophytic culture s were screened for producing beneficial chemicals including primary, secondary metabolites and hormones. All plant growth promoting fungal strains was known to be helpful in alleviating heat stress by enhancing important phyto-hormones, secondary metabolites & shoot/root size, fresh/dry weight, after inoculation to maize seedlings on 25oC and 45oC. B10 2S strain results best growth-promotion and B12 2S was the least growth promoter, best IAA producer was B31S and Bc12 1L was least IAA producer, best GA producer was Bc10 1L, best ABA producer was B3 1S, best SA producer was Bc12 1L, best flavonoids producer was Bc11 2S, best Proline Producer was Bc10 1L, best protein enhancer was Bc11 2S, highest phenols producer was Bc10 1L, best lipids producer was Bc12 2S, best carbohydrates producer was Bc10 1L.

Keywords: Wheat, Endophytic Fngi, Heat stress, IAA, ABA

Technical Session-V

SYNTHESIS OF DECORATED GNPS REINFORCED COPPER COMPOSITES FOR THERMAL MANAGEMENT OF SMART DEVICES

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The dissipation of heat from high performance electronic devices is a future challenge and existing heat sinks have limitation to management due to lower thermal conductivity. This study explores the possibilities of decorating graphene nano platelets (GNPs) with different metallic nano particles to examine their physical, mechanical, and thermal properties. A few types of metallic nano particles were decorated on GNP and decorated GNPs were reinforced in copper, followed by sintering in argon. The density, hardness and microstructure of sintered parts were stied. The results showed that successful decoration of copper oxide, iron oxide, gold, and silver nano particles. The sintered density achieved was 80-90% and hardness measured was in the range of 45-80 Hv. FESEM images showed good dispersion and stable GNPs in the sintered copper composites. The test performed on LED showed a 20C drop in working temperature of LED and approximately 10% increase in luminous of LED.

HYDROTHERMAL SYNTHESIS OF NI-IN_2O_3 AND RGO/NI-IN_2O_3 FOR EFFICIENT DEGRADATION OF METHYLENE BLUE UNDER VISIBLE LIGHT

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This work aims to prepare photocatalysts with enhanced activity under visible light. One wt% transition metals Ni-doped indium oxide (Ni-In2O3) are synthesized via a hydrothermal route, and their composites with reduced graphene oxide (r-GO) are prepared. Improved photocatalytic materials were fabricated to exhibit organic dye photodegradation under visible light. A facile synthesis and composite formation method leads to well-defined morphology at a relatively low temperature. The bandgap energy of In2O3 metal oxide lies in the range of 3.00 eV to 4.30 eV under visible light. Its high light absorption capacity, high stability, and non-toxicity make it a choice as a photocatalyst active under visible light. The transition metal Ni doping changed the physiochemical (optical and chemical) properties of the In2O3 photocatalyst. These photocatalysts' structure and optical properties were completely characterized using different techniques. The materials thus synthesized were used for photocatalytic application. Methylene blue- a common dye used in the dyeing industry, is a model organic dye for degradation under visible light.

MICROBIAL STRATEGIES FOR SUSTAINABLE MANAGEMENT OF CHROMATE STRESS IN HOST PLANT

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Chromate stress poses a significant threat to agriculture, affecting not only crops but also the potential harm to humans consuming food grown in contaminated soil. Therefore, the management of chromate stress involves methods to reduce plant exposure and its subsequent transfer to humans through the food chain. Our research focuses on the use of Pantoea conspicua (MT5) and Aspergillus niger (CRS3) to assess their ability to restore the growth of Helianthus annuus L. under chromate stress. P. conspicua and A. niger strains revealed resilience, with the ability to withstand up to 1200 and 900 ppm, respectively, in the medium, efficiently biotransforming it into a non-toxic form. The selected levels of supplemented metals significantly decreased the growth traits of H. annuus ($p < 0.05$). Both the microbes rescued the host plant by establishing a higher colonization frequency within the host roots under chromate stress. Furthermore, MT5 transformed the toxic Cr-VI into the non-toxic Cr-III in the rhizosphere, significantly reducing its uptake by the host roots. Low Cr uptake and accumulation accompanied by microbial phytohormones enhanced the growth of the host plant. In contrast, CRS3 accumulated and subsequently transform metal within their hyphae. However, both microbes modified phytohormone production and strengthened the host's antioxidant system. Seedlings associated with these strains exhibited improved ROS scavenging, reducing its accumulation to a toxic level. Additionally, the strains produced higher amounts of phytohormones, including IAA, GA, and SA. These activities render them efficient phytostimulants that can be used as biofertilizers in chromium-polluted soils.

