



Book of Abstracts

3rd Global Science

Technology & Management Conference

(GSTMC-25) Jhang (Pakistan)

20-21 January 2025



GSTMC-25

Jointly Organized By

Jhang

University of Jhang & Evolution Pakistan



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BOOK OF ABSTRACTS

3rd Global Science Technology and Management Conference (GSTMC-25) Jhang

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Conference Fields

- Agriculture & Animal Sciences
- Biological & Chemical Sciences
- Computer, Physics & Numerical Sciences
- Commerce & Management Sciences
- Pharmacy & Allied Health Sciences
- Social Sciences & Languages

Introduction

About Conference

The goal of **Global Science Technology and Management Conference (GSTMC-25)** is to provide a stage for researchers and practitioners from academia and business to deal with state-of-the-art advancement in their respective fields.

GSTMC-25 will offer participants to interact with industry experts on the recent challenges in scientific research and associated areas. Leading researchers will share their incredible research findings and tools that they use to achieve better results. This international conference on multidisciplinary research and education is bound to generate a number of new ideas and experiences that participants, irrespective of who they are (Experienced scientists, seasoned professionals or young scholars at the early stages of their careers), can derive and make use of in some form of another, towards the advancement of their careers. For those looking to spread awareness of their incredible research findings and other work, they will also have the chance to present their papers and articles.

Objective of the Conference

Global Science Technology and Management Conference (GSTMC-25) is revolves around bringing Science Technology and Management research areas synchronically on an individual platform. This conference will draw collectively research fellowships from diverse fields in untidiness, to share their research findings and latest ideas. The main intention of this conference is to integrate interdisciplinary inquiry to deliver the best applications.

Global Science Technology and Management Conference(GSTMC-25) , one of the most meticulous specialist conferences of its kind in the academic world, has been specially devised to present technological and additional assistance to intensify investigation and innovative enterprises, disseminating groundbreaking experimental outcomes, as well as innovative magazines/papers.



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GSTMC-25-01 Computational Characterization Of ChREBP: Promoter In Fatty Liver Analysis

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ChREBP (carbohydrate-Responsive Element-Binding protein) is a transcription factor having a pivotal role in regulating glucose mediated lipogenesis in hepatic cells. This study presents thoroughly computational analysis of ChREBP. The 3D structure, quality of the given structure is analyzed by using computational biology. The SWISS-model gives the details that ChREBP is a monomer and its oligo state is a monomer. The GMQE (Global Molecular Quality Estimate) graph taken through SWISS-model which varies between the 0-1 predicts that the selected template having good quality. The QMEAN score lies between 0.5-1.0 means the given template is stable and is used for the further analysis. The phylogram of ChREBP reveals the closest relatives which includes *Rattus norvegicus*, *Rattus rattus*, *Mus musculus* and *Mus pahari*. After these, given characterization reveals the promoter role of ChREBP in fatty liver. The results show that ChREBP is upregulated in liver tissues from NAFLD patients. Several novel target genes of ChREBP are also identified which are involved in lipogenesis, including acetyl-CoA carboxylase (ACC) and fatty acid synthase (FAS). Knockdown of ChREBP in hepatocytes decreased lipid accumulation, while overexpression of ChREBP increased lipogenesis.

Keywords: ChREBP, fatty liver disease, lipogenesis, NAFLD, transcription factor

GSTMC-25-02 Modulation of the SIRT1 Gene by Phytoconstituents of *Aloe barbadensis*: A Key Intermediate in the Aging Process

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Skin aging is marked by a decrease in ATP synthesis, increased ROS production and reduced antioxidant defense, leading to damage to the cells, organelle membranes, DNA and skin proteins. This study aimed to evaluate the skin permeability, antioxidant, anti-inflammatory, and anti-aging effects of *Aloe barbadensis* phytoconstituents using computational techniques. Molecular docking was used to explain the energy required to pull apart the ligand receptor. Phytol, Lupeol, Lophenol, Sitosterol, Eicosane, and Cycloartenol were found to be used as skin permeant products at a skin permeability threshold of -5.0 cm/s. Molecular target prediction found tyrosinase, 11-beta-hydroxysteroid dehydrogenase 1, androgen receptor, and cyclo-oxygenase-1 as potential targets. Lupeol with a LogKp value of -1.9 with a docking score of -14.1523 kcal/mol and Lophenol with a skin permeability of -2.55 with a docking score of -13.3135 kcal/mol were found to have strong binding effects with the target protein of cyclooxygenase, but Cycloartenol (-10.2971 kcal/mol) and Lupeol (-10.988 kcal/mol) showed high antioxidant activity. Lupeol had binding score of (-12.8829 kcal/mol) with the Tyrosinase while Lophenol binds hydrophobically with Collagenase with binding score of (-14.1541kcal/mol). Amino acids with hydrophobic side chain Alanine, Valine and serine participate most of stable interaction between Ligand/Receptor complex. Furthermore, the SIRT1 gene was found to be an important intermediate in the aging process, tying *Aloe*

barbadensis' bioactive compounds for anti-aging potential. The study finds that dermatologists can use the aloe barbadensis to improve dermal and epidermal histology, lower inflammatory indicators, and ameliorate wrinkle formation.

Keywords: In-silico, Skin permeation, Pharmacokinetics, Molecular Docking, Protein-protein interaction.

GSTMC-25-03 Characterization Of Heat Tolerant Bacteria Isolated From Rhizosphere Of *S. Lycopersicum* L. And Its Varietal Response Against Heat Stress

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Plant Growth Promoting rhizobacteria (PGPR) play a significant role in protection of plants against abiotic stresses. PGPR increase nutrient availability in rhizosphere through enhance production of siderophores, indole acetic acid and plant growth regulators (Auxins, Gibberellins and kinetin). More than 200 rhizospheric bacterial strains were isolated from rhizosphere of *Solanum lycopersicon* L. and screened for heat tolerance under high temperature 30 - 50 °C. PGPR had been characterized for their ability to produce indole-3-acetic acid (IAA), siderophores, phosphate solubilization and ammonia production. These strains were further screened by 16S rRNA sequencing. Among all rhizospheric strains, most promising strain (T6) was identified as *Bacillus safensis*. Plant growth regulators (IAA, GA3 and kinetin) quantification of *B. safensis* was done at 40 °C and 50 °C by High Performance Liquid Chromatography (HPLC). *B. safensis* produced high level of kinetin (22.64) µg·L⁻¹ at 50 °C as compared to control. Green house growth trial was performed in two tomato varieties (Sweetie- heat resistant and Riograndi- heat sensitive) with inoculation of *B. safensis* under heat stress (42°C) and control. Significant increase was observed in fresh weight, shoot and root length in *B. safensis* inoculated CV. Sweetie as compared to CV. Riograndi. The objective of this study is to use heat tolerant PGPR against heat stress and used as an inoculant in agriculture for improvement of crops under abiotic stresses.

Key words: Rhizospheric, Plant growth regulators, Abiotic stress, Strain, Auxin.

GSTMC-25-04 A Multi-Dimensional *In Silico* Exploration of Brefeldin A (1JKM) and Pyrimidin

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Brefeldin A is a macrolide antibiotic known for its antimicrobial and antitumor activities. Pyrimidin derivatives exhibit a broad spectrum of biological activities, including antiviral and anticancer properties. This study aims to explore the interaction between Brefeldin A and pyrimidin through *in silico* methods to uncover novel therapeutic insight. The therapeutic potential of proteins and ligands can be comprehensively evaluated using advanced computational approaches. This study investigates the interaction between Brefeldin A (PDB ID: 1JKM) and

pyrimidin, a biologically active ligand, using *in silico* methods. Molecular docking via SwissDock demonstrated strong binding affinity (-7.8 kcal/mol), revealing significant interactions between the two molecules. ADME profiling through SwissADME confirmed pyrimidin's favorable pharmacokinetic properties, including high gastrointestinal absorption and compliance with drug-likeness criteria. SwissTargetPrediction identified potential molecular targets, while NetPhos analysis suggested phosphorylation sites on Brefeldin A, indicating its regulatory roles. The novelty of this research lies in integrating these analyses to provide a holistic understanding of the therapeutic potential of Brefeldin A-pyrimidin interactions. The findings not only offer insights into drug discovery but also establish a platform for experimental validation, contributing to the development of novel antimicrobial and therapeutic agents.

Keywords: Brefeldin A, pyrimidin, molecular docking, SwissDock, ADME,

GSTMC-25-05 Design, Simulation and Analysis of Electron Gun and Magnet of C-band Klystron for High Energy Accelerator

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We introduced here the design and simulation of electron gun and magnet of **50 MW C-band** klystron for high energy accelerator. It is a **diode gun** with a focusing electrode to focus the beam of electrons. The gun is designed and simulated in DGUN software. The operation of gun is performed at **350 kV** accelerating potential with the resulting space charge current **317.7 A**. To obtain an array of magnetic field, a magnet is designed and simulated in POISSON software. The obtained array of magnetic field is used to direct and transport the beam of electrons. The gun is designed with controlled parameters such as diminished ripple rate i.e. **4.2%**, low electric field on electrodes i.e. **17.44 kV/cm** and **18.14 kV/cm** are maximum electric fields on focusing electrode and anode respectively and uniform flow of electron beam.

GSTMC-25-06 Design, simulation and analysis of electron gun and magnet of S-band klystron for particle accelerator

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A high-power, **144.9 MW** electron gun with **2.0 μP** and current **414.2 A** for an electromagnetic S-Band Klystron is designed by using 2D, DGUN and POISSON softwares. The gun optics parameters were estimated through the Vaughan synthesis method. The static electric field on the electrodes is **18 kV/mm** which is under the scaling law. The current density of the cathode is less than **10A/cm²** keeping for maximum life of the cathode. An electromagnet is designed to transport the beam with lower ripple of **4.82%** to interact the beam with microwave smoothly with a fill-factor of **0.655** to avoid any damage to the drift tube. This gun and the magnet can be useful to the S-band RF power source to produce the high-power microwave for high energy particle accelerator.

GSTMC-25-07 Solid State Synthesis And Electrochemical Properties Of Cds/Ac Nano-Composites For Advanced Energy Storage Applications

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This study explores the solid-state synthesis and electrochemical properties of CdS/Activated Carbon (AC) nanocomposites, aimed at enhancing performance in advanced energy storage applications.

In order to create the CdS/AC Nano-composite, CdS nanoparticles were successfully produced and mixed with activated carbon (AC) using a solid-state method. Using methods including cyclic voltammetry (CV), scanning electron microscopy (SEM), and X-ray diffraction (XRD), the nanocomposites structural, morphological, and electrochemical properties were carefully examined. When compared to separate components, the CdS/AC combination demonstrated superior stability, high conductivity, and enhanced charge storage capacity. The composite is a viable option for use in supercapacitors and batteries because of the improved electron transport and expanded surface area made possible by the synergistic interaction between CdS and AC. The CdS/AC nanocomposite demonstrated excellent cycle stability and high specific capacitance during electrochemical tests, suggesting possible use in next-generation energy storage devices. Through the use of nanocomposite techniques, this work offers important insights into the creation of effective materials for energy storage devices.

KEYWORDS:- Cadmium Sulfide, Activated Carbon, Nano-composites.

GSTMC-25-08 Explainable AI for Cybersecurity Threat Detection to Reduce Cyber Attacks and Their Impact

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This research proposes the use of Explainable AI (XAI) techniques to develop an interpretable AI-based threat detection model. Explainable AI can provide insight into a model's decisions, helping cybersecurity professionals understand, trust, and act on AI predictions more effectively. By integrating explainability with threat detection, this study aims to reduce both the occurrence and impact of cyber-attacks, empowering cybersecurity teams to respond more efficiently and confidently to potential threats. In this context, we propose a hybrid framework using explainable AI techniques to assess cyber-risks generated from correlated phishing attacks. The first phase computes the probability of expert phishers within a community of similar attackers with varying expertise. The second phase calculates the probability of phishing attacks upon a firm even after it has invested in IT security and adopted regulatory steps. The third phase categorises phishing and genuine URLs using various machine-learning-based classifiers. Next, it estimates the joint distribution of phishing attacks using an exponential-beta distribution and quantifies the expected loss using Archimedean Copula. Finally, we offer recommendations for firms through the computation of optimal investments in cyberinsurance versus IT security. While existing literature highlights the importance of AI and machine learning in enhancing cybersecurity threat detection, there remains a significant gap

in the application of Explainable AI (XAI) methodologies specifically tailored for cybersecurity contexts. Most current research focuses on the accuracy and performance of deep learning models without addressing their interpretability, leaving a critical need for frameworks that integrate XAI principles into cybersecurity.

GSTMC-25-09 Big Data Investment and Organizational Performance: The Role of Big Data Governance and Big Data Analytics Capabilities

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The study examined the impact of big data investment (BDI), contractual governance (CG), and relational governance (RG) in healthcare on decision making (DMP) and organizational performance in the United Kingdom. The study further examined the role of big data analytics (BDA) capability as a mediator between the CG and the relationships between RG and DMP. Data driven culture was also examined as a moderator in the association between big data analytics (BDA) capability and DMP in this study as well. Managerial staff (IT Professionals and executives) in private hospitals in the United Kingdom comprised the target population. Data was collected from 310 respondents using a survey questionnaire. For testing the hypotheses, Structural equation modeling is used. Some analyses also examine through SPSS. The results show that big data investments are positively linked to big data CG and RG. Big data CG and RG are also positively linked with big data analytics (BDA) capabilities. Moreover, a mediating role of big data analytics (BDA) capabilities is established and data-driven culture moderates the association among big data analytics capabilities and DMP. Few relationships due to contextual factors and special research environments have been found insignificant. This study contributes to the literature on the mechanisms of big data management and governance through the mediation of BDA capability to establish a direct or indirect connection between decision making and big data CG and RG. This study gives guidance for hospitals to increase their big data capabilities to improve DMP and organizational performance.

Keywords: Big data investment, Big data contractual governance (CG), Big data analytics (BDA) capability, Big data relational governance (RG), Decision making performance (DMP), Organizational performance

GSTMC-25-10 Design and Prototype of Solar (CSP) Heating Water purification System

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Water is a fundamental resource critical for sustaining life on Earth. Despite approximately 70% of the planet's surface being covered with water, only 2.5% of it is fresh and suitable for human consumption. Ensuring access to clean drinking water remains a pressing global challenge. This project presents a sustainable solution for water purification using a solar-powered distillation system. In this method, a solar-powered heating rod is utilized to heat water, generating steam that undergoes condensation to produce purified water. The distilled water collected through this process is free from impurities, making it safe for drinking and food preparation. This eco-friendly approach

leverages renewable solar energy, offering an efficient, cost-effective, and environmentally sustainable means to enhance access to clean drinking water, particularly in areas with limited resources or unreliable water supplies.

Background: Traditional purification methods are often costly and resource-intensive, making them unsuitable for widespread use in resource-limited areas. Solar distillation, which replicates the natural water cycle using solar energy, provides an efficient and sustainable alternative. This project proposes a solar-powered water purification system using a heating rod to produce steam, which is then condensed into clean water. By harnessing renewable energy, this approach offers a low-cost, environmentally friendly solution to improve access to safe drinking water, especially in regions facing water scarcity.

GSTMC-25-11 Polystyrene Microplastics' Phytotoxic Effects on Wheat Growth, Morphology, Photosynthesis, Gas Exchange, and Oxidative Stress: The Role of Shape and Concentration

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Microplastics' tenacity and variety make them a serious ecological hazard to agricultural soils. This study examined the effects of four concentrations (0%, 1%, 3%, and 5%) and three forms (beads, fibers, and powder) of polystyrene (PS) microplastics on the growth of wheat (*Triticum aestivum* L.). All PS shapes significantly decreased morphological features, according to a factorial pot experiment. At 3% and 5% concentrations, powdered PS caused the most pronounced reductions in plant height (58%–60%), fresh biomass (54%–55%), and dry biomass (61%–62%). Along with a concentration-dependent decline in the leaf area index, greater concentrations also resulted in a decrease in fresh root weight and root length, regardless of shape. Antioxidant enzyme activity was elevated in all forms by increased PS concentrations, indicating a diverse reaction to reactive oxygen species. Chlorophyll pigmentation, photosynthetic rate, transpiration rate, stomatal conductance, and intercellular CO₂ concentration were all markedly decreased by PS at 5%. These results demonstrate the harmful effects of PS microplastics on the physiological and biochemical characteristics of wheat, with higher concentrations presenting more hazards. To further understand the consequences of microplastic translocation and tissue-specific retention in crops for food safety, more research is advised.

Keywords: agricultural pollution; abiotic stress; emerging pollutants; cereal crops; food safety

GSTMC-25-12 Population Estimation And Distribution Of Migratory Crane Species Wintering In District Bhakkar, Punjab, Pakistan

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Pakistan hosts four crane species, with Demoiselle and Common cranes being the least concerned, and Sarus and Siberian cranes being vulnerable and critically endangered. We assessed the population estimation and distribution of migratory crane species wintering in District Bhakkar, Punjab, Pakistan, during autumn 2023 and spring 2024. We collected the data using the line transect method. A total of 529 crane bird individuals were observed, including 310 demoiselle cranes and 219 common cranes, while Sarus and Siberian cranes not being observed. Overall, the study observed 28% of demoiselle cranes and 18% of common cranes in Bhakkar, while in Kallurkot, we observed 31% of demoiselle cranes and 23% of common cranes. Results of diversity indices revealed dominance (D') of 0.5139, Simpson (D) of 0.4861, Shannon (H') of 0.6792, evenness (E) of 0.9862 and Margalef (R) of 0.1595. The PCA analysis explained 98% of the variation in crane behavior, with Component 1 accounting for 93% of the variance and Component 2 explaining 5%. Overall, we observed 20 flocks, with an average of 28 flock sizes, 294 cranes visible through binoculars and 235 cranes visible to the naked eye in both autumn 2023 and spring 2024. The study found a linear correlation of 0.86 between environmental variables and cranes in Bhakkar and Kallurkot, indicating a significant impact. The study concluded a significant decline in crane populations due to human activities, suggesting that Pakistan, particularly Punjab, requires comprehensive studies on seasonal crane passage to conserve migratory cranes and attract international attention.

Key words: Cranes, Migratory birds, Population, Distribution, Wintering

GSTMC-25-13 *Momordica Charantia* Green Synthesis Of Carbon Dots For The Detection Of Cadmium (Ii) In Different Water Samples And Their Antibacterial Activity

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Carbon dots (CDs) are a novel class of fluorescent nanomaterials characterized by their particle size of less than 10 nm. These versatile nanomaterials have many applications, including drug delivery, synthetic chemistry, metal ion sensing, disease diagnostics, and biosensing. This study focuses on synthesizing CDs from *Momordica charantia* fruits, their characterization, and evaluating their antibacterial properties. The CDs were synthesized using the hydrothermal method. UV-Visible spectroscopy was employed to confirm the presence of CDs, while their characterization was carried out using X-ray Diffraction (XRD), Scanning Electron Microscopy (SEM), and Fourier-Transform Infrared (FTIR) spectroscopy techniques. The CDs demonstrated a limit of detection (LOD) and a limit of quantification (LOQ) for Cd(II) sensing in water samples of 3.08×10^{-5} M and 1.22×10^{-3} M, respectively. The CDs exhibited significant antibacterial activity against the gram-negative bacterial strain *Escherichia coli* (*E. coli*), with zones of inhibition measuring 2.3 mm, 5.6 mm, 10.5 mm, 14.2 mm, 17.0 mm, 21.3 mm, 27.0 mm, and 23.0 mm at a concentration of 500 μ L/mL of CDs. However, the CDs were inactive against *Streptococcus mutans*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa* bacterial strains. In conclusion, the synthesized CDs can be utilized for antibacterial activity against *Escherichia coli* and Cd(II) sensing.

KEYWORDS Carbon dots, Antibacterial activity, XRD, FTIR, SEM

GSTMC-25-14 Divergence and Comparative Analysis of Ketosynthase and 16S rRNA Genes in *Streptomyces* Species

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Polyketides, a vast group of medicinally significant natural compounds, are synthesized by polyketide synthases (PKSs). These enzymes, known for their structural diversity, are widely distributed across bacterial, fungal, plant, and other eukaryotic genomes. The ketosynthase β -subunit (KS β), also referred to as the chain length factor (CLF), plays a pivotal role in the biosynthetic pathways of type II bacterial aromatic polyketides. To study this, CLF nucleotide sequences were obtained from DoBISCUIT and GenBank for thirty three *Streptomyces* sp. and used to reconstruct a phylogram. The resulting phylogram revealed that most species grouped into clades corresponding to various aromatic polyketide classes, including angucyclines, anthracyclines, naphthoquinones, and pentangular polyphenols. Interestingly, *Streptomyces griseus*, known for producing griseusin, formed a distinct branch outside the main naphthoquinone clade, indicating a unique evolutionary trajectory. Similarly, *Streptomyces* sp. producing anthracycline polyketides clustered into three separate monophyletic groups. Additionally, 16S ribosomal RNA (rRNA) sequences from these species were analyzed to construct a second phylogram. The comparative analysis between the CLF and 16S rRNA phylograms revealed significant incongruence, suggesting the horizontal gene transfer of aromatic polyketide biosynthesis genes among *Streptomyces* species. These findings demonstrate that CLF-based phylograms can be valuable tools for DNA fingerprinting and screening genes involved in aromatic polyketide biosynthesis.

Keywords: Chain-length factor; DoBISCUIT; Phylogeny; Secondary metabolites

GSTMC-25-15 Pytogenic Synthesis Of Copper Oxide Nanoparticles From *Nepeta Lagopsis* Extract And Its Antibacterial And Antioxidant Activities

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Background: Copper oxide nanoparticles have bactericidal effects and are widely used in various research fields. The study aimed to produce copper oxide nanoparticles from an aqueous extract of *Nepeta Lagopsis* and evaluate their antioxidant and antibacterial activities. Materials and Methods: Copper oxide nanoparticles were synthesized by reacting 50 ml extract (10% w/v) with 50 ml copper nitrate solution (1 mM) under controlled conditions. The UV-Vis spectrophotometer validated the synthesis of copper oxide nanoparticles. The copper oxide nanoparticles were characterized using X-ray diffractometer, Scanning Electron Microscope, Energy-dispersive spectroscopy and Fourier Transform Infrared spectroscopy. The antioxidant properties of copper oxide nanoparticles were assessed using the 2, 2-diphenyl-1-picrylhydrazyl, hydrogen peroxide, hydroxyl radical. Copper oxide nanoparticles exhibit

antibacterial action. Copper oxide nanoparticles showed bactericidal activity against multi-drug resistance strains including *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Klebsiella pneumonia*. Copper oxide nanoparticles were tested for antibacterial sensitivity and minimum inhibitory concentration (MIC) against microorganisms.

Results: The *Nepeta Lagopsis* extract produced crystalline copper oxide nanoparticles with an average particle size of 20 nm and a spherical shape. The synthesized copper oxide nanoparticles showed significant radical scavenging percentage in the range 40-85% for the dose amounts in the range 1-3 mg/mL. Copper oxide nanoparticles with amounts in range 1-3 mg/mL effectively inhibited MDR bacterial strains including *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Klebsiella pneumonia* bacteria. The copper oxide nanoparticles had MIC values of 16.53 µg/mL for *Escherichia coli*, 4.32 µg/mL for *Pseudomonas aeruginosa*, 16.62 µg/mL for *Staphylococcus aureus*, 8.12 µg/mL for *Klebsiella pneumonia*, and 8.67 µg/mL for *Pseudomonas aeruginosa*.

Keywords: *Nepeta Lagopsis*, copper oxide nanoparticles Green synthesis Antioxidant Antibacterial activity

GSTMC-25-16 Characterization Of C-C Chemokine Receptor 5 Protein; Unraveling Its Sequence-Structure Through *In Silico* Approaches

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Cysteine-cysteine chemokine receptor 5 (CCR5) has been identified as a co-receptor for HIV's entry into the immune cells i.e. TD-4 cells, responsible for causing contagious diseases. Human immunodeficiency virus type 1 (HIV-1) has been an unwavering health concern in the present era with approximately 38 million people affected throughout the world. Although, techniques for curing this lethal disease have been introduced e.g anti-retroviral therapy (ART) but with certain limitations, for example, HIV-1 could cause resistance against ART medications which is an expensive treatment. CCR5, a vital G protein coupled receptor has been uncovered as a therapeutic target for HIV-1 disease. In this study, various bioinformatics tools were utilized for in depth investigation of query protein. The CELLO v.2.5 tool elucidates that the subcellular localization of CCR5 protein was estimated to be a cytoplasmic membrane protein with the highest localization score 4.996 in membrane and these results were validated using webserver PSORTb which gave highest localization score 9.99 in cytoplasmic membrane. The active sites of protein under examination were identified by an online available webserver CASTp which showed a large active pocket with solvent accessible (SA) area of 922.862 and sixty active amino acid residues in the chain. Moreover, the transmembrane regions of hypothetical protein were determined, illustrated and examined through the helical wheel plots generated by EMBOSS pepwheel tool which highlighted the amphipathicity and other properties i.e. aliphatic, hydrophilic and positively charged residues around the helix. BioGRID software was used to check protein and/or chemical interactors of CCR5 protein, results of which showed its interaction with various interactors including maraviroc, the antagonist of CCR5 protein vital for blocking the entry of HIV virus into cells. This computational biological study has disclosed the sub-cellular localization, active sites, transmembrane regions and its biological interactions which will prove to be effective for scientific researchers in inquiring medical potential of

C-C chemokine receptor 5 from *homo sapiens* as future protein-based treatments of various human diseases including HIV-1.

Keywords: c-c chemokine receptor 5, subcellular localization, active sites, transmembrane regions, protein and/or chemical interactions

GSTMC-25-17 Unrevealing The Structural Dynamics Of Prion Protein From *Homosapiens* To Examine Significance

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Prion protein is a naturally occurring protein found in cells of mammals including humans. Structure of protein in which comprises of flexible N-terminal tail and globular c-terminal. It is involved in cell signaling, copper binding, antioxidant activity. It refers the abnormal folding of protein leading to diseases. BSE, Creutzfeldt-Jakob disease, and scrapie. Understanding prion protein biology is crucial for developing diagnostic and therapeutic strategies. Research on prion protein can lead to insights into neurodegenerative diseases and development of novel treatments. In this study, the protein sequence of prion protein retrieved from NCBI data base for 3D structures. By using trRosetta tool 3D structure is predicted, colors in rainbow from purple N-terminal to red C-terminal. Its TM-score is 0.603. The confidence of the model is high. 4KML-A template confidence is 100.0, coverage is 44.1, identity 100.0, E-value 2E-63, Z-score is 49.831. trRosetta also predicts 2D structure of prion protein from *homosapiens*. 5 graphs are predicted by using contact graph range is 1.0 to 0.2, Distance graph range is 2.0 to 4.0, omega graph range is 150 to -150, Theta graph also range is 150 to -150, phi graph range is 180 _ 0. Swiss online web server also predicts 3D structure. Sequence identity of 2ef 0.1.A is 99.34%, identity is 0.61, X-ray is 2.00Å, GMQE is 0.95. IntFOLD tool helps to predict 3D structures of protein 7AF2TS2 template in which confidence and P-value medium value 3.15E2, Global model quality score is 0.3750. RasMol coloring uses the reverse rainbow scheme from blue (high accuracy) through green, yellow and orange to red (low accuracy). JSmol coloring uses a gradient from blue (high accuracy) through white to red (low accuracy).

Keywords : prion, 3D structure, trRosetta, Swiss, IntFOLD (RasMol, JSmol).

GSTMC-25-18 Characterization Of Structure And Function Of Desmin Protein From *Canis Lupus Familiaris* To Examine Its Medicinal Significance

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Desmin is a member of the large multigene family of IF proteins and is specifically expressed in myocytes. Desmin filaments are mostly situated near the Z-disk periphery in striated muscles and surrounding dense bodies in smooth muscle cells. Desmin involves in the maintenance of cell shape and mechanical integrity, regulates organelle anchorage and movement, and is engaged in cell migration and adhesion. Desmin possesses various isoforms, and is expected as a specific marker for myogenic differentiation. The protein sequence of desmin from *Canis Lupus*

familiaris was retrieved from the GenPept database for characterization. The physicochemical properties of desmin protein were predicted using ProtParam including molecular weight (53320.60 D), theoretical pH (5.21), extinction coefficient (26,360 at Abs 0.1% [=1 g/l] 0.494, assuming all pairs of Cys residues form cystines), instability index (50.66), aliphatic index (80.77), and grand average of hydropathicity (-0.710) . Complete annotation of the desmin protein was conducted, revealing six helices, 107 exposed region, 106 buried region, 17 disordered region, 6 Protein binding sites and 6 strands (positions15-18,257-262,422-426,443-433,445-453,456-466. Additionally, the protein-protein interactions of the desmin protein were predicted, identifying the top ten interacting proteins, including Phosphate cytidyltransferase 1, choline, alpha, Ig-like domain-containing protein; Belongs to the MHC class II family, Gigaxonin, Myosin binding protein C, slow type, Myosin light chain 1, Myosin binding protein C, fast type, Myosin binding protein C, cardiac, Troponin T3, fast skeletal type, Uncharacterized protein, Myosin light chain 3 using STRING.

Keywords: Desmin, Myogenic Differentiation, Physiochemical properties, Structural annotation, Protein-protein interaction.

GSTMC-25-19 The Nexus Of Hygiene And One Health In Mitigating Infectious Diseases:A Global Health Aproach

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Background: Hygiene is a vital aspect in one health model. The global disease burden has impacted the food security, health security, economic security and water security. The core idea of one health lies in the collaborative approach to facilitate health of human ,animal and environment by creating the linkage between these biotic & abiotic factors of environment.

Purpose : The purpose of this monograph is to illustrate the bond between hygiene within the boundaries of one health. Furthermore, exploring the role of hygiene in mitigating the infectious diseases in context of human , animal and environmental health.

Methods : The employed mixed research methods in designing of this manuscript includes mind mapping, data analysis, literature review , relevant graphs, global health indexes & reports from international organizations like CDC, WHO and UN .

Conclusion: This monograph highlights the bond between hygiene and one health analyzing interconnected issues, solutions & effects in altering the global disease burden. Moreover , strengthening planet earth enhances environmental protection which fosters the well-being of humans, animals and environment.

Significance: This limited study reveals the worth of clarifying the hierarchy of hygiene in relation to infectious diseases .

Keywords :

Hygiene, one health , infectious disease, water security, food security.

GSTMC-25-20 Allelopathic Effects Of Fresh And Dried Leaf Extracts Of *Avena Fatu* on Wheat Cultivars
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Plant invasions pose a significant threat to global biodiversity and economic sustainability. Allelopathy is recognized as a crucial mechanism through which these invasive plants adversely affect native flora and fauna. This study aimed to investigate the effects of fresh and dry leaf aqueous extracts of *Avena fatua* on two wheat varieties. Two wheat varieties (Ujala and Arooj, referred to as RV I and RV II, respectively) were selected to assess the impact of *A. fatua* on germination and growth parameters. Mature, healthy fresh leaves of *A. fatua* were collected, and solutions of 25% and 50% concentrations were prepared. For the dry leaf solutions, leaves were air-dried at room temperature in the shade, and similar concentrations were prepared. Ten sterilized, viable seeds per petri plate were randomly placed, and the prepared leaf solutions (25% and 50%) were added to the plates. Distilled water was used as the control treatment. Data on germination and growth parameters were recorded. Significant reductions ($p < 0.05$) in germination, plumule, and radicle growth were observed with increasing extract concentrations. The dry leaf extract caused more inhibition (50%) in all parameters compared to the fresh leaf extract. The results indicate the inhibitory effects of grassy weed leaf extracts, likely due to allelopathic compounds in the leaves, which may act independently or in combination to inhibit plant growth. Wheat variety Ujala showed higher tolerance to the allelopathic effects of *A. fatua* leaf extracts, making it more resilient to allelopathic stress. Future research should explore the potential use of *A. fatua* leaf extracts in sustainable weed management strategies and evaluate their broader ecological impacts under field conditions.

Key words: Aqueous extract, Germination, Growth, Inhibition, Wheat varieties.

GSTMC-25-21 Exploration Of Eating Patterns Among University Hostel Residents

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The aim of the present study was to investigate eating habits of university hostelite students in regard to meal frequency and food preferences besides associated health habits. The results of the survey provided important insight, and there were important findings on how students in hostels maintain or neglect their health and nutritional well-being. Consumption of two major meals per day was a very common habit for most of the students with special reference to the 18-20-year-old students who skipped their breakfast regularly. Most of the students preferred self-cooking or eating at the hostel mess, although a fair proportion also depended on outside food delivery. Many respondents regularly consumed packaged and processed foods, such as chips and instant noodles; the consumption of fresh fruits and vegetables was relatively low. Many of them reported the occasional consumption of carbonated and sugary drinks, while quite a number of them also indulged in midnight eating. Similarly, the intake of dairy products, whole grains, and lean proteins was also irregular, with some students hardly consuming them or not at all.

Most students, despite these dietary challenges, reported no major weight changes, although a portion did report weight loss. Digestive problems abounded, with bloating and indigestion among the frequent complaints. The study therefore recommends that hostel dining services should focus on preparing and serving more wholesome and balanced meals with much emphasis on the availability of fresh fruits, vegetables, and whole grains.