SYNTHESIS AND CHARACTERIZATION OF OLIGOIMIDE-GRAFTED GRAPHENE OXIDE-EPOXY NANOCOMPOSITES WITH IMPROVED THERMAL AND MECHANICAL PROPERTIES

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Epoxy resins are thermoset polymers that have been widely used as coatings, adhesives, laminates, encapsulates, electronic packing and resin composites. However, there are two major problems associated with epoxies which limit their use in high performance applications: First, the brittle nature after curing and second is their low thermal conductivity. To make these resins more valuable, aforementioned problems must be resolved. In this study, the properties of a commercial epoxy resin Arraldite LY-564 were improved by incorporating an anime terminated oligoimide mounted graphene oxide (MDA-GO). The surface of graphene oxide (GO) was modified by using commercial diamine methylene dianiline (MDA) and pyromelletic dianhydride (PMDA). This modified GO (MDA-GO) was dispersed in epoxy resin in different filler ratios to prepare series of MDA-GO-epoxy nanocomposites. In this series, MDA-GO showed good interfacial compatibility with epoxy matrix due to co-curing effect of terminal amino group and resulted in enhancement of thermal stability, thermal conductivity and mechanical properties of nanocomposites. Thermal analysis indicated that glass transition temperature (Tg) of nanocomposite with 5% modified GO filter was 14% higher than neat epoxy while maximum degradation temperature (Tmax) was enhanced 7% than neat epoxy. Moreover, 54% increase in thermal conductivity value was observed for same nanocomposite. Nanoindentation results showed an improvement of 79.3% in elastic modulus and 95.8% in hardness value for 5% filler loaded nanocomposite. The significant improvement in these properties of said nanocomposites demonstrated their poptential capability as high performance materials in electronic packing and electronic devices.

ELECTRON DONOR ACCEPTOR DOUBLE CABLE COVALENT CONJUGATES: TOWARDS IMPROVED PHOTOVOLTAIC DEVICES AND ACCELERATED ARTIFICIAL PHOTOSYNTHESIS

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Tremendous amount of effort is being invested in improving the optical and electrical properties of semiconducting materials for use in diverse applications. These efforts have led to a remarkable development in the field of semiconducting materials offering versatile chemical and functional traits. In this context, various chemically and functionally distinct classes of organic semiconducting polymers (OSPs) have been developed with functional groups as side chains and end groups. These provisions have resulted in the development of a toolbox of OSPs with tunable optical and chemical properties. Current research is focused on development of side chain engineered OSPs via Grignard Metathesis polymerization. The overarching aim was to develop a variety of OSPs with controlled chemical nature of side chain functional groups for targeted applications. In the context of energy applications, a part of work is related to developing facile strategies for covalent conjugation of OSPs with fullerene for better electronic communication between donor-acceptor (D-A) for enhanced photovoltaic effect that was revealed through current generation in photodetector devices that will open new avenues to materials for advancing applications. Besides, OSPs developed were employed in the development of hybrids of OSPs and NiO nanoparticles (NPs) to synergize their distinct optical and electrical properties for (electro)catalysis. In-addition, light harvesting NPs systems based on covalent conjugation of OSPs with flavin moieties were developed for biophotovoltaic devices that mimic the natural photosynthesis. In summary, this work will lead to development of OSPs derived functional systems with precise molecular design for energy, environmental, and biological applications

ENGINEERING CROP MICROBIOMES AND DESIGNING SOIL AMENDMENTS FOR SUSTAINABLE CROP IMPROVEMENT UNDER CLIMATIC CHANGE SCENARIO

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Soil microbial diversity is a key indicator of soil health and fertility. The main drivers of soil ecosystems include plant and soil type, and environmental conditions govern all factors. There is a dire need to explore beneficial microbial responses for managing the risks to sustainable agriculture in an environment threatened by climate change. Soil is a limited resource, and environmental stresses decrease agricultural productivity day by day. To check the effect of environmental stresses like drought, salinity, and heavy metal on soil microbial biodiversity and testing the efficacy of tolerant Plant Growth Promoting Rhizobacteria alone and in combination with effective soil amendment techniques for improving plant growth under predicted abiotic stresses of climatic change. Experiments were conducted to isolate and characterize stress-tolerant Rhizobacteria and to check their stress mitigation potential. Modified plant biomasses like compost, biochar, and bio-organic fertilizer were used as soil amendments techniques. Various morphological, physiological, biochemical, growth and productivity parameters were studied. Microbial strains were isolated from the stressed region. The identification of isolated microbial strains was carried out by physiochemical and 16s rDNA sequencing and phylogenetic analysis. Stress tolerance and different plant growth-promoting traits of isolated strains were evaluated under normal and stress conditions. Inoculation of seeds with PGPR along with compost, biochar, and bio-organic fertilizer improved all growth and productivity parameters, increased nutrient status, and improved osmolyte production and hence helping the survival and growth under stress conditions.Microorganisms have a variety of evolutionary adaptations and physiological acclimation mechanisms that allow them to survive and remain active in the face of environmental stress. Building our understanding of the interdependence of microorganism communities, ecological pressures, and plant responses will be necessary for understanding climatic effects on soil health and plant growth. Our new understanding of microbial diversity in response to environmental stresses will allow us to cure and conserve our environment and grow more food.