GSTMC-25-22 فہم قرآن میں قرآنی عربی گرامر کی ضرورت اور الحادی مسائل اور حل

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عربی زبان تاریخ کے ہر دور میں ایک زندہ و تابندہ زبان کی حیثیت سے رہی ہے۔ اور آج بھی اپنے تمام تر اوصاف کے ساتھ ایک ترقی یافتہ زبان ہے۔ اس کی سب سے بڑی فضیلت یہ ہے کہ اسے اللہ تعالیٰ نے قرآن کو اسی زبان میں نازل فرمایا ہے۔ اس لیے اسے ام الالسنہ (تمام زبانوں کی ماں) کہا جاتا ہے۔ اہل عرب کی یہ مادری زبان تھی۔ جب اسلام نے سر زمین عرب سے باہر قدم رکھا۔ تو غیر اقوام کے لئے عربی زبان فہم قرآن کے لئے رکاوٹ ہوئی۔ عصر حاضر میں اس زبان کو کئی چیلنجز کا سامنا ہے۔ جن میں عالمگیریت، الحادیت، غیر ملکی زبانوں کا اثر، قرآنی عربی گرامر کی کمی وغیرہ شامل ہیں، پاکستانی نصاب تعلیم میں یہ تحقیق قرآنی عربی گرامر کی ترقی عصری الحادی مسائل اور ان کو ممکنہ حل پر روشنی ڈالتی ہے۔ مزید اس تحقیق میں ان اقدامات کا جائزہ لیا گیا ہے۔ جو پاکستان میں قرآنی عربی گرامر کی بحالی اور فروغ کے لیے کیے جارہے ہیں۔ خاص طور پر تعلیمی او ٹیکنالوجی کے شعبہ جات میں۔ اس کے علاوہ مستقبل کے امکانات اور حکمت عملیوں پر بھی غور و خوض کیا گیا ہے؟ جو جو قرآنی کلام کو جدید ضروریات سے ہم آہنگ کر سکتی ہیں اور فہم قرآن میں معاون ہو سکتی ہیں۔

- کلیدی الفاظ: عربی زبان - قرآن کی زبان ام الالسنہ - پاکستانی نصاب تعلیم - عالمگیریت - ٹیکنالوجی - اقدامات - گرامر

GSTMC-25-23 Impact Assessment Of Oxidative Stress Caused By The Cadmium Chloride In Model Animal *Rattus Rattus*

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The rodents are economically significant as serious pests to destroy crops, orchards and stored food grains. Major crops losses caused by field rats either directly or indirectly in different areas of Pakistan is highly increased. The present study was conducted to evaluate the physiological, hematological and histopathological changes caused by the cadmium chloride as oxidative stress. To determine the effect of cadmium chloride on water, feed intake, body weight, and histopathology two weeks old rats were used for experiment. Total 15 rats were divided into 5 groups randomly with 45 to 60 g body weight and were kept individually for 15 days after acclimatization in the cages. Control group marked as T0, cadmium treated rats via water marked as group T1 and T2 while cadmium treated rats

via feed were marked as group T3 and T4. During the treatment period daily feed consumption, water intake and body weight of rats were monitored. Water consumption increased significantly in the groups treated with cadmium chloride due to dehydration. Coat color of the rats was turned to pale brown and gradually fur of rats fallen down at the end of the trial period except the rats of control group. In this project, the tested parameters of serum were serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT). These two parameters were tested to evaluate the physiology of liver. The tested value was 256.4 greater than 122.6 reference value ($p > 0.05$). The higher tested values was the indication of liver damage to some extent. Necrotic changes were observed in histopathology of liver as the loss of striation and putrefaction of individual cells.

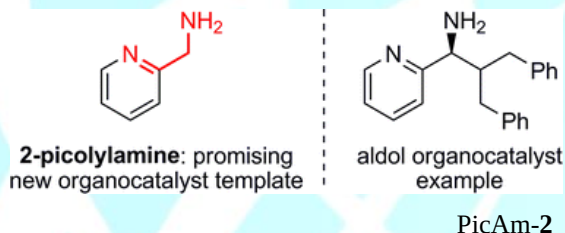
GSTMC-25-24 New Picolylamine Template Organo-Catalyst For Enantioselective Aldol Reactions

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Abstract: Picolylamine template organocatalyst containing only one stereogenic center has been identified for fast aldol reactions (16-48 h). Using 2–5 mol% of (*R*)- or (*S*)-PicAm-2, cyclohexanone (3.3 equiv) readily undergoes aldol reactions with *o*-, *m*-, and *p*-substituted aromatic aldehyde partners (limiting reagent), including the poor electrophile 4-methylbenzaldehyde (95–99% ee). Furthermore, functionalized cyclic ketone substrates have been converted into four aldol products 9–12 using the lowest catalyst loading (5.0 mol%) to date with the highest yield and enantioselectivity.



Keywords: Picolylamine, Enantioselective Aldol Reaction, Asymmetric Aldol, Organocatalysis

GSTMC-25-25 A Comparative Study On The Production Of Bioethanol From Wheat Straw Residue As Industrial Feedstock In Pakistan

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In the awake of current challenge faced by world concerning high GHG emissions, high fuel rates and global warming, lignocellulosic biomass of wheat straw is cheap, abundant, easily accessible, and effective substrate for the

commercial scale production of green bioethanol. Various pretreatment methods including physical (milling), and chemical pretreatment (H_2SO_4) were applied on wheat straw samples obtained from three different regions of Punjab, i.e., Faisalabad, Jhang and Sialkot in Pakistan. Maximum cellulose content (61.3%) was obtained from residual lignocellulosic biomass of Jhang with maximum delignification (71.6%) as result of pretreatment with 2.5% H_2SO_4 for 60 minutes at 121°C in autoclave. The structural modification by pretreatment were confirmed by SEM, XRD and FTIR results. The pretreated sample was enzymatically hydrolyzed by cellulase and xylanase enzymes by incubation for 8 hours aimed at bioconversion of cellulose and hemicelluloses to fermentable sugars. The pretreated wheat straw samples of Faisalabad showed the highest saccharification extent (21.6%) while Jhang wheat straw samples showed lowest saccharification extent (20.09%).

Keywords: 2-G bioethanol, wheat straw, hot acid pretreatment, saccharification, delignification

GSTMC-25-26 Academic Dishonesty And Its Impact On students Moral And Personality Development

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Academic dishonesty is an illegal activity in which students are involved in different ways for the temporary benefit of ignoring other aspects of this illegal activity. One aspect of this activity enchants students to get temporary success in exams through unlawful activity. On the other hand, the second aspect is very terrible, which spoils all students' abilities. This study aims to highlight the effect of academic dishonesty on students' moral development and personality. This study was conducted at the University of Agriculture Faisalabad. Out of a total of seven faculties faculty of social sciences was chosen purposively. A total of 105 students were selected randomly from the chosen faculty. The researcher collected data through a validated and pre-tested questionnaire. Collected data were analyzed using Statistical Package for Social Sciences (SPSS). The results of this study indicate that lack of confidence, Failure to explore ideas, and lack of hard work have adverse effects on students' personalities. Lack of discipline among students and low acceptance of students' opinions lowered students' moral development. This study suggested that academic dishonesty is minimized by using institutions' ethical, and professional standards and building student confidence.

Keywords: Academic dishonesty; Moral development; personality; Confidence.

GSTMC-25-27 Effects Of Professional Development Of Public Primary School Teachers On Their Pedagogical Skills

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Professional development is the most important strength of a teacher. It plays a vital role in the enhancement of the quality of teaching. Teaching is not a minor or unidirectional task for teachers but there are many dimensions of the aspects of the teaching or pedagogical process. A common man may not become a teacher in a real sense due to a lack of professional development. It is known that deficiency in professional development is badly affecting the pedagogical process and is also affecting the quality of education of the school education especially. In this sense, there is an emerging need for research on the professional development of teachers to enhance the excellence of tutorial skills. This study was focused on professional development activities, their importance, effects on the enhancement of pedagogical skills, and barriers affecting the pedagogy skills of public school teachers. Data of teachers were collected through the website sis.punjab.gov.pk. There were 15 marakez having 161 primary schools in Tehsil Bhowana, District Chiniot. Six marakez having two marakez of male wing (43-M and 46-M) and four marakez of female wing (markaz 23-W, 24-W, 26-W and 28-W) were selected for data collection. Then 7 schools from each markaz were selected using multistage random sampling. The lottery method was used to select schools. The total no of respondents in schools was 154 and 110 teachers were selected from the selected schools keeping in view time and resources. The sample size was obtained using www.surveysystem.com with a confidence level of 95% and a confidence interval of 5. Furthermore, the data were examined by using Statistical Package for the Social Sciences (SPSS). The majority of teachers had practiced induction training. Most of them have not practiced any other professional development activities like CPD, coursework programs, mentoring, etc. Many barriers affect pedagogy due to deficiency of professional development activities for example lack of funding, over-emphasis on teaching, poor work-life balance, lack of awareness, lack of encouragement, lack of opportunity, and lack of personal interest, etc. It can be concluded that skills to make lesson planning, use of A.V aids, making timetables, computer skills, management skills, developing grant research proposals, communication skills, teaching skills and to make conducive environment should be focused in future professional development activities. It is proposed that all professional development activities should be promoted among teachers. Factors affecting pedagogical skills should be minimized. Clear guidance for planning lessons, subject knowledge improvement and guided to use time effectively should be focused on the professional development of teachers to enhance their pedagogical skills.

Keywords: Professional development, public school teachers, and pedagogical skills.

GSTMC-25-28 *Hymenaea Courbaril* Resin Mediated Synthesis Of Silver Doped Iron Oxide Nanocomposite For Dye Degradation And Antimicrobial Activity

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Metal and metal oxide nanoparticles have recently gained the focus of scientific community due to their unique features and potential applications in a biomedical, pharmaceutical wastewater treatment, catalysis, energy storage and other various fields. This paper describes the green synthesis and characterization of Fe₃O₄, Ag, and silver/iron oxide (Ag@Fe₃O₄) nanocomposite, which were synthesized employing a green synthesis technique with *Jutaicica* resin. The effective integration of Ag into Fe₃O₄ nanoparticles was confirmed by using X-ray diffraction (XRD),

Energy-Dispersive X-ray spectroscopy (EDX), scanning electron microscopy (SEM), and Fourier transform infrared (FTIR) spectroscopy. Physical characterization revealed that the synthesized nanoparticles were small in size and pure. Spectroscopic techniques such as ultraviolet-visible spectroscopy, FTIR, and SEM demonstrated the green synthesis of nanocomposites. The phenolic hydroxyl functional groups were found to play an active role in nanocomposites formation and stability. The SEM and UV-Visible spectral data revealed that the particles are well distributed and spherical, with an average size of 45 nm. The synthesized nanocomposite (Ag@Fe₃O₄) demonstrated remarkable degradation potential against Congo red (CR) and para-nitrophenol (PNP) and the generated nanocomposite (Ag@Fe₃O₄) decomposed CR by 73% and PNP by 82% in 120 minutes. The synthesized nanocomposite successfully detected amoxicillin and levofloxacin in aqueous medium, as confirmed through color change and ultraviolet-visible spectra.

Key words: Resin, nanocomposite, dyes, degradation, antibiotics, sensing

GSTMC-25-29 Ecotoxicity of the Phthalates in *Cirrhinus mrigala*; Oxidative Stress Assessment

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In addition to skincare products, plastics frequently constituted phthalates (PAEs). However, when plastics became trash, they produce enormous amounts of plastic waste. Phthalates and their derivatives are typical water contaminants. Aquatic organisms have shown oxidative stress responses brought on by plasticizers. In this study the alterations in the antioxidant enzyme activities, viz catalase (CAT) and superoxide dismutase (SOD) in organs of *Cirrhinus mrigala* was analyzed. Fish sample were taken from natural breeding pond and acclimated in glass tank for two weeks. To determine the acute toxicity of phthalates for *Cirrhinus mrigala* in terms of the 96-hour LC₅₀ and lethal concentration fish were exposed to different concentration of phthalates. There was one control group and three treatments. All treatments were exposed to sub lethal concentration of LC₅₀ of diethyl phthalates for 75 days. Fish samples were taken at regular interval for the assessment of antioxidant enzyme activity in different organs. Daily measurements of Physico-chemical parameters was also made and organ samples taken after the dissection of fish. The result indicated that acute toxicity of DEP was also evaluated in term of LC₅₀ and LC₉₉. SOD activity in fish liver was noticed to increase first and reach to maximum level during chronic exposure of DEP while afterwards it was decreased from control values. Sub- lethal dosage of DEP cause more effects in liver than the gills. Data analyzed statistically by using ANOVA was significant and the relationship among the physico-chemical parameters was evaluated by correlation analysis using software Statistix ^{8.1}. Variation in antioxidant enzymes activity could be considered as a reliable biomarker.

Key words: Antioxidant enzyme, diethyl phosphate, measurements of parameters, oxidative stress, acute toxicity.

GSTMC-25-30 Maximizing Biomethane Production from Lignocellulosic Biomass with a Custom-Designed Microbial Consortium

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Biomethane production from lignocellulosic biomass via anaerobic digestion (AD) represents a promising strategy for sustainable bioenergy generation. This study evaluates the efficiency of a custom-engineered microbial consortium (DMC) in optimizing biomethane yields from three lignocellulosic feedstocks: kallar grass (KG), rice husk (RH), and wheat residue (WR). The DMC, consisting of microbial taxa including Bacteroidetes, Firmicutes, Proteobacteria, Euryarchaeota, and Chloroflexi, with methanogens comprising 14.6% of the microbial community, was applied under controlled AD conditions. Detailed physicochemical characterization and ultimate analysis of the feedstocks revealed their distinct biomethane potentials (BMPs). The system demonstrated efficient biomethane production, with methane concentrations ranging from 61-64.6% during the initial week of AD. Among the biomasses tested, KG exhibited the highest BMP (289.7 mL/g VS), followed by RH (283.3 mL/g VS) and WR (269.7 mL/g VS), outperforming previously reported BMP values for similar feedstocks. The modified Gompertz model provided the best fit for predicting methane production dynamics, followed by the logistic and transference function models. These findings emphasize the considerable potential of KG, RH, and WR as efficient substrates for biomethane production and highlight the significant role of microbial consortia in enhancing anaerobic digestion processes. This research offers valuable insights into optimizing biomethane production from lignocellulosic biomass, with implications for sustainable bioenergy solutions.

Keywords: Lignocellulosic biomass, Anaerobic digestion, Biomethane potential, Microbial consortium, Mathematical modeling

GSTMC-25-31 Phytochemical Profiling, Antioxidant, Anti-Inflammatory, Hepatoprotective, and Toxicity Evaluation of *Dryopteris juxtapostia* Root and Shoot Extracts

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The genus *Dryopteris*, with approximately 450 species, is found in regions including Japan, Korea, China, Pakistan, and Kashmir. Although several *Dryopteris* species exhibit biological activities, research on *Dryopteris juxtapostia* remains limited. This study explores the biological potential of *D. juxtapostia* root and shoot extracts using dichloromethane and methanol. Antioxidant activity was evaluated using DPPH, FRAP, and H₂O₂ assays, while anti-inflammatory effects were assessed in vitro (antiurease) and in vivo (carrageenan- and formaldehyde-induced paw edema). Toxicity was evaluated via the brine shrimp lethality assay and cytotoxicity was determined using the MTT assay. Hepatoprotective effects were tested in rats, and the chemical profile was analyzed by LC-ESI-MS/MS. The results showed that the dichloromethane root extract demonstrated superior antioxidant (DPPH IC₅₀ of 42.0 µg/mL), anti-inflammatory (urease inhibition 56.7% at 50 µg/mL), brine shrimp mortality (100% at 1000 µg/mL),

and cytotoxicity (HeLa cancer IC₅₀ of 17.1 µg/mL) effects compared to the methanol extract. The dichloromethane and methanol shoot extracts showed negligible activity. Hepatoprotective testing revealed that the methanol root extract improved hepatic cell structure, whereas the dichloromethane extract had no significant impact on hepatocyte morphology or cellular infiltration. LC-ESI-MS/MS identified several bioactive compounds, including albaspidin PP and kaempferol-3-O-glucoside. These findings suggest that *D. juxta-postia* has notable pharmacological potential but requires further safety evaluation in drug development.

Keywords: Cytotoxicity, Hepatoprotective effects, HeLa cancer, Inflammation, Mass spectrometry, Oxidation, Prostate cancer, Phytochemicals.

GSTMC-25-32 The Effect Of Oyster Mushroom As Prebiotic And Functional Agent On Yogurt Quality

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Complementary foods, such as yogurt, which are often used to address under nutrition in young children, can be enhanced by adding nutrient-rich ingredients. This study explored the potential benefits of incorporating oyster mushrooms, known for their high nutritional value, into yogurt. The aim was to improve the nutritional profile of yogurt, commonly used as a base for complementary foods. In this study, powdered oyster mushrooms—cleaned and sun-dried—were mixed into yogurt at varying concentrations: 0% (as a control), 0.5%, 1.0%, and 1.5%. Several tests were conducted to assess the resulting yogurt's nutritional content, including proximate composition, viscosity, pH, antioxidant activity (DPPH), and sensory attributes. The results showed a significant enhancement in the nutritional quality of yogurt with the addition of oyster mushrooms. Specifically, the protein content increased from 8.63% in the control yogurt to 18.20% with 0.5% mushroom powder, 20.37% with 1.0%, and 22.75% with 1.5%. Additionally, the ash content rose by 82.52% to 84.16%, and fiber content increased by 50.69% to 58.35%. The study also noted improvements in the protein content of the yogurt blends, ranging from 62.89% to 64.72% for 0.5% mushroom powder, 7.63% to 22.69% for 1.0%, 77.48% to 78.02% for 1.5%, and 67.55% to 67.64% for other blends. A sensory evaluation revealed that yogurt with oyster mushroom powder was well-received in terms of color, flavor, and aroma. Overall, this study suggests that adding oyster mushrooms to yogurt can significantly boost its nutritional value, making it a better option for young children who rely on dairy products as part of their complementary feeding.