EXPLORING THE ELECTRONIC STRUCTURE AND BONDING IN ACTINIDE COMPLEXES USING DFT AND MULTI-CONFIGURATIONAL METHODS (CASSCF)

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The electronic structure of actinide complexes are interesting to explore due to the near degeneracies present in the valence orbitals and the ability of both the 5f and 6d orbitals to engage in bonding. In present work we have investigated the electronic structure of uranium-arene homoleptic complexes. This includes [U(naphthenelide)3]3- and [U(perylenide)3]3-and one heteroleptic complex of [U(anthracenide)3I]2-. Previous research has explored that the f orbitals on uranium and electrons from the arene can contribute in different types of bonding ranging from strong, highly covalent bonds to polarized donor-acceptor interactions between occupied orbitals on the ligand and empty orbitals on the metal. We have used a combine approach of DFT and multiconfigurational methods like CASSCF and complete active space second order perturbation theory (CASPT2), to study these complexes while ensuring that the electronic structure is properly described.

FROM STRESS TO SUCCESS: HOW SELENIUM NANOPARTICLES ENHANCE PLANT RESILIENCE AND OIL BIOACTIVES IN SESAME UNDER BIOTIC STRESS

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Vegetable oil consumption is expected to reach almost 200 billion kilograms by 2030 in the world and almost 2.97 million tons in Pakistan. A large quantity of edible oil is imported annually from other countries to fil the gap between local production and consumption. Compared to other edible oil crops such as soybean, rapeseed, peanut and olive, sesame has innately higher (55%) oil content, which makes it an excellent candidate to be considered to meet local edible oil production. Oil seed crops, especially sesame, are affected by various pathogens, which results in decreased oil production with low quality oil. Selenium nanoparticles (SeNPs) work synergistically, as it has antifungal activity along with improving plant growth. Different concentrations of SeNPs were used, on three different varieties of sesame (TS-5, TH-6, and Till-18). Plant growth and development were accelerated by SeNPs, which ultimately led to an increase in crop yield. Morphological parameters revealed that SeNPs resulted in a growth increase of 55.7% in root length, 48% increase in leaf number/plant, and 38% in stem diameter. Out of three sesame varieties, TS-5 seedlings treated with 40 mg/L SeNPs showed 96.7% germination and 53% SVI at 40 mg/L. Sesame varieties dramatically increased antioxidant capability using SeNPs, resulting in 147% increase in SOD and 140% increase in POD enzyme units in TH-6 and 76% elevation in CAT enzymes in TS-5 (mean ± S.E). GCMS analysis revealed that bioactive compound I, sesamin, sesamol, and tocopherol contents were increased along with enhanced production of different unsaturated fatty acids. Kegg pathway analysis and MSEA revealed that these compounds were mainly involved in biosynthesis of unsaturated fatty acids, suggesting that SeNPs have elicited the biosynthesis of unsaturated fatty acids such as oleic acid, linoleic acid, and α-linoleic acid. This study concluded that SeNPs (40 mg/L) have an excellent capability to be used for crop improvement along with better oil quality.

MOLECULARLY IMPRINTED POLYMER-PTCU ALLOY NANOCOMPOSITES FOR GLUCOSE SENSING

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Molecularly imprinted polymer-PtCu alloy (MIP-PtCu) nanocomposites have been fabricated by using a novel template free one-pot hydrothermal method. The morphology, chemical composition, functional groups and crystalline structure of the fabricated MIP-PtCu were assessed by the scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS), Fourier transform infrared spectroscopy (FTIR) and X-ray diffraction spectroscopy (XRD), respectively. Furthermore, the as-synthesized PtCu nanoparticles were embedded with the molecularly imprinted polymer to fabricate extremely sensitive or selective recognition composite material for sensing of glucose. Then, theses as-synthesized MIP-PtCu nanocomposites were immobilized onto IDEs surface to assess their sensitivity and specificity towards glucose. MIP-PtCu nanocomposite showed substantially sensitive and selective response towards glucose. The range of detection of MIP-PtCu nanocomposite for glucose sensing is 0.178-421 ppm and its lower limit of detection is 178 ppb. Moreover, the fabricated sensors show a higher selectivity response towards its analyte as compared to the other competing species.