Keywords: Mushroom, Prebiotics, Yogurt, Nutritional Value, Complementary Foods

GSTMC-25-33 Technological Advancements in Supply Chain Using Fuzzy Laws

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Efficient supply chain management is critical for achieving cost-effectiveness and maintaining a competitive edge in today's dynamic business environment. This paper explores the application of fuzzy logic in supply chain management to enhance decision-making processes and improve logistical operations. By leveraging fuzzy laws, we develop a systematic approach to address uncertainties inherent in supply chain logistics, enabling the optimization of key parameters such as transportation, inventory, and distribution. The proposed fuzzy logic-based model aids in minimizing supply chain costs while maintaining operational efficiency and responsiveness. Furthermore, the integration of technological advancements into the framework enhances the adaptability of the supply chain to real-time challenges. The results demonstrate the potential of fuzzy logic as a transformative tool for sustainable and cost-effective supply chain solutions.

Keywords: Fuzzy Laws; Decision Making; Market Impact; Transportation

GSTMC-25-34 Phyto-fabrication of gold nanoparticles using medicinal plant extracts: characterization, antimicrobial and wound healing potential

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Chronic wounds remain a significant threat to public health and economy due to complications of the healing process and bacterial infections. Traditional wound care relies on prolonged use of antibiotic, which faces limitations such as reduced effectiveness, potential toxicity, and an elevated risk of opportunistic infections. However, emerging technologies like nanotechnology offer promising solutions, enabling the development of more sustainable, cost-effective, and innovative approaches to wound healing. In this study phto-fabricated nanoparticles were synthesized using medicinal plants aqous extract. Gold nanoparticles were characterized by different techniques using UV. Vis absorption spectroscopy, X-Ray Diffraction (XRD), Fourier transformation infrared spectroscopy (FTIR), Dynamic light scattering (DLS) and scanning electron microscopy (SEM). UV-Vis. spectroscopy have shown peak at 550 nm. XRD confirmed the crystalline nature of nanoparticles. FTIR have shown presence of different functional group such as C-O, N-H, C=O, C-H and O-H. SEM and DLS have shown particle size of 30nm. Burn wound was created on 16 rats and randomized into four groups. Group I was untreated. Group II rats were treated by applying topical ointment cream. Group III rats were treated by applying plant extract-based cream and group IV rats were treated by applying gold nanoparticles-based cream. Treatment was carried out for 14 days. Wounds treated with gold nanoparticles-based cream decreased consistently and almost completely. The antibacterial activity of plant extract and green synthesized gold nanoparticle were tested against the bacteria collected from the wound which revealed remarkable inhibition of these microorganisms. It can be concluded that gold-nanoparticles based cream can be used as an ointment to treat wounds especially burn wounds.

Keywords: Medicinal plants, Wound healing, Gold-nanoparticles, Green Synthesis

GSTMC-25-35 A Study Of Disposition Of Pedagogical Knowledge And Skills At College Level Teachers

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In education, the effectiveness of college-level teaching relies on teachers' pedagogical knowledge and skills. Pedagogical knowledge consists of a deep understanding of educational principles and theories, while pedagogical skills involve the practical application of this knowledge in the classroom environment. College teachers, as essential figures in molding the academic journey of students, play a significant role in promoting a conducive learning environment. This research paper was designed to know college teachers' pedagogical knowledge and skills. For data collection, a pedagogical skills diagnostic scale was used; the scale consisted of 24 items about pedagogical knowledge and skills teachers' perceptions of pedagogical knowledge. The scale consisted of 24 items with three factors: (a) Pedagogical Knowledge, (b) Pedagogical Skills, and (c) Teachers' Perception. The sample was selected using a simple random sampling technique. Krejcie and Morgan's (1970) table followed in choosing the minimum sample; this way, 148 respondents were selected as samples for research work from seven boys' government colleges of District Jhang. Collected data were analyzed using descriptive and inferential statistical techniques. The objectives of the study were (a) to identify the current level of pedagogical knowledge among college-level educators, (b) to identify the current level of pedagogical skills among college-level educators, (c) to identify the perceptions of college-level educators regarding the effectiveness of current Pedagogical knowledge and skills. It was concluded that college-level teachers' current pedagogical knowledge and skills were very low. It was concluded that the perceptions of college-level educators regarding the effectiveness of current Pedagogical knowledge and skills were positive. It is recommended that Pedagogical knowledge and skill-based training should be conducted in colleges for teachers because approximately teachers lack pedagogical knowledge and skills.

Keywords: *College-Level Teaching; Pedagogical knowledge; pedagogical skills; Teachers Training.*

GSTMC-25-36 Extraction of flavonoids from Lemon peel as a bio-preservative and its antioxidant potential

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Since the amount of garbage derived from the fruit makes up half of the original whole fruit weight, the global industrial citrus waste was projected to be more than 15.1 tones. Although citrus peel is high in fiber and antioxidants, its higher concentration of astringent compounds renders it unfit for human ingestion. Numerous health benefits of citrus peel components have been discovered, including the impact of pectin on cholesterol levels, glycemic control, cancer prevention and mineral balance regulation; limonene's effect on cancer prevention; and the vitamin activity of carotenoids. The study's objective was to extract flavonoids from lemon peel and assess their antioxidant capacity. Folin-Ciocalteu technique was used to measure the polyphenolic content and the DPPH test was used to measure the antioxidant activity. The results showed that the powdered lemon peel had a much greater percentage of ash and crude fiber (2.50 and 9.30%). It was an excellent source of total phenolic compounds (9.40

mg GAE/g), and had a high percentage of antioxidant activity (37.80-90.33%) at concentrations between 50 - 250 µg/ml. According to this study, lemon peels have strong antioxidant properties and are a good source of phenolic compounds and dietary fiber. As a result, they can serve as a natural antioxidant supply.

Keywords: Lemon peel, total polyphenols, antioxidant activity, DPPH assay.

GSTMC-25-37 Anthelmintic activity of *Syzygium cumini* and *Solanum nigrum* extract against *Toxocara canis* in vitro study

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Toxocara canis and *Toxascaris leonina* are zoonotic roundworms that infect both dogs and humans and are found worldwide. In this study, anthelmintic activity of *Syzygium cumini* and *Solanum nigrum* was evaluated against *Toxocara canis* in vitro study. Plant leaves were dried under shade for one month. For aqueous extract, 1kg of leave was mixed with distilled water (5 L) and for 10 hours then the water was removed using Hot air oven (HAO). The methanol extract was prepared by adding 250 g powder in 1000 mL methanol and was placed in shaker for 15 days. The mixture was then filtered using Whatman No. 1 filter paper and was concentrated in the hot air oven and then the obtained crude extract was stored at 4°C. The eggs were collected using sugar flotation method and the collected eggs were kept in the refrigerator 4°C until the assay was performed. The Eggs embryonation inhibition (EDI) was performed at 20 mg/mL to 0.625 mg/mL concentrations of each extract in comparison with albendazole (20 to 0.625 mg/mL). The Larvae Development Inhibition (LDI) was performed at 20 mg/mL to 0.625 mg/mL concentrations of each extract in comparison with albendazole (20 to 0.625 mg/mL) as positive control in a 24-well micro-titration plate. The most potent inhibition was observed at 20 mg/mL. The percentage of eggs embryonation after 13-26 days at 20 mg/mL was 88% for *S. cumini*. The percentage of eggs embryonation after 13-26 days at 20 mg/mL was 90% for *S. nigrum*. As compare to albendazole at 20 mg/mL was 88%. Larvae Development (LD) was performed at 4 mg/mL to 1 mg/mL concentrations of each extract in comparison with albendazole (4 to 1 mg/mL) as positive control in a petridish. The most potent inhibition was observed at 4 mg/mL. The percentage of larva development after 25-52 days at 4 mg/mL was 70% for *S. cumini*. The percentage of larva development after 25-52 days at 4 mg/mL was 75% for *S. nigrum*. As compare to albendazole at 4 mg/mL was 68%.

Keywords: Anthelmintic activity, *Syzygium cumini*, *Solanum nigrum*, *Toxocara canis*

GSTMC-25-38 Wound Healing And Biochemical Potential Of *Alternanthera Sessilis* Leaves Fabricated By Zinc Oxide Nano Particle In An Animal Model

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Wound healing is a crucial concern in both human and veterinary medicine, highlighting the need for new agents with effective wound healing properties. This study demonstrated the eco-friendly synthesis of Zinc oxide nanoparticles (ZnO NPs) using the leaf extract of *Alternanthera sessilis*. The leaf extract of *Alternanthera sessilis* acts as both a capping and reducing agent during the green synthesis of ZnO NPs. The biosynthesized ZnO NPs were characterized using various analytical techniques, including X-ray diffraction (XRD), Liquid Chromatography-Mass Spectrometry (LC-MS), Fourier Transform Infrared Spectroscopy (FTIR), UV-visible spectroscopy (UV-vis), and Scanning Electron Microscopy (SEM). The XRD analysis confirmed the polydisperse and crystalline nature of the ZnO NPs. The FTIR results indicated the presence of biomolecular capping on the surface of the nanoparticles. The biosynthesized ZnO NPs exhibited significant antimicrobial activity against several gram-positive and gram-negative bacteria. In wound healing studies conducted on rabbits, those treated with ZnO NPs showed a higher wound closure rate at all doses compared to those treated with crude *Alternanthera sessilis* extract and the untreated control group. This demonstrates the effective wound healing properties of the ZnO NPs. Furthermore, the ZnO NPs displayed strong antioxidant activity against TPC, TFC And DPPH. Thus, the use of *Alternanthera sessilis* in the synthesis of ZnO NPs is not only cost-effective but also yields nanoparticles with substantial antimicrobial and antioxidant activities. These properties, confirmed by various analytical techniques, underscore the potential of ZnO NPs as effective agents for wound healing.

Keywords: Nanoparticles (NPs), Antioxidant, Antimicrobial, *Alternanthera sessilis*, Wound healing, FTIR, SEM, LC-MS, XRD, UV

GSTMC-25-39 Exploring Bacterial Isolates From Hydatid Cysts From Cattle: Unveiling Antibiotic Resistance Profiles

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Cystic Echinococcosis (CE), caused by the larval stage of *Echinococcus granulosus*, is a serious zoonotic disease affecting both humans and livestock globally. The study aims to analyze *Echinococcus granulosus*-related hydatid cysts in cattle, separate the bacteria from the cysts, and evaluate the resistance of antibiotics against the separated bacterium. The diagnosis made by several tests, including microscopy, culturing, colonial morphology, biochemical tests and then the antibiotic resistivity are test. Out of 1050 cattle post-mortem examination six are infected with hydatid cysts were collected from Hangu slaughterhouse. The *Echinococcus granulosus* are present in all but only three was fertile. The bacteria isolated and identify from hydatid cyst are *Staphylococcus Aureus*, *E.coli*, *Staphylococcus epidermidis* and *Proteus vulgaris* which are pathogenic. The isolates' different levels of resistance to antibiotics, revealed by antibiotic resistance tests, raise serious public health concerns about their use. The antibiotic Linezolid, Gatifloxacin, Cefepime, Imipenem, Cefoperazone/Sulbactam, Vancomycin, Doxycycline, Teicoplanin and meropenem are found resistive. The connection between dangerous microorganisms and antibiotic resistance is demonstrated by the study on cattle hydatid cysts. In order to prevent resistance, it highlights the necessity of

continuous monitoring and judicious use of antibiotics. The study also sheds light on how parasite infections and bacterial colonisation interact.

Key words: Cystic Echinococcosis, *Echinococcus granulosus*, antibiotics

GSTMC-25-40 Major Threats To Migratory Crane Species In District Bhakkar, Punjab, Pakistan

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Background: Many migratory birds, including cranes, cover large distances during migration between their breeding and wintering grounds annually. Their number is getting decline day by day. This study was designed to assess the major threats to migratory crane species in District Bhakkar, Punjab, Pakistan. Data was collected by direct observations and indirect observation methods including interviews and structured questionnaires. It was statistically analyzed by Past software 4.1c version, SPSS, and MS Excel. The results found that in fall 2023, 9 camps and 45 hunters were observed at tehsil kallurkot and 8 camps and 34 hunters at Bhakkar while in spring 2024, 7 camps and 35 hunters in kallurkot and at Bhakkar, 6 camps, and 25 hunters were recorded. For hunting 20% and 10% of hunters used simple trapping, 15% and 20% used string coin trapping, while 65% and 70% used shooting methods in Kallurkot and Bhakkar respectively. The PCA's first two dimensions shows 99.2144% variance of potential threats, including illegal capturing, killing, and trading, with Component 1 at 93.195% and Component 2 at 6.0194%. The minimum and maximum price range for illegally traded cranes is 5000-35000. The study also revealed that in fall 2023, after covering a distance of 10-20 km, two Demoiselle crane carcasses were found in Kallurkot and one in Bhakkar at a distance of 5.6 and 6.2 kilometers from utility lines, respectively. The study concluded that illegal trade, large- scale hunting, and utility line collisions affecting migratory crane populations. There is urgent need to protect these precious animals by implementation of law enforcement, local awareness and minimizing other threats.

Keywords: Crane species, Bhakkar, Illegal trading, Killing, Capturing

GSTMC-25-41 A comprehensive overview of the Development of an Acetylcholine esterase-biosensing device for the detection of Arsenic from drinking water

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Metal-organic frameworks (MOF) loaded acetylcholinesterase (AChE) were used for the biosensing of heavy metals. The present study involved the synthesis of titanium aluminum carbide and etched to get titanium carbide. AChE-MOFs nanocomposites were synthesized by adopting a solvothermal approach. Morphological changes in AChE were examined by using scanning electron microscopy (SEM)-energy dispersive X-ray analysis (EDX) technique. Various spectroscopic techniques, including Fourier transform infrared spectroscopy (FTIR), Raman spectroscopy, and X-ray diffraction spectroscopy (XRD) were carried out to reveal the chemical and structural

properties of AChE and AChE/MOFs nanocomposite. The electrochemical response of AChE/MOF composites with various acetylcholine esterase concentrations was explored by cyclic voltammetry, showing that 7% AChE/Fe-MOF had the best redox properties. Subsequently, an electrode modified by Fe-MOF and 7% AChE-MOF was employed to detect As (III) in 0.1M arsenic iodide buffer solution. These sensors displayed remarkable capabilities to oxidize uric acid within the linear range of 500 nM-0.1 μM and 500-0.5 μM. The detection limits (LOD) were 0.019 and 0.04 for AChE-MOF and 7% AChE-MOF respectively. These results suggested that 7% acetylcholinesterase-MOF is more efficient in arsenic detection and can be explored further in research.

Keywords: Metal-organic framework, Arsenic, solvothermal approach, X-ray diffraction spectroscopy

GSTMC-25-42 Role of Artificial Intelligence in Livestock Management

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Artificial intelligence is playing a vital role in the development of the livestock sector and veterinary services. AI-powered tools and sensors, including machine learning algorithms, are being used to analyze data from livestock for signs of diseases. This includes monitoring temperature, behavior, and physical symptoms that can signal illness. AI models can predict disease outbreaks by analyzing large datasets from farms, veterinarians, and other sources. For example, AI algorithms have been developed to predict the spread of diseases like foot-and-mouth disease or avian influenza, helping to reduce their impact by initiating preventive measures early. AI-enabled diagnostic tools, such as image recognition software that analyzes medical scans or infrared imaging, can assist veterinarians in diagnosing diseases with higher precision and at a lower cost, especially in rural or underserved areas. AI algorithms analyze data from sensors and wearable attached to livestock (such as GPS collars, accelerometers, and RFID tags) to monitor animal behavior. Abnormal patterns, such as reduced movement or eating behavior, can be flagged, indicating possible health or welfare issues. AI is helping to improve telemedicine services for animals, where veterinarians can use AI-powered apps and tools to remotely diagnose and suggest treatments for minor illnesses or injuries. This is particularly useful in remote areas with limited access to veterinary professionals. AI-driven robotic systems are being employed in surgeries for precision, reducing the risk of human error and improving recovery time for animals. AI systems can assist in monitoring post-operative recovery, helping to prevent complications. The implementation of Artificial intelligence into various farm systems has caused valuable improvements in the dairy management. This methodology has brought more proficiency in managing animal health, operational efficiency and economical improvements. One important benefit of AI use to the dairy industry is the regulation of feed efficiency which, according to dairy experts, is an important economic factor in dairy industry. AI based systems analyze the feed consumption and the milk production and formulate the cost-effective feed formulations according to the productive capacity of each animal with compromising their health (Barrientos et al., 2020). Furthermore, forecast of milk yield and productive ability of animals based on their genetics can be analyzed by AI systems and algorithms. The AI systems can improve the reproductive activities by sensing the proper hormonal profile and

physical condition of animals and generating most effective breeding protocols- AI is integrated into farm management systems to provide data-driven insights for decision-making. From breeding decisions to optimizing resource use (like water and feed), AI helps livestock producers make better-informed choices. AI models analyze market trends, consumer demand, and supply chain logistics, which helps livestock producers better plan for future market conditions. This includes predicting meat or milk prices and adjusting production to meet future demand. AI is used to calculate and monitor the carbon footprint of livestock production systems. By analyzing data on feed efficiency, methane emissions, and other environmental factors, AI models suggest ways to reduce the environmental impact of farming practices. AI algorithms assist in optimizing waste management on farms, for example, by analyzing manure for optimal composting or conversion into biogas. This contributes to more sustainable farming practices.