ENTEROBACTER SP. AF-31 WITH MULTIPLE PLANT BENEFICIAL TRAITS ACTS AS GROWTH ENHANCER OF HELIANTHUS ANNUUS L. UNDER REDUCED FERTILIZER INPUT

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The health of soil plays an essential role in the ability of plants to produce food, fuel, and fiber for a growing world population. To keep pace, the total area of cultivated land worldwide has increased over 500% in the last five decades with a 700% increase in fertilizer use and a several-fold increase in pesticide use (Banerjee et al., 2019). However, it resulted in a remarkable increase in crop yield but drastically reduced soil fertility; increased the production cost, food prices, and carbon footprints; and depleted the fossil reserves and soil health with huge penalties to the environment and ecological sustainability. Moreover, continuous release of these chemical inputs causes toxic compounds such as metals to accumulate in the soil and move to the plants with prolonged exposure, which ultimately impact the human health. Besides, Pakistan is the world third largest importer of edible oil, imposing enormous burden on the economy of the country. Sunflower (Helianthus annuus L.) has great potential to bridge up the gap between production and consumption of edible oil. The use of plant growth promoting rhizobacteria is a promising strategy for sustainable agriculture production and is a potential alternative to chemical fertilizers and pesticides. Despite its economic importance, a little is known about the response of sunflower towards inoculation with PGPR. This study was envisaged for (a) the isolation, characterization and identification of a potent plant root associated beneficial bacteria from the soil samples collected from different sites of sub-division Dhirkot, AJK using biochemical and molecular techniques, (b) analysis of bacterial diversity using polyphasic techniques, (c) documenting exo and endo-rhizospheric bacterial interaction in sunflower using different microscopy techniques i.e., Transmission Electron microscopy and Confocal Laser scanning Microscopy and (d) sunflower plant inoculation and evaluation of potential plant growth promoting rhizobacteria under controlled conditions and field environment to select the candidate bacteria for inoculum production of sunflower. A potential Enterobacter sp. AF-31 was isolated from Chamman Kot, Himalayan Mountain region of Dhirkot(subdivision), Azad Jammu and Kashmir. The bacterium produced 24.67µgmL-1 indole-3-acetic acid, showed 137.84nmoles mg-1 protein h-1 nitrogenase activity and solubilized 40.11µgmL−1 insoluble phosphorus and showing significant decrease in pH (from 7 to 4.74) due to the production of oxalic acid, malic acid and gluconic acid. The Enterobacter sp. AF-31 was metabolically diverse (utilized 68 out of 96carbon sources), resistant to many antibiotics, and showed antagonistic activity against Fusarium oxysporum. Inoculation with this bacterium to sunflower grown in soil-free (hydroponic) medium, sterilized soil and under natural field conditions at two locations i.e., Rawalakot, Azad Jammu and Kashmir, and Faisalabad, Pakistan showed a significant increase in sunflower growth, yield and oil contents and achene NP uptake compared with non-inoculated control treatments. Enterobacter sp. AF-31 was able to colonize on sunflower roots forming a biofilm like structure; documented through yfp-labelling by confocal laser scanning microscopy as well as through immunogold labeling coupled with transmission electron microscope. This study concludes that the Enterobacter sp. AF-31 containing multiple plant growth promoting traits can be a potential candidate for production of biofertilizer for sunflower crop to enhance yield with reduced application of chemical (NP) fertilizers hence reducing the chemical fertilizer pollution crises.

Technical Session-VI

MOF/ZIF DERIVED HETEROSTRUCTURED ELECTRODE MATERIALS FOR ENERGY CONVERSION AND STORAGE APPLICATIONS

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Metal-organic frameworks (MOFs) have attracted great interest because of their unique porous structures, synthetic advantages, organic-inorganic hybrid nature, and versatile applications. Recently, the applications of MOFs in energy fields such as fuel storage, photo-induced hydrogen evolution, fuel cells, batteries, and supercapacitors have experienced a new surge of interest in chemistry and materials science communities. Research on the various applications of MOFs has shown that they are promising porous materials for energy storage and conversion technologies. Furthermore, MOFs have been used as support substrates to accommodate metals, metal oxides, semiconductors, and complexes and have sacrificial materials for generating various nanostructures for energy applications. Zeolitic Imidazolate Framework (ZIF) can provide hollow framework of nitrogen doped nano porous carbon with promising electrochemical activity. The enhanced activity and durability can be attributed to the synergistic effect from the nitrogen doped nano-porous carbon derived from ZIF. Here, we present the highlights of MOFs, ZIFs their composites and derivatives for energy conversion and storage applications.