Keywords: Artificial Intelligence, Livestock, Dairy farm, advance technologies, Animals welfare

GSTMC-25-43 Photocatalytic performance of $\text{Co}_3\text{O}_4/\text{Na-Alginate}$ nanocomposite for the dynamic removal of direct red 31 dye: Degradation and mechanical pathways

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This study examines the use of Co_3O_4 nanocomposite as a photo-catalyst in aqueous solution for photocatalytic degradation of dyes under UV. It has been observed that substrate concentrations, catalyst, pH, oxidant present and temperature, effect on dye degradation. The characterization of synthesized Co_3O_4 NPs and $\text{Co}_3\text{O}_4/\text{Na-Alg}$ NC was done by UV-Visible, SEM, XRD and FTIR. Co_3O_4 NPs and $\text{Co}_3\text{O}_4/\text{Na-Alg}$ NC were found to be 23 nm and 10 nm in size, respectively. The synthesized $\text{Co}_3\text{O}_4/\text{NaAlg}$ NC were employed to degrade Direct Red 31 dye using batch experiments by optimization of experimental conditions. 80 minutes were given to the experiment. At ideal conditions, including 0.02% dye, 3 mg/L $\text{Co}_3\text{O}_4/\text{NaAlg}$ NC photocatalyst, 0.03 mM H_2O_2 , pH 5, and 70 °C temperature, the maximum degradation (68.24%) was achieved. TOC and COD were evaluated to check proficiency of this process. It was found that percentage reduction in TOC and COD was 66.7% and 65.2%. The generation of non-toxic products was validated by Direct Red 31 dye degradation route. The study concluded that the synthesized nanocomposites could be chosen for dyes-containing wastewater remediation. Because it is economical and environmentally beneficial, the produced $\text{Co}_3\text{O}_4/\text{Na-Alg}$ NC is strongly advised for dye degradation.

GSTMC-25-44 Synthesis, characterization and biological activity of sulfone based Polyazomethine zinc oxide nanocomposites

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A series of zinc oxide polyazomethine nanocomposites was synthesized with variable percentages of zinc oxide nanoparticle (3%, 7%, and 9%). First, the sol gel method was used to create zinc oxide nanoparticles (ZnO NPs), which were then uniformly distributed using a sonication procedure in acetone at varying concentrations. Then, using an optimized ultra-sonication method, polyazomethine (PAM) was synthesized and mixed with zinc oxide nanoparticles (ZnO NPs) to create polyazomethine zinc oxide nanocomposites. Spectroscopic methods including UV-visible, Fourier transformation infrared radiation, Thermo gravimetric analysis, gel permeation chromatography, scanning electron microscopy, and X-ray diffraction were used to confirm the structural, morphological, and optical properties of the synthesized polyazomethine and nanocomposites. Certain bacteria and fungi were used to assess the antibacterial activity of polymers and polymer nanocomposites. The greatest activity against the chosen gram-positive and gram-negative bacteria is demonstrated by these synthesized polymer and polyazomethine nanocomposites. The ability of the produced polymers and related nanocomposites to eradicate the selected fungus was evaluated. Only polyazomethine and polyazomethine zinc oxide nanocomposites were efficient against *Candida albicans*, but all of them were effective against *Aspergillus flavus*. The DPPH radical scavenging assay was also used to assess antioxidant activity, and the results showed a strong ability to neutralize free radicals. The potential uses of polyazomethine and zinc oxide nanoparticles in biological and environmental sectors are highlighted by their synergistic qualities in the nanocomposites.

GSTMC-25-45 The Impact Of Human Psychology On Buying Behavior: Opportunities And Challenges In Pakistan

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Understanding human psychology is crucial for businesses to develop effective marketing strategies and influence consumer buying behavior. This study explores the impact of human psychology on buying behavior in Pakistan, highlighting opportunities and challenges for businesses.

Methodology: A mixed-methods approach was employed, combining both qualitative and quantitative data collection and analysis methods. A survey of 500 consumers was conducted, followed by in-depth interviews with 20 marketing experts and business owners.

Findings: The study reveals that Pakistani consumers are heavily influenced by psychological factors such as emotional appeals, social norms, and cognitive biases. However, businesses in Pakistan face challenges in leveraging these psychological insights due to limited understanding of consumer psychology, inadequate marketing resources, and cultural nuances.

Conclusion: This study highlights the significance of human psychology in shaping buying behavior in Pakistan. Businesses can capitalize on this knowledge by developing targeted marketing strategies that appeal to consumers' emotional, social, and cognitive needs. However, addressing the challenges of limited resources, cultural

differences, and inadequate understanding of consumer psychology is crucial for businesses to succeed in the Pakistani market.

Keywords: Human psychology, buying behavior, consumer psychology, marketing strategies, Pakistan.

GSTMC-25-46 Automatic Sugarcane bud detection and cutting using Deep Learning

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The purpose of this research is to detect effectively sugarcane buds for the sowing process. Lot of sugarcane stalk is wasted in traditional way. In current era agriculture has lot of impact on economy of any country so improving agriculture yield is emerging task. In last few years' deep learning has gained much reputation in different image processing task. These days' lot of task has been done by using deep learning. Working principal of deep learning is based on amount of dataset that is required to train the model. The traditional way for cutting buds of sugarcane is very time consuming process, so this system is introduced to save the time as well as money. Some work has already done to convert that manual cutting process into automatic. The system developed in this research contains two parts. In the first part the sugarcane bud will be detected using a camera and after detection this bud will be cut using cutting blades. Basically in detection phase convolutional neural network (CNN) will be used. System proposed in the research can identify the sugarcane buds and cut them automatically, so that the sugarcane bud will not be damaged. Due to this proposed system the rate of injured buds are decreased. This system has a quality of being very simple so that an unskilled person can use it easily. This system also has quality of being simple. Due to its simplicity it is also adopted by low income farmer. Its usage of electricity is also less.

Keywords: Sugarcane bud, Automation, Deep Learning, Convolutional Neural Network, Precision agriculture

GSTMC-25-47 Molecular Identification, Phytochemical Analysis And Antioxidant Activity Of *Lemna Minor* Collected From Faisalabad

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Lemna minor, duckweed, is an aquatic plant used in traditional medicine due to its antibacterial, antiparasitic and antioxidant potential. It grows rapidly on the surface of Pakistan's contaminated water reservoirs. It also possess a vast repertoire of secondary metabolites highlighting its therapeutic qualities. Despite its significance, there is very limited study on this plant. In the current study, *Lemna minor* was collected from Faisalabad, Pakistan and its molecular identification was done by using universal DNA barcodes like *rbcL* gene. After sanger sequencing was done, the sequence was submitted to NCBI with accession number PQ463294. The extracts were prepared using maceration with ethyl acetate (S-EA) and *n*-hexane (S-NH). The antioxidant activity was evaluated with 2,2-Diphenyl-1-picrylhydrazyl (DPPH) assay and ferric reducing antioxidant power (FRAP) assays. S-EA showed stronger antioxidant effects, with a DPPH inhibition of 49.23% compared to 25.08% for S-NH. The FRAP value of S-EA was 19.37 mM and 7.48 mM of S-NH. The S-EA had a Total Phenolic Content (TPC) of (0.754 ± 0.0008) µg

GAE/mg, while the S-NH had a TPC of (0.503 ± 0.0012) μg GAE/mg, indicating a higher phenolic content in the S-EA. The S-EA had a Total Flavonoid Content (TFC) of (0.141 ± 0.00262) μg CE/mg whereas the n-hexane extract had a TFC of (0.056 ± 0.00202) μg CE/mg, indicating a higher flavonoid content in the S-EA. Phytochemical analysis using HPLC identified bioactive compounds in both extracts. S-NH contained P-coumeric acid, gallic acid, and chlorogenic acid, while S-EA had sinapic acid, HB acid, chlorogenic acid, and kaempferol. Sinapic acid had the highest concentration in S-EA (1215.36 ppm). These findings suggest that S-EA of *Lemna minor* exhibit high antioxidant activity, with sinapic acid being a key contributor, highlighting its potential for future pharmaceutical applications.

Keywords: Molecular identification; *rbcL*; S-EA; S-NH; DPPH; FRAP; TPC; TFC; HPLC

GSTMC-25-48 From Phytochemicals to Pathways: Decoding the Anti-Diabetic Mechanisms of *Gymnema sylvestre*

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Globally, diabetes mellitus represents a major public health concern, affecting millions of individuals and imposing significant economic and healthcare burdens. In this study *Gymnema sylvestre*, a medicinal plant known for its therapeutic potential, was investigated using network pharmacology and molecular docking approaches to explore its role in diabetes mellitus treatment. Phytochemical analysis identified three active compounds: Ethyl octadec-9-enoate, beta-carotene, and stigmasterol, selected based on pharmacokinetic properties (DL >0.18, OB >30%). These compounds exhibited significant interaction with 171 overlapping gene targets predicted through Swiss Target Prediction, STITCH, OMIM, and GeneCards databases. A compound-target network constructed using Cytoscape revealed 174 nodes and 257 edges, with a network density of 0.009, indicating interconnectedness among compounds and targets. Protein-protein interaction (PPI) analysis in the STRING database highlighted 170 nodes, 1,311 edges, and significant hub genes such as AKT1, TNF, PPARG, and EGFR. Gene Ontology (GO) and KEGG pathway enrichment analyses identified pathways associated with cellular stress, programmed cell death, transcription regulation, and diabetes-related signaling mechanisms. Molecular docking studies further validated the interaction between key hub genes (AKT1, SRC, TNF, STAT3, and EGFR) and active compounds, revealing potential drug candidates. These findings elucidate *Gymnema sylvestre*'s molecular mechanisms, demonstrating its multi-targeted therapeutic potential in diabetes management and related metabolic pathways. This study underscores the significance of integrating network pharmacology and molecular docking for drug discovery, paving the way for further experimental validation.

Keywords: Network pharmacology, Molecular docking, Diabetes mellitus, Hub genes, KEGG

GSTMC-25-49 Synthesis Of Iron Oxide Nanoparticles By Using *Asplenium Dalhousiae* Extract And Their Antibacterial And Antioxidant Potentials

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The easy technique for the one-pot of iron oxide nanoparticles is reported by using green synthesis method. Their characterization was done by spectroscopic techniques such as UV/Vis and FTIR, while SEM and EDX revealed the surface shape, size distribution, and surface charge of the nanoparticles. The surface plasmon resonance (SPR) band was observed at 310 nm with 1.07 absorbance units. The SEM image demonstrated that the particles were monodispersed and spherical in shape. The z-average size distribution of iron oxide nanoparticles in a colloidal solution was found to be 79.20 nm. The disc diffusion method was used to evaluate the antibacterial activities of these iron oxide nanoparticles along with macrolides (erythromycin and azithromycin) as control against Gram-negative and Gram-positive bacteria. The antioxidant activity against DPPH (1,1-diphenyl-2-picrylhydrazyl) was also assessed using the standard test technique. The drugs' antibacterial activity was observed to enhance against the microorganisms examined, demonstrating the favorable synergistic effect of the *asplenium dalhousiae* extract based iron oxide nanoparticles. The current study's findings point to a potential therapeutic application of iron oxide nanoparticles. These iron oxide nanoparticles also have strong antioxidant activity and can thus be employed in a variety of biomedical applications.

Key words: *Asplenium dalhousiae*, iron oxide nanoparticles, antibacterial activity, antioxidant activity.

GSTMC-25-50 Copper and iron oxide co-doped MXene Nanocomposite as a Peroxidase Mimic for Colorimetric Sensing of Uric Acid

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MXenes are a new two dimensional (2D) layered materials discovered in 2011. They are named for their synthesis procedure in which they are selectively etched out as a layer from a parent MAX phase using concentrated HF solution as the etchant. MXene based materials have been recognized to be suitable for enzyme binding and show great potential in biosensing applications. MXene material have some distinct advantage over other 2D nanomaterials. This project shows the synthesis and characterization of copper and iron oxide co-doped MXene nano composite and the use of this nano composite for colorimetric sensing of uric acid. The prepared Nanocomposite was characterized by UV-visible spectroscopy, fourier transform infrared (FTIR) spectroscopy, scanning electron microscopy (SEM), X-ray diffraction analysis (XRD), thermal gravimetric analysis (TGA) and energy dispersive x-ray analysis (EDX). The Peroxidase -like activity will be evaluated by colorimetric detection of uric acid utilizing TMB as a substrate.

Keywords: MXene, Peroxidase Mimic, 2D nanomaterials

GSTMC-25-51 Structural And Functional Annotation Of Beta Lactamases From *Lactococcus Lactis*

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Beta-lactamases are the key enzymes responsible for bacterial resistance to beta-lactam antibiotics by hydrolyzing the beta-lactam ring of penicillins, cephalosporins and related compounds. In this study, the beta-lactamase protein from *Lactococcus lactis* was structurally and functionally annotated using various computational tools. The protein sequence was obtained from NCBI (Accession: CAD32838) and analyzed for its physicochemical properties using ProtParam, which revealed a molecular weight of 8650.33 Daltons, a pI of 9.60 and a stable nature with an instability index of 17.43. Structural features, including exposed, hidden, disordered and binding regions, were annotated using PredictProtein. The 3D structure was modeled using Phyre2, showing 51% coverage with a confidence value of 6.1%. Protein-protein interactions were assessed using STRING and STITCH, identifying key interactors such as KinC and FtsX crucial for cellular functions. Domain and motif analysis using Pfam and MEME highlighted functional regions critical for enzyme activity. A phylogram of Beta lactamases protein with its homologs was also reconstructed to reveal its evolutionary relationships with Beta lactamases. The study has revealed the structural characterization, biological interactions, and evolutionary background which will play crucial role in exploring the medicinal and biological potentials of Beta lactamases protein from *L.lactis*. Phylogenetic analysis placed the protein in a broader evolutionary context. This study provides insight into the structure-function relationship of beta-lactamase from *L. lactis* and highlights its potential as a target for developing strategies against antimicrobial resistance. Further experimental verification and investigation of its pharmaceutical potential is warranted.

Keywords: Beta-lactamases, Physicochemical properties, protein-protein interaction, Motif-domain analysis, Phylogenetic tree

GSTMC-25-52 Estimation Of Lc50 For Selected Insecticides Against Selected Preys And Predators

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Wheat (*Triticum aestivum L.*) is one of the most important cereal crops and source of staple food worldwide, including Pakistan, with a GDP contribution of 18.9%. Reduced wheat productivity is caused by a variety of biotic and abiotic factors. Wheat is prone to a variety of insect pests that attack at various stages of the crop, cause harm, and ultimately reduce crop production. Aphid, weevil, midges, cereal leaf beetle, white grubs, are among the pests that attack wheat crops. This study was conducted to estimate LC50 of selected insecticides such as imidacloprid and acetamiprid on lady beetle and aphids. Sampling was done from the wheat fields of University of Agriculture Faisalabad and from Chak No 170 Jhang from January 2023 to May 2023. Specimens were captured by pitfall, handpicking and beating and brought to biodiversity laboratory of Zoology, Wildlife and Fisheries. In the Laboratory specimens were brought from wheat fields, they were acclimatized and were given exposure to insecticides (acetamiprid and imidacloprid) at different concentrations. The data was recorded after 24 and 48 hours.

Leaf disc method for aphids and filter paper bioassay for beetles was followed. Probit analysis was conducted and LC50 values of acetamiprid was 65.2563ppm and 43.9600ppm after 24 and 48 hours respectively and LC50 values of imidacloprid was 2979.18ppm and 2374.98ppm after 24 and 48 hours respectively. The most effective ratio of insecticides was recorded as Acetamiprid > Imidacloprid.

Key words: Wheat, Acetamiprid, Imidacloprid, Probit analysis, LC50.

GSTMC-25-53 Spectrum Of Hygiene In Fragile States; One Health And Infectious Diseases:

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Background: Hygiene presents a dual imperative related to its necessity and matching challenges in fragile states such as, Democratic republic of Congo, Sudan, State of Palestine, Pakistan and The Syrian Arab republic. Hygiene is a fundamental pillar for the health of human, animal and environment. The rate of infectious diseases in any fragile state poses barriers to effective health security, economic security, food security, state stability, public health and health safety.

Purpose: The aim of this manuscript is to give awareness regarding the potential risks like, poor hygiene practices in response to growing burden of infectious diseases.

Methods: Our methodology includes literature review, mind mapping, data analysis, case studies with health reports from 2024 for selected fragile states including, Democratic republic of Congo, The Syrian Arab republic, Sudan, state of Palestine and Pakistan.

Findings: Our study highlights the complications of these fragile states in implementing the hygiene protocols addressing its needs for investigating the link between human, animal and environmental well-being. Furthermore, exploring the most prevalent diseases with their possible solutions.

Significance: Despite the limitations of this study, we hope to clarify the hurdles of these above-mentioned fragile states to stable health system proposing for the peaceful solutions.

Keywords: Hygiene, fragile states, one health, infectious diseases, public health.

GSTMC-25-54 Evaluation Of Knowledge, Attitude, And Practice Towards Nosocomial Infection Prevention And Associated Factors Among Healthcare Workers In Punjab-Pakistan

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Background: Healthcare workers (HCWs) play a vital role in delivering care and are frequently exposed to the risk of acquiring infections within the hospital setting. Around 15% of hospitalized patients suffer from these infections globally. However, the role and awareness of HCWs in transmitting nosocomial infections are still unclear. The HCWs must routinely practice precautionary behaviors to control the spread of Nosocomial infection among the healthcare workers, as no vaccines and antiviral treatments are currently available. This paper examines and assesses

the Knowledge, Attitude, and Practices (KAP) of the healthcare worker related to preventing high-risk Nosocomial infection and their relationships and identifies the pandemic's vulnerable populations to identify measures and recommendations for behavioral interventions and policies to address this problem.

Methods: This was a hospital-based cross-sectional descriptive study conducted among healthcare workers in hospitals selected to cover both North and South Punjab as the study population. Data was collected through a self-structured questionnaire which was first focused on sociodemographic characteristics; and second, third, and fourth focused on the level of knowledge, attitude, and practice regarding HAI, respectively. A total of (n=264) healthcare workers participated, and there was a slight difference between the majority being aged 18-27 (n=142; 53.8%) and predominantly female (n=157; 59.5%). The collected data was entered and cleaned using SPSS. Univariate descriptive analysis was conducted by calculating the frequency and percentage of the main findings. The associations between independent variables and knowledge, attitude, and practice scores were calculated using Pearson's chi-square test.

Results: Among (n=264) healthcare workers, it is displayed that the male proportion is less (n=107; 40.5%) in comparison to females (n=157; 59.5%). Professionally, medical doctors and dentists showed the highest knowledge scores (n=104; 39.9%) and favorable attitudes (n=65; 24.6%), while other professions like optometrists and nutritionists demonstrated lower knowledge and attitudes. The analysis also indicated significant relationships between qualification and knowledge ($\chi^2 = 10.9717$, $v = 4$) and practice ($\chi^2 = 13.56629$, $v = 4$), highlighting that higher educational backgrounds correlate with better understanding and attitudes towards infection prevention.

Conclusion: Based on the study findings, even though the respondents have good knowledge with a sympathetic attitude about HAI prevention, good knowledge did not translate into prudent practices. In Pakistan females in general receive poor education as compared to males. Intuitively, knowledge and attitude of people toward anything (nosocomial in this case). Thus, the knowledge about and attitude toward HAI depend on gender in our population sample. Educational seminars and awareness programs can provide better equal education for both males and females in Punjab Pakistan. The provision of continual on-job and off-job training together with strict implementation of updated standard operational procedures (SOP) may reduce the identified gap.

Keywords: Attitude, Healthcare workers, knowledge, Nosocomial infections, Practice, Hospital-acquired infection

GSTMC-25-55 Synthesis, characterization and antimicrobial activity of polyazomethine ZnO nanocomposites

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In this study polyazomethine was prepared by the condensation reaction between terephthalaldehyde and 4,4-diaminodiphenylmethane. The resulting polymer was characterized through various spectroscopy techniques: UV visible spectroscopy, Fourier transform infrared spectroscopy (FTIR), to confirm the conformation of azomethine linkage and thermogravimetric analysis (TGA) for the stability of polyazomethine. Finally, polyazomethine ZnO nanocomposites were prepared by incorporation of ZnO nanoparticles with different ratios: 3%, 5% and 7% (ZnO 3%, ZnO 5% and ZnO 7%) into the polymer matrix in the presence of DMF as solvent. These nanocomposites were

synthesized with varying ZnO nanoparticle loadings and characterized using techniques such as Fourier transfer infrared spectroscopy (FTIR) X-ray Diffraction (XRD), Scanning Electron Microscopy (SEM), thermogravimetric analysis (TGA) and UV-Visible spectroscopy to assess their structural, morphological and optical properties. The resulting nanocomposites demonstrated enhanced thermal stability and potential for advanced applications, particularly in antimicrobial agent. The antimicrobial efficacy was assessed through both antibacterial and antifungal activity tests. The 7% ZnO-loaded nanocomposites exhibited the most significant antimicrobial activity. Notably, the 7% loading achieved the highest inhibition zone of 21 mm against *Escherichia coli*, outperforming other formulations. These results confirm that a higher concentration of ZnO nanoparticles enhances both thermal stability and antimicrobial performance, making the 7% ZnO-loaded polymer nanocomposites highly effective as antimicrobial agent.

Keywords: DDM, TPA, DMF, and ZnO NPs.

GSTMC-25-56 Green Synthesis Of Cobalt Oxide Nanoparticles From *Dodonaea Viscosa* Leaves Extract For Colorimetric Sensing Of Antibiotics & Antibacterial Activities

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Nanotechnology is a new and emerging technology with a wealth of applications. It involves synthesizing and applying materials with one of the dimensions in the range of 1–100 nm. Various physico–chemical approaches are being used to synthesize nanoparticles (NPs). However, the biogenic reduction of metal precursors to produce corresponding NPs is eco-friendly, less expensive, and free of chemical contaminants for medical and biological applications. Cobalt oxide nanoparticles have many applications and nowadays the green methods of synthesis of these NPs are preferred over other methods because of associated benefits. In this study, Cobalt oxide nanoparticles were synthesized by using leaves extract of *Dodonaea Viscosa*. The synthesized NPs were analyzed by different techniques such as Ultraviolet (UV) spectroscopy, Fourier transform spectroscopy (FTIR), X-ray diffraction (XRD), Scanning electron microscopy (SEM), and Energy-dispersive X-ray (EDX). Colorimetric sensing of Cobalt oxide nanoparticles demonstrated successful detection of antibiotics. The antibacterial activity of synthesized cobalt oxide nanoparticles was examined on gram-positive & Gram-negative bacteria. In conclusion, the green synthesized Cobalt oxide nanoparticles can be used for colorimetric detection of antibiotics, and their synergistic effect can be used as a bactericidal effect.

Keywords: Green synthesis, Nanoparticles, Cobalt oxide, SEM, UV, XRD, FTIR, EDX, Sensing, Antibacterial activity.

GSTMC-25-57 Assessment of Air Quality and Brick Kiln Emissions: Impacts on Human Health in Jhang City

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The demand of building material has raised due to the steady growth rate of population. In emerging nations such as Bangladesh, China, India, and Pakistan bricks are considered as primary building material and in recent years, brick manufacturing industries has been seen a dramatic growth in number. Brick kilns are third main contributors that pollute our environment along with them, they also possess deleterious effects on human health and agriculture sector. The environmental factors are also affected by brick kiln emissions such as SO₂, CO, Black Carbon, CO₂, NO_x, PM. Thus, the purpose of current study was to assess the effects of kilns emissions on community health. Pollutants PM_{2.5} and PM₁₀, CO₂, CO, NO_x, and SO_x, was carried out in few selected locations in Jhang and their concentration was measured by using mobile scientific equipment. Social surveys were used to determine the public health and how much it is affected by kilns pollution. The surrounding environment, climate, and agricultural fields are significantly impacted by brick kiln pollutants, including SO_x, NO_x, CO₂, CO, unburnt hydrocarbons, particulate matter, heavy metals, and several other chemicals. The results of the sociological survey show that respiratory problems like asthma, which were reported in every age group chosen for sampling, were directly linked to particulate matter. The present research recommended to protect environment and human health by implementation of precautionary measures (use cleaner fuels, improve kilns designs, use scrubbers or filters) in kilns sector. Furthermore, to enhance the air quality and to protect humans from atmospheric pollutants and the environmental protection agencies should develop strategies to mitigate adverse conditions by proper monitoring and checking.

GSTMC-25-58 Impact of Academic Feedback and Teacher Relationships on Self-Efficacy with Academic Motivation as a Mediator

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The purpose of this research is to examine the role of Academic Feedback on Self-Efficacy. Moreover, the purpose of this study is to investigate the effect of teacher relationships on self-efficacy. Furthermore, this study aims to examine the Mediating role of Academic Motivation between Academic Feedback, Teacher Relationships, and Self-Efficacy. However, the current research study design is Quantitative. The philosophy of current research is the Positivism. The Deductive research approach was used by researchers to conduct this study. The population of this study consisted of students studying at Thal University Bhakkar. The total population of Thal University Bhakkar is 6000 students studying at Thal University Bhakkar. The sample size of the current research is 300 students studying at Thal University Bhakkar. Sample Random sampling technique was used in this research. Researchers use SPSS and SMART PLS SEM For Data Analysis. The current study findings reveal that there is a significant role of Academic Feedback on Self-Efficacy. Furthermore, the findings also show that there is a significant effect of Teacher Relationships on Self-Efficacy. Lastly, the findings indicated that there is a significant mediating role of Academic Motivation between Academic Feedback, Teacher Relationships, and Self-Efficacy. The Significance of this study is important because it can help to improve the educational environment for students. It will help the

Government, Schools, and Teachers to improve the academic performance of Students and improve their results in Educational institutions through better policies. It also is important

Keywords: Academic Feedback, Teacher Relationships, Self-Efficacy, Academic Motivation, Students.

GSTMC-25-59 Biochemical and Cultural Identification of Pathogenic Bacteria in Poultry Meat Jhang, Pakistan

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Poultry meat, is a globally consumed source of food due to its high-quality protein and essential vitamins but its perishable nature and susceptibility to microbial contamination poses significant health and economic risks especially in tropical regions like Pakistan. This study aims to biochemically and culturally identify pathogenic bacteria in poultry meat sold in Jhang, Pakistan. The microbial contamination of poultry meat analyzed by 2kg samples through serial dilution culturing on nutrient agar and incubation. Colonies of pathogenic bacteria were isolated using gram staining and biochemical tests (Methyl red, catalase, indole, urease and oxidase tests) five bacterial isolates were identified i.e. *Klebsiella pneumonia*, *Salmonella typhi*, *Escherichia coli*, *Staphylococcus aureus* and *Bacillus subtilis*. These pathogens known to cause foodborne illnesses and spoilage represent substantial threats to public health and the economy. The findings highlight the necessity of proper handling, storage and preservation techniques to inhibit bacterial growth. Regular monitoring and education on safe handling and cooking practices are essential to reduce the risks of microbial contamination of poultry meat in Jhang, Pakistan.

Keywords: Poultry meat, Foodborne illnesses, Microbial contamination, Biochemical test, Bacterial isolates,

GSTMC-25-60 Green Synthesis Of Copper Oxide Nanoparticles From *Zamia Furfuracea* Extract For Degradation Methyl Red

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In recent years, the green synthesis of metal nanoparticles has gained significant attention due to its eco-friendly approach, reduced toxicity, and cost-effectiveness. This study focuses on the green synthesis of copper oxide (CuO) nanoparticles using *Zamia furfuracea* leaf extract as a reducing and stabilizing agent. The synthesis was carried out at room temperature, and the synthesized CuO nanoparticles were characterized using various techniques such as UV-Vis spectroscopy, X-ray diffraction (XRD), scanning electron microscopy (SEM), and Fourier-transform infrared spectroscopy (FTIR). The results confirmed the formation of CuO nanoparticles with a size range of 10-50 nm and a crystalline structure. Furthermore, the synthesized CuO nanoparticles were evaluated for their photocatalytic activity in the degradation of methyl red, a widely used azo dye. The degradation efficiency was determined by monitoring the reduction in methyl red concentration under UV light. The results showed that the

CuO nanoparticles exhibited significant photocatalytic activity, with an optimal degradation rate of 85% within 90 minutes. This study highlights the potential of *Zamia furfuracea*-mediated CuO nanoparticles as an efficient and sustainable solution for wastewater treatment, specifically for the removal of hazardous dyes from industrial effluents.

Keywords: *Zamia furfuracea*, biosynthesis of copper oxide nanoparticles, catalytic degradation, methyl red, environmental remediation.

GSTMC-25-61 Opportunities And Obstacles In Implementation Of Stem Education In Schools

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This research work was designed to find out whether teachers have proper opportunities in implementing STEM education in school or they have to face obstacles in implementation of STEM education. Data was collected using questionnaire in which teachers were asked about different perspectives in STEM education implementation in schools. The sample was selected using a simple random sampling technique. Respondents of questionnaire were from District Jhang of province Punjab. Collected data was analyzed using statistical techniques (i.e., Mean, SD, samples t-test, and One-way ANOVA). The objectives of the study were; a) to know teachers attitudes toward STEM education and their current knowledge of it. b) To learn about opportunities and obstacles associated with implementation of STEM education. c) To evaluate the need for professional development and training in STEM teaching. d) To ascertain how STEM education will be implemented in classrooms and what effects it will have on students. e) To determine STEM education's potential future in Pakistan. It was concluded that teachers were aware of importance of STEM education and its role in students' future. But there were lack of resources in STEM education implementation in some areas especially rural areas. Government is providing opportunities in STEM education implementation by providing resources and arranging healthy competitions in STEM and STEAM education at school levels. It was also concluded that teaching of STEM education needs to be improved by professional developments and trainings. It was also concluded that schools can show good results in STEM education within available sources.

Keywords: Opportunities; Obstacles; STEM education; Implementation; teachers

GSTMC-25-62 Structural And Physiochemical Properties Of Dermcidin Protein From *Homosapien* To Examine Its Significance Against Microbial Pathogens.

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The human body is constantly exposed to a myriad of microbial and environmental agents, with the skin serving as a primary defense mechanism. This rapid defense is largely facilitated by antimicrobial peptides (AMPs), which are low molecular weight proteins with inherent protective properties. AMPs, as critical components of the innate immune system, protect the epithelial surfaces of multicellular organisms. Human skin produces two main classes of

AMPs— β -defensins and cathelicidins—under inflammatory conditions through keratinocytes. Dermcidin (DCD), a recently identified AMP with broad-spectrum antimicrobial activity, is produced in eccrine sweat glands and delivered to the skin surface through sweat. The most abundant peptide in sweat, DCD-1L, is highly effective against pathogens. In this study, we analyzed the snakin protein using computational approaches. The protein sequence of dermcidin from *homo sapien* was retrieved from the GenPept database for characterization. The physiochemical properties were analyzed using protparam which gives the computational data with different characteristics like molecular weight (11283.86), Instability index (24.41), Theoretical pI (6.09), extinction coefficient (1615 Abs 0.1% (=1 g/l) 0.143, assuming all pairs of Cys residues form cystines), aliphatic index (86.18). Complete annotation of the snakin protein was conducted, revealing four helices (positions 3-19, 41-43, 60-94, 96-108), fourteen exposed regions (positions 1-4, 14-14, 19-64, 66-68, 79-72, 74-79, 81-83, 85-86, 89-90, 92-94, 96-98, 100-101, 103-104, 107-110), 13 buried region (positions 5-13, 15-18, 65-65, 69-69, 73-73, 80-80, 84-84, 87-88, 91-91, 95-95, 99-99, 102-102, 105-106), Two disordered region (positions 1-13, 19-110). Protein binding sites (positions 2-2, 4-4, 15-16, 20-21, 61-63, 65-68, 75-81, 91-91, 106-109, 17-19, 64-64, 82-90, 92-97, 99-105, 98-98). Additionally, the protein-protein interactions of the dermcidin protein were predicted, identifying the top five interacting proteins, including RNASE7 (Ribonuclease-7(have broad-spectrum antimicrobial activity), CAMP (Cathilicidin (antimicrobial peptide), LYZL 1 (Lysozyme like 1 (belongs to glycosyl hydrolase 22 family), LACRT(Extracellular glycoprotein lacritin), BEFB103(Beta defensin 103(Antimicrobial activity against gram positive bacteria) using string.

Keywords: Dermcidin, Physiochemical properties, Structural annotation, Protein-protein interaction, antimicrobial peptides.

GSTMC-25-63 Anomalies Of Antioxidative Enzymes In Common Carp Exposed To Bisphenol-A
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Bisphenol-A is a commercial chemical which is used as synthetic additive. Bisphenol-A also referred as 4,4'-(propane-2,2-diyl)diphenol is majorly used in the making of plastic food containers and bottles. Exposure of organisms to Bisphenol-A through a variety of pathways, including the environment and food chain, has proliferated as a result of tremendous use of plastics. According to numerous studies, it can act as endocrine disruptor and is a causative agent of oxidative stress. Antioxidant enzymes keep reactive oxygen species (ROS) like OH in balance. If their activity is hindered this balance is lost and the condition is called as oxidative stress. In present research work, toxicity of Bisphenol-A on antioxidant enzymes of common carp viz. catalase (CAT) and superoxide dismutase (SOD) was tested. For research purposes fish fingerlings of same weight and length were used. Fish were transferred after acclimatization in glass aquariums having 50 liters of water. They were divided into two groups. One was controlled and the other was treated with Bisphenol-A. Commercial pellets feed was fed to fish once in a day.

Different sub-lethal concentrations of Bisphenol-A were used to check their effects on different fish organs (liver, kidneys, gills, muscles and heart) to analyze enzymatic activity. Tissues from different organs were obtained after dissection. Activity of CAT was measured by using Chance and Maehly's, (1955) standard method. SOD activity was calculated by Giannopolitis and Ries', (1997) standard method. Statistically, records were obtained by applying correlation through Minitab 17 and ANOVA (analysis of variance) through Statistix 8.1. The results showed gradual fluctuations in activity of both enzymes in all organs especially in liver and kidneys after exposure to Bisphenol-A. This demonstration indicated adverse impacts of Bisphenol-A on fish population.