COMPARATIVE STUDY OF MACHINE LEARNING MODELS FOR PLASTIC WASTE RECYCLE

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Machine learning provides an insightful way to see the intrinsic properties of plastic waste recycling through pyrolysis. Metaheuristic algorithms provide rapid procedures to enhance the efficiency of ML models. In this study the metaheuristic algorithms are integrated with ML models to mimic the pyrolysis process for plastic waste recycling. Feature engineering and hyperparameters tunning provide is performed to get the key parameters that impact the bio oil yield the most. The graphical user interface is developed for the optimum ML model and to ease in computing Bio Oil yield through pyrolysis of waste plastic waste.

A CLINICAL STUDY ON RISK FACTORS OF MULTIDRUG-RESISTANT TUBERCULOSIS-A HOSPITAL-BASED STUDY

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Multi-drug resistance TB (MDR-TB) is the resistance to first-line TB drugs for instance Rifampicin and Isoniazid. MDR-TB is prevalent in 9.3% of the Pakistani population and ranked 5 th with respect to MDR-TB burden. Lack of national awareness programs on antibiotic resistance as well as TB control, illiteracy, and poverty are the major causes of the increasing burden of MDR-TB. The present study was designed to assess the etiology and risk factors associated with MDR-TB from atertiary care hospital. The study involved sporadic cases of both MDR-TB and non MDR-TB patients. A well-designed questionnaire was used to collect all the essential information like general information, history of a patient, family medical history, symptoms/ causes, diagnosis, therapeutic prognosis etc. For inquiring about gene mutation that causes drug resistance, sputum samples were taken from patients and screened using Gene-Xpert technology. Statistical analysis was done using SPSS software version 22.0 (IBM). Frequency of MDR-TB and non MDR-TB patients was evaluated. For finding significant association of socio-demographic and clinical factors with drug resistance chi square test was performed. Finally, binary logistic regression was used for predicting the predictors of factors associated with drug-resistant tuberculosis. The research findings exhibited that MDR-TB is most frequent in the lungs (PTB). Female gender, lack of education, PTB, and primary condition are associated risk factors of MDR-TB. Mutation in the rpoB gene for rifampicin resistance was assessed using Gene Xpert technology. It accounted for 60% of mutation in probe E of the rpoB gene. This study highlighted the factors inclined to have drug resistance like female gender, lack of awareness, pulmonary infection, and primary case. Using a systematic approach MDR-TB can be dealt with by prioritizing factors figured out in this study.
Keywords: Tuberculosis, MDR-TB, risk factors

CONSTRUCTION OF AIE-ACTIVE FLUOROPHORES BASED ON ISOBUTYLENE BIS-NAPHTHYLAMIDE FRAMEWORK WITH SENSING APPLICATIONS

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Fluorescent materials with AIE activity are absolute reflection of the great philosophy. “United we stand, divided we fall” Aesop”. Since the debut of AIE concept, it has brought out a brilliant revolution in the field of fluorescent material science via opening a highly fertile ground for scientific community to cultivate new thinking with far-reaching ideas. The AIE phenomenon is precisely the reverse process to the ACQ effect in which organic fluorophores are non-emissive in solution while exhibiting robustly emissive behaviour with efficient quantum yields on aggregation or solid state. Hence the discovery of new working mechanism and novel molecular system with AIE feature in parallel to the responsive fluorescence sensing properties have begun garnering the attention of scientific community due to the cutting-edge perspectives. Herein, we have designed and synthesized a series of novel fluorescent materials via isobutylene bis-naphthylamide motifs with vivid AIE feature, highly responsive sensing and bio-imaging properties towards ionic species such as metal ions and anions.

DEVELOPMENT AND CHARACTERIZATION OF SUSTAINABLE NANOCOMPOSITE SOLID POLYMER ELECTROLYTES FOR ENHANCED IN LI-ION CONDUCTIVITY

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This work reports the fabrication and characterization of nanocomposite solid polymer electrolytes (NSPEs) for potential applications in Li-ion batteries. The solid polymer electrolytes are prepared by doping food-grade corn starch (as matrix) with $LiClO_4$ as a source of Li ions, Pluronic [a triblock copolymer of poly (ethylene glycol) and poly (propylene glycol)] as plasticizer, and graphene oxide as nanofiller via solution casting technique. Different characterization techniques, including X-ray diffraction analysis to elucidate the crystalline structure of the NSPEs, and FT-IR to evaluate the interactions between the polymer matrix and the additives are employed. Thermal properties are analyzed by differential scanning calorimetry (DSC) and a gradual decrease in melting point is observed by the addition of salt and Pluronic. EIS analysis has revealed a continuous increase in ionic conductivity after the stepwise introduction of $LiClO_4$, Pluronic and GO. The maximum ionic conductivity at room temperature is 35.66µS/cm with compositional formulation as Corn Starch/ 40% $LiClO_4$/ 20% Pluronic/ 0.5% GO. Temperature-dependent EIS analysis has revealed the concordance with Arrhenius model which shows the hopping mechanism of Li ions migration. The lithium transference number has been improved from 0.76 to 0.85 which reveals the ionic mode of conduction. The dielectric and modulus analysis has also given insight into faster relaxation time and improved ionic conductivity.

PROTEOMIC ANALYSIS OF H. PYLORI ISOLATED GASTRIC PATIENTS

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Introduction: Helicobacter pylori is a human stomach-dwelling organism that causes many gastric illnesses, including gastritis, ulcer, and gastric cancer. Objective: The purpose of the study was to perform differential proteomic analysis on H. pylori- isolated from gastric biopsies of infected individuals with gastritis, ulcer, and gastric cancer. Methods: Differential proteins were identified by making pooled samples of each group and subjected to nano-LC-QTOF MS/MS analysis. Results: A total of 44 significantly regulated proteins were identified in H. pylori isolated from patients with either gastritis, ulcer, or cancer. Comparative analysis of groups revealed that in case of cancer vs gastritis, 16 proteins were over expressed out of which 9 proteins including Cag3 & FlhA were upregulated in only isolates from cancer patients. Similarly, in cancer vs ulcer a total of 19 proteins were expressed. DNA Helicase & Adenyl succinate lyase were upregulated in cancer while Cag3 and FlhA were downregulated. In ulcer vs gastritis, 10 proteins were expressed. In this group, FlhA was overexpressed. A reduction in DNA gyrase subunit B was observed in ulcer vs gastritis and cancer vs ulcer. Conclusion: Our study suggested Six discrete protein signatures, Cag3, FlhA and DNA gyrase subunit B with differential expression in gastritis, ulcer, and cancer. Future perspectives: Protein expression profiles of H. pylori isolated from patients of these gastric diseases will help to understand the virulence and pathogenesis of H. pylori.

RICE STARCH BASED GREEN SOLID-STATE ELECTROLYTE: FABRICATION, CHARACTERIZATION AND ELECTROCHEMICAL ANALYSIS

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The study deals with the fabrication and characterization of sustainable nanocomposite solid polymer electrolytes (NSPEs) for their potential applications in Li-ion batteries. Solid polymer electrolyte (SPE) with rice starch as a polymer matrix while $LiClO_4$ as a source of Li-ions has been successfully fabricated by employing a solution casting technique. Pluronic (a class of commercially available triblock copolymers of poly(ethylene glycol) and poly(propylene glycol) has been used as a plasticizer. GO was added as a nanofiller. The FTIR analysis ascertained polymer-salt complexation. A prominent decrease in the melting point of the fabricated films was observed with the incorporation of the plasticizer and the nanofiller in the polymer matrix by differential scanning calorimetry (DSC). The X-ray diffraction (XRD) analysis was employed to analyse the structural changes in the polymer matrix upon the inclusion of salt, plasticizer, and GO. Electrochemical analysis of fabricated composite polymer electrolyte films was performed by electrochemical impedance spectroscopy (EIS). A high dc conductivity of 1.1 x 10^{-5} Scm^{-1} was attained by employing 50% salt into the polymer matrix that slightly increased up to 1.85 x 10^{-5} Scm^{-1} upon the addition of 20 wt.% plasticizer. The trend of increasing dc conductivity was also observed by employing nanofiller in NSPEs thin films. Fabricated nanocomposite films showed improved dc conductivity with increasing temperature as revealed by temperature-dependent EIS analysis that follows the Arrhenius character. The dielectric and modulus analysis revealed a faster relaxation phenomenon and hence high ionic conductivity of the fabricated nanocomposite films.