Key Words: Bisphenol-A, Antioxidative, Oxidative stress

GSTMC-25-64 The Influence of Family Income and Access to Resources on Educational Attainment: The Mediating Role of Motivation

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This research investigates the influence of family income and access to resources on educational attainment, specifically focusing on the mediating role of motivation. The study aims to explore how financial stability and resource availability impact academic success and to understand motivation's role in bridging these factors with educational outcomes. The study employs a quantitative research design, grounded in the positivist philosophy, with a deductive approach to theory testing. The population for the study comprises 6,000 students enrolled at Thal University Bhakkar. A sample size of 300 students was selected using a simple random sampling technique, ensuring a representative and unbiased selection of participants. Data collection was conducted using structured surveys, and data analysis was performed using SPSS and SMART PLS-SEM to evaluate the relationships between variables and test the mediating effects. The findings of the study reveal that family income has a significant and positive effect on educational attainment, highlighting the importance of financial stability in supporting academic achievement. Similarly, access to resources, such as study materials and learning tools, is shown to have a substantial impact on educational outcomes. Furthermore, motivation is identified as a key mediating factor, enhancing the influence of family income and access to resources on educational attainment. Students with higher motivation are better able to translate financial and resource support into academic success. This study underscores the importance of developing education policies that address income disparities and resource limitations to promote equitable learning opportunities. The insights are particularly valuable for parents, educators, and policymakers in designing interventions that foster motivation and improve academic performance, especially for students from underprivileged backgrounds.

Keywords: Family Income, Access to Resources, Educational Attainment, Motivation, Academic Performance.

GSTMC-25-65 Fabrication of Silver Nanoparticles Using *Dalbergia sisso* Leaves extract, its Biochemical Characterization and Wound Healing Potential in Rabbits

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In general, plants show great potential for treating and managing wounds. The main aim of study was to evaluate the antibacterial, antioxidant and wound healing properties of *Dalbergia sisso* leave extract with biosynthesized silver nanoparticles. Agar well method estimates the bactericidal potential against both gram-positive and gram-negative bacteria. Total phenolic, total flavonoids and scavenging potential of free radical were documented through

spectrophotometric methods. The results indicate that both *Dalbergia sisso* extract and biosynthesized silver nanoparticles demonstrate potent antibacterial activity against *Escherichia coli*, *Pasturella multocida* and *proteus vulgaris* bacterial strains respectively. The 1,1-diphenyl 2-picrylhydrazyl (DPPH) free radical scavenging test was used to measure the antioxidant activity. As the concentration increases the phenolic and flavonoids contents also increase. LC-MS applied for the identification of phytochemical, such as Apigenin and Quercitrin. Biosynthesized nanoparticles show great wound healing property. The crude extract of *Dalbergia sisso* leaves show slowest healing while biosynthesized silver nanoparticles express fastest wound healing respectively. Histopathology results indicated that formation of new capillaries, scab formation, collagen deposition, dermis and epidermis formation. It was concluded that biosynthesized silver nanoparticles and crude extract of *Dalbergia sisso* leaves has great wound healing properties.

Keywords: *Dalbergia sisso*, Biochemical profiling, Antibacterial and Antioxidant activity, characterization and wound healing.

GSTMC-25-66 Climate Accountability in Pakistan: Examining the Legislative and Oversight Role of Parliament

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Climate change poses an existential threat, demanding robust legislative action and effective institutional oversight to address its multifaceted challenges. Pakistan, as one of the most climate-vulnerable nations, requires strong parliamentary engagement to formulate and implement sustainable climate policies. This paper critically examines the legislative and oversight roles of Pakistan's Parliament in advancing climate accountability and promoting environmental governance. The study highlights key legislative milestones, such as the Pakistan Climate Change Act (2017) and the formation of the Climate Change Council, assessing their effectiveness in institutionalizing climate governance. It also investigates the role of parliamentary committees, particularly the Senate Standing Committee on Climate Change, in monitoring policy implementation and ensuring accountability of executive bodies. Using a mixed-methods approach, the paper conducts qualitative content analysis of parliamentary debates, motions, and resolutions, alongside quantitative evaluations of policy outcomes and resource allocations. This approach identifies systemic gaps in policy coherence, institutional capacity, and execution. Findings reveal that while significant legislative progress has been made, substantial challenges persist in translating policies into actionable outcomes. Issues such as weak inter-institutional coordination, insufficient resource mobilization, and limited technical capacity hinder effective climate governance. Additionally, alignment with international frameworks like the Paris Agreement remains inconsistent, reflecting the need for greater harmonization with global climate strategies. The analysis underscores the importance of strengthening parliamentary oversight mechanisms, improving technical expertise among legislators, and fostering public engagement to enhance transparency and accountability. It also emphasizes the critical role of multi-stakeholder collaboration and budgetary scrutiny in reinforcing Pakistan's climate governance framework. This paper concludes with strategic recommendations to

amplify the role of Pakistan's Parliament in addressing the climate crisis. Key proposals include capacity-building initiatives for legislators, institutionalizing climate accountability frameworks, and fostering international cooperation to enhance policy effectiveness. By leveraging its legislative and oversight functions, Pakistan's Parliament has the potential to drive trans-formative change, advancing sustainable development and climate resilience.

Keywords: Climate accountability, legislative governance, parliamentary oversight, climate policies, environmental sustainability.

GSTMC-25-67 Characterization And Cytotoxicity Of Copper Oxide Nanoparticles Using Medicinal Plant Combinations And Their Antibacterial Activity

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The current study describes the environmentally friendly, green method used to synthesize copper oxide nanoparticles from copper sulphate. FTIR, UV/Vis, X-ray Diffraction (XRD), and scanning electron microscopy (SEM) were used to characterize copper oxide nanoparticles. The FTIR shows the functional groups (N-H, C-H, O-H, C=O and C=C) involved in the synthesis of Cu-NPs, according to FTIR investigations, XRD shows that the average size of synthesized Cu-NPs was 45.2 nm, SEM describe the prepared Cu-NPs are spherical in shape, and UV verified the synthesis of Cu-NPs. The green synthesized nanoparticle from medicinal plant combinations exhibited strong antibacterial activity against the *Escherichia coli* and *Vibrio cholera* medicinal plant extracts of combination A showed the significant inhibition zone against the *Vibrio cholerae* and *E. coli* 23 mm and 25 mm respectively. The combination B showed least zone of inhibition such as the 18 mm and 21 mm of and combination N shows the moderate behavior against the selected bacteria. Over all the result showed that the rapid, cost effective, environmentally friendly and convenient method for copper nanoparticles synthesis, which could be used as a potential antimicrobial agent against bacterial and fungal disease. In cytotoxicity all these combinations of nanoparticles were applied on brine shrimp. From all three combinations A B and N combination B shows more cytotoxicity because they have more number of dead nauplii.

Keywords: *Mentha piperita*, *Camellia sinensis*, *Ocimum basilicum*, Nanoparticles, Antibacterial Activity.

GSTMC-25-68 Ameliorative Effects Of Plant Growth Hormones On The Physio-Chemical Parameters Of Maize Under Temperature Stress

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Temperature stress is the major limiting factor restricting plant growth and development. Little is known about the comparative and combined effects of Gibberellic acid and Salicylic acid on seed priming and foliar application on maize under temperature stress. This study investigates the impact of Gibberellic Acid (GA), Salicylic Acid (SA), and their combination (GA+SA) on the germination, growth, biochemical composition, and antioxidant activity of maize (*Zea mays*) seeds (variety CS-220) under controlled environmental conditions. The viable seeds were grown

in a Petri dishes and will be subjected to different treatments. Two controls will be set for treatment comparison (one at room temperature and one at 40C⁰), alongside treatment with Gibberellic acid, Salicylic acid and combination of both (GA+ SA) for 15 days. Key growth parameters, including germination rate, radicle and plumule lengths, fresh and dry weights, and photosynthetic pigment contents, were analyzed. Additionally, the total soluble sugar, total protein content, and electrolyte composition were measured to evaluate the physiological response to the treatments. The study also examined antioxidant enzyme activities such as Peroxidase (POD), Catalase (CAT), and Superoxide Dismutase (SOD), and performed GC-MS analysis to identify potential phytochemicals involved in stress responses. The combination of Gibberellic acid (GA) and Salicylic acid (SA) doubles the increase in shoot and root length, fresh and dry weights, and chlorophyll and carotenoid contents in maize plants under temperature stress compared to their individual use. According to this study, temperature stress reduces morpho-physiological parameters as well as phytochemicals. However In combination, Gibberellic acid and silicylic acid have increased these parameters.

Keywords: Temperature Stress; Gibberellic Acid (GA) and Salicylic Acid (SA); Maize (*Zea mays*); Growth and Biochemical Responses; Antioxidant Enzyme Activity

GSTMC-25-69 Deciphering the Gnetic Basis of Prelingual Sensorineural Hearing loss in Pakistani Families

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Hearing loss (HL) is a genetically heterogeneous and common sensorineural disorder affecting approximately 360 million people globally. This study investigates the genetic causes of prelingual sensorineural HL in nine large consanguineous families from Pakistan. Whole-exome sequencing (WES) identified ten pathogenic variants, including three novel variants in *TMPRSS3*, *ESRRB*, and *OTOF*, and seven previously reported variants in *LRTOMT*, *MYO15A*, *KCNE1*, *LHFPL5*, *USH1C*, and *SLC26A4*. In family GCNF-01, a novel splice-site variant (*c.877-1G>A*) in *USH1C* was linked to Usher syndrome type I (USH1), characterized by prelingual HL, low vision, and balance problems. Family GCNF-03 harbored a previously known pathogenic variant (*c.716T>A*, p.Val239Asp) in *SLC26A4*, associated with prelingual HL. Intersibship locus heterogeneity was observed, with the pathogenic *c.226C>T* variant in *KCNE1* segregating with HL and cardiac defect in a subset of affected individuals in family GCNF21. In silico mutagenesis and protein modeling demonstrated that these variants adversely impact protein structure and function. The findings expand the mutation spectrum of HL-related genes, highlight the challenges posed by genetic heterogeneity, and underscore the utility of WES and bioinformatics tools for clinical genetic diagnosis, prognosis, and family counseling.

Keywords: Prelingual Hearing loss, Usher syndrome, Whole Exome sequencing, and Insilico analysis for pathogenicity prediction.

GSTMC-25-70 Protein Annotation and Structural Insights into Sirtuin Proteins: A Comprehensive Analysis

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Sirtuins, NAD⁺-dependent enzymes, regulate cellular processes and are implicated in various diseases, including cancer, diabetes, and neurodegenerative disorders. This study analyzed sirtuin protein sequences to identify key structural features and annotations, providing insights into their structure-function relationships and therapeutic potential. Protein sequence was retrieved from the NCBI (National Centre For Biotechnology Information) database in FASTA format. Predict Protein, PSIPRED, and SOPMA were employed to analyze sirtuin protein sequences, revealing protein annotation, secondary structure prediction, and key structural elements. Complete annotation of sirtuins protein was conducted, it's revealed eleven helices (positions 25-33, 64-69, 76-77....., 265-274, 278-201), ten strands (positions 39-44, 48-49, 79-81....., 240-244, 250-261), eleven protein binding region (positions 53-62, 74-75, 81-88....., 221-225, 127-129), three disordered region (positions 1-15, 287-305, 318-397), sixty-seven exposed region (positions 1-6, 8-18, 21-24 , 321-321, 323-397), sixty-four buried region (positions 7-7, 19-20, 25-25, ... , 320-320, 322-322) using predict protein. SOPMA (Self-Optimized Prediction Method with Alignment) analysis of a 397-residue protein sequence predicted its secondary structure. SOPMA analysis revealed a secondary structure composition of random coil 169 residues (42.57%), alpha-helix 134 residues (33.75%), extended strands 58 residues (14.61%), and beta turns 36 residues (9.07%) providing insights into the protein's flexibility and stability and indicating confidence levels for each structural state. PSIPRED results revealed a distribution of helices: pink (stable structural cores), strands: yellow (beta-sheet formation), and coils: blue (flexible regions), providing insights into the protein's flexibility, stability, and functional regions, with high confidence predictions indicating reliable results. The protein appears to be a mix of structured and dynamic regions, suggesting roles in both stability and interaction with other biomolecules. This comprehensive analysis provides novel insights into sirtuin protein structure and function, highlighting their potential as therapeutic targets for various diseases. This study presents the first comprehensive analysis of sirtuin protein annotation and secondary structure prediction, providing a deeper understanding of their structure-function relationships and therapeutic potential.

Keywords: Sirtuins, Protein annotation, Protein secondary structure prediction, Predict protein, SOPMA.

GSTMC-25-71 Biodiesel Production from Waste Fat of Chicken Feet And Its Characterization

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The environmental pollution challenges including global warming and depletion of fossil fuels have diverted the attention of researchers from all over the world to seek alternative sources. Biodiesel is found as promising

replacement of petroleum fuels, especially petroleum diesel due to its eco-friendly nature, biodegradability, renewability and cost-effectiveness. Among the different feed stocks, chicken fat is found encouraging and wonderful for biodiesel production. In the recent study, fat was extracted from chicken feet and converted into biodiesel through transesterification. Extracted fat was analyzed to check its suitability for biodiesel production. Different concentrations of KOH and NaOH as catalyst were used. Optimized parameters were recorded as 1:6 oil to methanol ratio, 60°C and reaction time 60 min. Biodiesel yield was found maximum for 1.5% w/w for KOH catalyst and 1.00% w/w for NaOH catalyst. FT-IR and GC-MS analysis confirmed the conversion of chicken feet fat into biodiesel. The synthesized biodiesel was tested for various physiochemical properties like acid value, calorific value, pour point, flash point, cloud point, density, viscosity, water content, ash content in accordance with ASTM-D6751 biodiesel standards.

Keywords: Biodiesel, Transesterification, Catalyst, Feed stock, physiochemical properties.

GSTMC-25-72 Mesoporous Cr₂O₃/MWCNTs/PANI Nanocomposites as a High Performance Anode materials for Lithium Ion Battery

Laraib Kiran

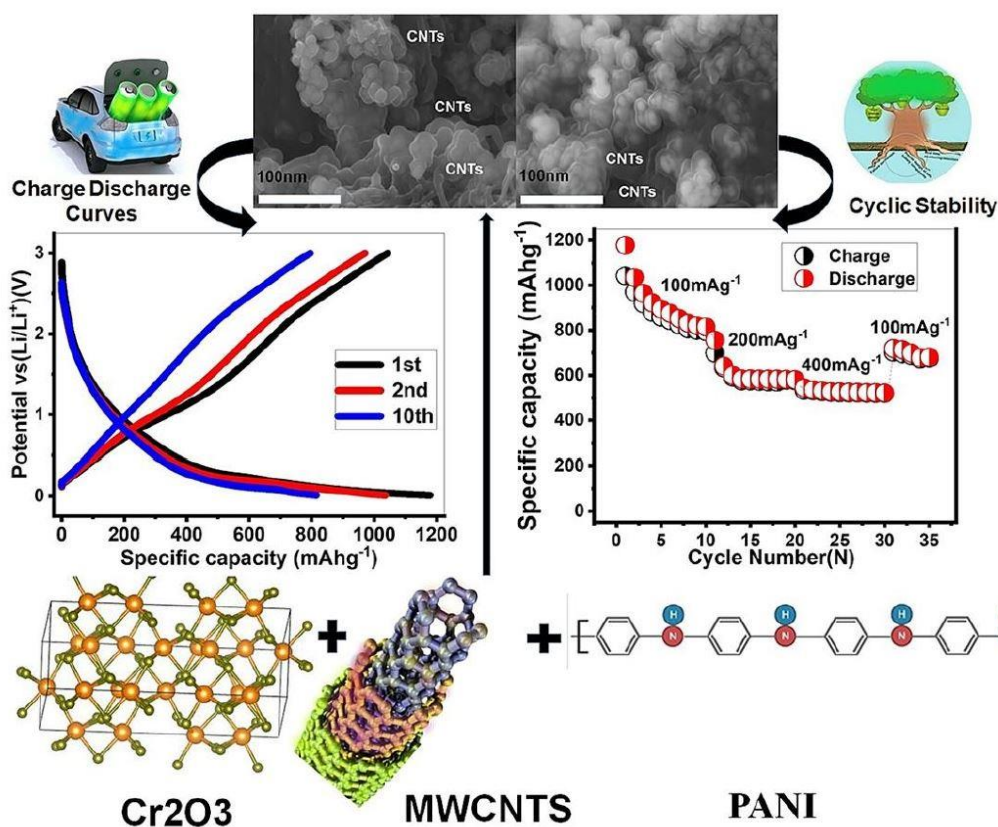
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Chromium oxide (Cr₂O₃) is a highly promising material for use as an anode in lithium-ion batteries (LIBs). Nevertheless, the battery's performance is hindered by a significant increase in volume, which leads to damage to the material's internal structure. This study demonstrates the achievement of dual modification by the development of a Cr₂O₃ nanocomposite with multi-walled carbon nanotubes (MWCNTs) using an affordable and reproducible coprecipitation process. This method effectively lowers volume changes by boosting electronic conductivity and mechanical strength. Concurrently, a polyaniline (PANI) coating was utilized by the process of in-situ polymerization of aniline monomer. This coating enhances the conductivity of lithium ions and permits efficient electron transportation, ultimately leading to exceptional stability. This study primarily investigates the impact of PANI coating, which facilitates conductive contact between the active material and electrolyte. The homogeneous nanocomposite consisting of Cr₂O₃-MWCNTs and PANI has excellent electrochemical performance. The Cr₂O₃-MWCNTs_(12%)-PANI material exhibits a discharge capacity of 815 milliampere-hours per gramme (mAh g⁻¹) when tested at a current density of 100 milliamperes per gramme (mA g⁻¹), with a coulombic efficiency of 97.5%. Furthermore, the nanocomposite has excellent capacity to maintain its performance at different rates and throughout multiple cycles.