SYNTHESIS, CHARACTERIZATION, HIRSHFELD SURFACE ANALYSIS, ANTIOXIDANT AND SELECTIVE B-GLUCURONIDASE INHIBITORY STUDIES OF TRANSITION METAL COMPLEXES OF HYDRAZIDE BASED SCHIFF BASE LIGAND

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The synthesis of N'-[(4-hydroxy-3-methoxyphenyl)methylidene] 2-aminobenzohydrazide (HAHMB) was performed by condensing O-vanilin with 2-aminobenzohydrazide and was characterized by FTIR, high resolution ESI(+) mass spectral analysis, 1H and 13C-NMR. The compound H-AHMB was crystallized in orthorhombic Pbca space group and studied for single crystal diffraction analysis. Hirshfeld surface analysis was also carried out for identifying short interatomic interactions. The major interactions H...H, O...H and C...H cover the Hirshfeld surface of H-AHMB. The metal complexes [M(AHMB)n] where M = Co(II),Ni(II), Cu(II)and Zn(II) were prepared from metal chlorides and H-AHMB ligand. The bonding was unambigously assigned using FTIR and UV/vis analysis. The synthesized ligand H-AHMB and its metal complexes were studied for β-glucuronidase enzyme inhibition. Surprisingly the metal complexes were found more active than the parent ligand and even the standard drug. Zn-AHMB shown IC50 = 17.3±0.68 µM compared to IC50 = 45.75±2.16 shown by D-saccharic acid-1,4-lactone used as standard. The better activity by Zn-AHMB implying zinc based metallodrug for the treatment of diseases associated with β-glucuronidase enzyme. The DPPH radical scavenging activities were also studied for all the synthesized compounds. The CoAHMB complex with IC50 = 98.2±1.78 µM was the only candidate to scavenge the DPPH free radicals

FABRICATION OF POLYANILINE/BISMUTH-DOPED ZINC OXIDE (PANI/BI–ZNO) COMPOSITE FOR ENERGY STORAGE

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The performance of high-rate supercapacitors is greatly controlled by the electrical and morphological properties of electrodes. Owing to its unique behavior, polyaniline (PANI) is considered one of the best materials for storing energy. This study emphasizes the fabrication of PANI and PANI/bismuth-doped zinc oxide (PANI/Bi–ZnO) as electrode materials for high-efficiency supercapacitors. The pure PANI and its composite were synthesized through inverse emulsion polymerization. Electrochemical impedance spectroscopy, galvanostatic charging–discharging, and cyclic voltammetry were used to investigate the electrochemical properties. The PANI-based electrode showed high charge storage capacity with better capacitance retention. The PANI/Bi–ZnO composite showed high energy density and power density.

PREVALENCE OF LEISHMANIA IN THE ELEVEN DISTRICTS OF KPK, PAKISTAN

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Leishmaniasis is a parasitic disease caused by a protozoan parasite Leishmania that is transmitted to humans by the bite of sand fly. The vectors of Leishmania have two species i.e; Phlebotomus was in Old World and Lutzomyia were in New World. Leishmania were held to prevalent in 88countries throughout the world. Leishmaniasis was one of the most ignored health difficulties in tropical and subtropical regions. Leishmanisis was expresses in complicated procedures as: Cutaneous Leishmaniasis (CL), Mucosal Cutaneous Leishmaniasis (MCL), Diffuse Cutaneous Leishmaniasis (L), and Visceral Leishmaniasis (VL). The global prevalence of Leishmaniasis was 12 million. In Pakistan the first main endemic of Leishmaniasis was reported from Quetta, Baluchistan in 1935 following a plain earthquake. Worldwide the prevalence of Cutaneous Leishmaniasis was increasing in children in the age of 15years.Leishmaniasis infections were found in all ages and most commonly Cutaneous Leishmaniasis infected age groups were 10 to 40 years. In human part of the body site of lesion Leishmaniasis were found in neck, nose, hand, cheek, face, legs, arms and ears. The increases period were 2to8 weeks. Internationally, there were an estimated 1.5-2 million new cases and 70000 deaths each year, and 350million people were at the risk of infection by the illness. From the current study of Leishmania in the eleven districts of KPK from 2018-2020 concluded that the year wise district prevalence of Leishmanial patient of KPK cases from 2018-2020 showed high prevalence in Mardan and low prevalence in other districts. The data was also reported showed that males were more affected as compare to females. The age wise prevalence was highly reported in age group 1 to 24 years and low in 75 and above years old group. The sites of lesion were highly reported on hands and low on other parts of the body.

Keywords: Leishmania, Cutaneous leishmanisis, mucutaneous leishmanisis, Visceral leishmanisis , Lifecycle of leishmania, site of lesions, year wise, Age wise ,Gender wise, district wise, Month wise.

ACHIEVING THE SUSTAINABLE DEVELOPMENT GOALS THROUGH THE UTILIZATION OF NANOTECHNOLOGY

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As one of the revolutionary inventions of the twenty-first century, nanotechnology holds great promise for achieving the Sustainable Development Goals (SDGs) by providing solutions to issues in numerous industries. Since the turn of the 20th century, nanotechnology has advanced incredibly quickly in a variety of fields including health (e.g., drug delivery system, nanodrug, vaccines formulations and point-of-care diagnostics), agriculture (e.g., nano-fertilizers), clean drinking water (e.g., treatment and purification), clean energy technologies, lowering CO_2 emissions, and many more applications in the health and agricultural sectors. This study highlights how nanotechnology can be used in science, technology, and innovation (STI) to help poor nations meet their SDGs. Additionally, it will address the difficulties and implications of nanotechnology in a number of important domains and offer some policy suggestions.

EXPRESSION PROFILING OF CANDIDATE GENES IN BLOOD AND EPIDERMAL TISSUE OF PSORIATIC PATIENTS

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Psoriasis is an autoimmune skin disorder that is described by scaling and thickening of the surface of the skin, the epidermis, white blood cell accumulation, and inflammation. Histological characteristics comprise hyperproliferation and abnormal separation of keratinocytes within 4-8 days, vascular changes, and immune cell infiltration of the epidermis and papillary epidermis that cause inflammation. It is a multifactorial genetic disease that plays a crucial role in the manifestation and severity of disease. To provide insights into the immune modulatory mechanisms of the disease, we carried out the transcriptomic analysis of three transcription factor genes (STAT1, STAT4, and IRF5) from blood and two genes (STAT1 and STAT4) in epidermal tissue of psoriatic patients. It was done by RNA extraction both from blood and epidermal tissue which was quantified using RT-PCR. The double delta CT method was used to evaluate the differential expression of candidate genes in patients compared to healthy controls and psoriatic tissue compared to healthy tissue of patients and compared to tissues of healthy individuals. Upregulation of the transcription factor genes in blood and downregulation in psoriatic tissue compared to normal tissue of psoriatic patients while upregulation compared to normal tissue of healthy individuals was achieved. Transcriptomic variation in blood and epidermal tissue suggests the role of these genes in the activation of cytokines in psoriasis. Further studies will reveal the exact mechanism and effect of expressional variations of these genes leading to the diseased state.

Keywords: Psoriasis, RT-PCR, Expression, Blood, Tissue

PRODUCTION OF THERMOSTABLE ENDOGLUCANASE (CMCASE) FROM SUPER KOJI ASPERGILLUS ORYZAE M-60(5)

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Endoglucanase (CMCase) is an important enzyme of cellulase system, which synergistically clipped down β-1,4-linkages of cellulose. Super Koji mutants were developed through gamma rays treatment of A. oryzae cmc-1 (Koji) strain to enhance the production of thermostable endoglucanase. Initially seventeen mutants, hyper producers of CMCase were screened. Then six mutants resistant to 2-deoxy-D-Glucose were selected. The potent mutant M-60(5) having 60 kRad γ-rays exposure showed 3.6 folds higher CMCase production (6.02 U ml-1) and half-life of 29.42 min & 14.8 min at 55 °C and 60 °C, respectively. The M-60(5) did not produce aflatoxins and its FESEM analysis depicted that gamma radiation enhanced the stiffness of mycelia. Mutation in cmc-1 gene at one position was detected, which was the replacement of thymine with adenine at position 565. The process for endoglucanase production was optimized at lab scale (10 L) and scale-up at pilot scale in 200 L fermenter. Specific activity of endoglucanase after ammonium sulphate precipitation was 471 U mg-1 and purity was increased to 1.77-fold. The molecular mass of CMCase produced by M-60(5) was 24.5 kDa. Endoglucanase can be used in different industrial applications.

Key words: Endoglucanase, M-60(5), Fermentation, γ-rays, Molecular mass

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CONVERSION OF BIOWASTES INTO ENERGY STORAGE MATERIALS

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This study addresses two Sustainable Development Goals; Affordable & Clean energy (SDG-6) and Climate Action (SDG-7) by recycling one of biowaste of poultry industry; chicken feathers and its conversion into energy storage material by a facile high temperature carbonization strategy. The highly capacitive nitrogen-doped carbon material (NDCM) with significantly high-rate capability and high cycle stability were prepared from waste chicken feathers. The Raman spectroscopy, X-Rays Diffraction, X-Ray Photoelectron spectroscopy, Brunauer Emmet Teller/ Bayer Joyner Halenda, and Scanning electron microscopy were used for the physicochemical characterizations of the NDCMs. The synthesized carbons were tested as an electrode material for one of energy storage devices; supercapacitor with the help of Cyclic Voltammetry, Galvano-static Charge Discharge, and Electrochemical Impedance Spectroscopy. The obtained results suggested that high temperature pyrolysis of chicken feathers is a facile route to convert bio-waste into valuable energy storage materials.


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