Graphical Abstract



GSTMC-25-73 Spectrophotometric Analysis And Biochemical Characterization Of Eucalyptus Oil

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Essential oil of Eucalyptus globulus (EGEO) is thought to include bioactive chemicals with substantial biological action. This study set out to examine the chemical makeup of EGEO as well as its antibacterial properties. We used proximate analysis to verify the nutritional values found in eucalyptus oil. EGEO displays 63%, of moisture content. 6.62% of crude protein fat content were found to be 5.71% while crude fiber was 20.68 %, respectively. The chemical composition was identified using gas chromatography (GC) and gas chromatography/mass spectrometry (GC/MS). The bactericidal potential of eucalyptus leaf oil is estimated using the Agar well diffusion method, which demonstrates that it is effective against both gram-positive and gram-negative bacteria. The current study findings show that eucalyptus leaf oil exhibits strong antibacterial activity against *Proteus vulgaris* and *Escherichia coli* bacterial strains at a concentration of 100 mg/ml, with inhibition zones (mm) of 21.66±1.89 and 23.23±1.07, respectively.

Keywords: Essential Oil, Essential oil extraction, Antibacterial Activity, proximate analysis, GC-MS Analysis,

GSTMC-25-74 The Role Of Cement Production In Climate Change: A Case Study Of Pakistan

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The production of cement plays vital role in the development of modern infrastructure, poses a significant threat to global climate stability. Responsible for approximately 8% of anthropogenic carbon dioxide (CO₂) emissions, the cement industry is one of the largest contributors to greenhouse gas emissions. This study examines the intricate relationship between cement production and climate change, highlighting the environmental consequences of cement production. This study analyzes the cement production process, from raw material extraction to final product, identifying key emission sources and mitigation opportunities. The findings of this study highlight the critical necessity for sustainable cement production strategies, including energy efficiency improvements, alternative fuel utilization, and low-carbon cement production. Furthermore, this study discusses the policy and regulatory frameworks necessary to catalyze industry transformation. This study emphasizes the critical role of the cement industry in mitigating climate change, underscoring the imperative for collaborative action among stakeholders to reduce emissions and create a more sustainable built environment.

Keywords: cement production, climate change, greenhouse gas emissions, sustainable development, low-carbon technologies.

GSTMC-25-75 Clinical profile and treatment outcomes of drug resistant tuberculosis patients at a tertiary care hospital in Lahore, Pakistan

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Background: Controlling of multi-drug resistant tuberculosis (MDR-TB), is a big challenge for the National TB Control Program especially in developing countries. The data depicting the development of tuberculosis drug resistance in population of Punjab is not well categorized.

Objective: To analyze the characteristic, clinical profile and treatment outcomes of the enrolled drug resistant tuberculosis (DR-TB), in a tertiary care hospital in Punjab, Pakistan.

Methods: This is a retrospective observational study which was carried out at the Programmatic Management of DR-TB unit (PMDT), Ghulam Nabi Khan Chest hospital Lahore, Pakistan. All DR-TB patients enrolled for treatment from May 2012 to July 2014 were included in this study. Data of all DR-TB patients' record of demographic details, resistance pattern, and outcome was analyzed using mean and percentages.

Results: The male's percentage was relatively high (n=161, 53.7%) than females. Patients majority was living in urban areas (n=264, 88%). Significant risk factors associated with the occurrence of DR-TB, were those peoples; age 15-44 years (83.3%), labour employees (37%), housewife (28.3%), urban residence (88%), being married

(65.7%), illiterate (35.7%), previously TB treated patients and those having duration of sickness greater than 1 year. The success rate of treatment in MDR-TB group was 70.7% and in XDR-TB group was 4.7%.

Conclusion: The MDR-TB patients need special attention for better treatment outcomes. By following guidelines for treatment of this serious illness, it is not difficult to achieve high success rate which is evident in this study.

Keywords: Multi-drug resistance TB, Risk factors, Drug resistance, Punjab, Pakistan

GSTMC-25-76 Assessing the Spatiotemporal Impact of Climatic Variability on Wheat Yield Using Remote Sensing Indices

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Climate change is a global problem as it has adverse effects on many sectors but mainly influencing the agricultural production. Since the climate change has intensified the extreme weather events and is ultimately causing severe water shortage and deteriorating the crop yield. Wheat (*Triticum aestivum*.) is a vital part of human and animal food/feed hence being the most significant cereal crop in Asia. This research was planned to investigate the spatiotemporal impacts of climate-induced factors such as temperature and precipitation on wheat health and production in five major districts of Punjab, Pakistan by using panel data modeling techniques. Remote sensing and GIS techniques were employed to detect changes in wheat crop area accurately, enhancing yield estimation precision and facilitating better production forecasting. CHIRPS 2.0 and PMD's monthly temperature and precipitation dataset were used to assess the climatic drivers influencing wheat productivity. The results revealed that the increase in temperature ($T_{\max}$ - maximum temperature) decreased the wheat yield indicating a negative impact on the wheat crop productivity. On the other hand, the increase in temperature ($T_{\min}$) has significantly increased the wheat yield. Higher seasonal rainfall and $T_{\min}$ significantly improved the wheat crop health and productivity. The outcomes offer insights into climate trends impacting future wheat productivity under changing climatic conditions and identify vulnerable areas, to inform targeted interventions. This research equips stakeholders with the knowledge and tools necessary to enhance climatic resilience and sustain wheat production in districts of Punjab, Pakistan.

GSTMC-25-77 Synergetic contribution of sugarcane bagasse and derived biochar: Insights into cadmium stress tolerance of maize (*Zea mays* L.) with physiochemical exploration

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Cadmium (Cd) and other heavy metals are significant micropollutants originating from excessive industrial activities, inappropriate fertilizer use, and atmospheric deposition. The availability and movement of Cd can be minimized through adsorption using potential adsorbents like sugarcane bagasse (SB) and sugarcane bagasse-

derived biochar (SB-BC). It has been reported that organic amendments such as SB and SB-BC affect the bioavailability of heavy metals. A field study assessed the impact of SB and SB-BC on the physiological and biochemical properties of maize plants grown in Cd-contaminated soil. Compared with High Stress Cadmium (HS-Cd), in No Stress Cadmium (NS-Cd), the combined application of 1% SB and 1% SB-BC displayed maximum response in plant physiological and biochemical properties; improved the performance of IRGA traits, chlorophyll content (CHL), relative water content (RWC) get increased as leaf chlorophyll (52%), RWC (29%), A (11%), E (57%), Gs (41%) and Ci (24%) a marked decrease in shoot (15%) and root (27%) Cd concentration, enhanced antioxidant enzymatic and non-enzymatic response: Up-regulated the superoxidase (SOD) by 34%, peroxidase (POD) by 44%, catalase (CAT) by 29%, ascorbate peroxidase (APX) by 22%, and total phenolics (TP) by 55%, ascorbic acid (ASA) by 33%, glutathione (GSH) by 34%, glutathione reductase (GR) by 19%; the decreased lipid peroxidation and membrane damage: rebated the level of H₂O₂ (55%), O₂ (43%), content which alleviated the malondialdehyde (MDA) content by 46% and electrolyte leakage (EL) by 53% in maize plant; aggravated the profiling of compatible solutes: 18% proline content (PC), 43% soluble sugars (SS), 31% soluble proteins (SP), and 26% glycine betaine (GB) accumulation amplified, relative to their respective treatments of control and LS-Cd and HS-Cd groups. The combined application of SB and SB-BC (each at 1%) can be an eco-friendly and cost-effective approach to stabilize the Cd within the contaminated soils.

Keywords: Biochar; cadmium; adsorption; antioxidants; abiotic stress; sugarcane bagasse; Cd stabilization; food security; micropollutants

GSTMC-25-78 Efficacy Of Hybrid Constructed Wetland System For Treatment Of Polluted Water Of Chenab Drainage, Jhang

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Sewage wastewater treatment is a critical issue because of the increase in population growth, urbanization, lack of infrastructure management and investment. It can effect environment, human health and drinking water. In the current research, effect of the seasonal variations on the efficacy of hybrid wetland system was examined by treating the Chenab drain wastewater. Treated water was analyzed against the various parameters viz: chemical oxygen demand (COD), biological oxygen demand (BOD), total dissolved solids (TDS), total suspended solids (TSS), EC, pH and heavy metals (Fe and Pb). A tremendous decrease in contamination against heavy metals and physical & chemical parameters was observed. Maximum reduction in the concentration of **pH** (8.5 to 6.59) and **EC** (7.81 to 5.02 mS/cm) in mid-winter while (8.9 to 6.51 and 7.56 to 4.62 mS/cm) in summer season was observed respectively. In **mid-winter**, reduction against chemical parameters i.e. **TDS** (4240 to 2180 mg l⁻¹), **TSS** (1917 to 330 mg l⁻¹), **COD** (360 to 69 mg l⁻¹), **BOD** (235 to 96 mg l⁻¹) and **nitrate** (50.12 to 36.1 mg l⁻¹) while in **summer** **TDS** (5275 to

1702 mg l⁻¹), TSS (1604 to 74 mg l⁻¹), COD (570 to 68 mg l⁻¹), BOD (326 to 75 mg l⁻¹) and nitrates (74.26 to 16.1 mg l⁻¹) was recorded respectively. A slight decrease in amount of Pb (0.8 to 0.07 mg l⁻¹) and Fe (3.3 to 1.83 mg l⁻¹) in mid-winter was recorded while in summer maximum reduction was observed i.e. Pb (0.14 to 0.01 mg l⁻¹) and Fe (1.9 to 0.03 mg l⁻¹). These results depicted that treated water meets the water quality standards for irrigation. It is concluded that hybrid wetland system effectively eliminated the organic and inorganic pollutants from the drainage wastewater. The results depict that summer season (High temperature) is a best option for the removal of pollutants and heavy metals in waste water in comparison to winter season.

Keywords: Hybrid wetland system; Trace metals; Chenab drainage; Wastewater

GSTMC-25-79 Bioaccumulation Of Aluminum And Arsenic In *Channa marulius* And *Wallago attu*

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The research was planned to determine acute toxicity (96 h LC₅₀ and lethal concentrations) of aluminum and arsenic to the two commercially important fish species viz. *Channa marulius* and *Wallago attu* and their accumulation in body organs (gills, heart, liver, muscles and skin) of fish during acute concentrations exposure. The trials were conducted under controlled laboratory conditions. There existed statistically significant differences at p<0.05 among the two fish species for their tolerance limits to the metals. *C. marulius* was significantly more tolerant to both aluminum and arsenic toxicities, followed by *W. attu*. Both 96 h LC₅₀ and lethal concentration values of metals computed showed that arsenic was significantly more toxic to both the carnivorous fish species than aluminum. During acute concentrations exposure, significantly higher accumulation of metals was recorded in liver of both the fish species, followed by gills, heart and skin. However, statistically significant but least amassing of both the metals was found in muscles of *C. marulius* and *W. attu*.

Key Words: Bioaccumulation, Aluminum, Arsenic, *Channa marulius*, *Wallago attu*,

GSTMC-25-80 Assessment of University Students' Carbon Footprint and Recommendations for Sustainable Higher Education Practices

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Background: Climate change is a critical global issue, with rising CO₂ emissions causing severe climate-related disasters, particularly in Pakistan. Given its geographical vulnerability, it is essential to assess awareness among

youth about climate change and carbon footprints. This study evaluates the knowledge, attitudes, and practices (KAP) related to carbon footprints among University of Jhang students.

Methods: A self-structured questionnaire was used, covering socio-demographic data and KAP on carbon footprints. Data from 650 students across 18 departments were analyzed using SPSS version 23 and Microsoft Excel 365. Principal Component Analysis (PCA) and F-statistics assessed the significance of predictors.

Results: Significant differences in environmental knowledge and behavior were observed by department ($F = 2.058\text{--}6.724$, $p < .01$), while age and gender had limited effects. Most students (97%) showed high environmental awareness, with family (86%) and teachers (87%) as key influencers. However, only 60% understood carbon footprints. Behavioral practices included turning off lights (76%) and cleaning AC filters (61%), with 81% interested in awareness programs. Additionally, 82–87% was willing to adopt sustainable habits like recycling and using reusable bags.

Conclusion: Families, teachers, and educational institutions play a vital role in fostering sustainable practices and reducing carbon footprints in Pakistan and other vulnerable regions.

Keywords: KAP survey, Carbon footprints. Climate change, Youth awareness, Sustainable practices.

GSTMC-25-81 Molecular Characterization And Phylogenetic Analysis Of *Cimex Lectularius* Based On *Cox1* Gene In District Hangu Khyber Pakhtunkhwa

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Cimex lectularius (*C. lectularius*) is a widespread ectoparasite infesting human habitats, causing discomfort, allergic responses, and possible transmission of pathogens. Molecular characterization through the *COX1* gene is utilized for the assessment of genetic diversity, phylogeny, and population structure of bed bugs. The present study used field sampling in District Hangu where it focused on known infestation sites. Specimens of *C. lectularius* were preserved in absolute ethanol, and DNA was extracted using the phenol-chloroform method. The *COX1* gene was amplified through PCR, sequenced, and analyzed for phylogenetic relationships and population structure using MEGA software. A total of eight locations were inspected, five of which had active infestations. In total, 55 specimens (47 adults and 8 nymphs) were collected, with 45 adults identified morphologically as *C. lectularius* and two as *C. hemipterus*. Molecular identification of the *COX1* gene confirmed all nymphs as *C. lectularius*. The molecular analysis revealed that the strains of *C. lectularius* in District Hangu possessed high genetic similarity to those from neighboring countries, which include China, Iran, and India. The phylogenetic trees indicated a clustering with the reference sequences of these regions and, therefore, possible genetic flow and common evolutionary history. These results provide an important insight into the regional dynamics of infestation by bed bugs and emphasize cross-border collaboration as a key area in control efforts.

Keywords: *Cimex lectularius*; *COX1* gene; Genetic diversity; Nymphs; PCR; Bed bug

GSTMC-25-82 Tau Protein's Structural And Functional Elucidation: A Comprehensive Computational Analysis

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Tau protein, a microtubule-associated protein, played a pivotal role in maintaining microtubule stability and dynamics, crucial for neuronal health and function. Dysregulation of tau protein had been implicated in various neurodegenerative diseases, including Alzheimer's disease, Parkinson's disease, and tauopathies. A comprehensive computational analysis was employed, leveraging ProtParam, STITCH, and Phyre2 to investigate tau protein's structural and functional properties. ProtParam analysis revealed a high instability index (42.15) and hydropathicity (-0.677), indicating its propensity for aggregation and potential role in neurodegenerative diseases. Theoretical pI (9.88) and molecular weight (13210.14) were also computed. Phyre2 modeling predicted a 3D structure with a confident match to the template c7pqcO, with 99% of the sequence modeled with 100% confidence, highlighting the presence of microtubule-binding repeats and intrinsically disordered regions (54%). STITCH analysis predicted potential protein-protein interactions and binding partners, including microtubule-associated proteins, molecular chaperones, and kinases. This comprehensive computational analysis provided valuable insights into tau protein's structure-function relationship, shedding light on its involvement in neurodegenerative diseases and offering a foundation for further research into its role in neurodegeneration.

KEY WORDS Analysis, structure, prediction, neurodegenerative, Alzheimer.

GSTMC-25-83 *In Silico*, Analysis Of Hub Genes Of Gastric Cancer Using Bioinformatics Approaches

Shinygo & Cbioportal

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Gastric cancer is one of the most important and life-threatening cancers and the second leading cause of cancer-related deaths worldwide. In this study, the hub genes of gastric cancer including THBS1, COL1A1, MMP2, CXCL8, FN1, ITGA5, COL4A1, SPARC, and TIMP1 were analyzed through Bioinformatics approaches. ShinyGO was employed to perform Gene Ontology (GO) enrichment analysis and KEGG pathway analysis. The enriched GO terms were divided into molecular function (MF), biological process (BP), cellular component (CC) ontologies. The results of GO analysis indicated that these genes were mainly enriched in BP, including angiogenesis, cell migration, motility, locomotion and localization, blood vessel and tube development & morphogenesis, circulatory system development and anatomical structure formation involved in morphogenesis. For CC, they were enriched in extracellular matrix platelet components, vesicles, endoplasmic reticulum and extracellular regions. significant enrichment in binding activities, including: cytokine and growth factor binding (Interleukin-B, platelet-derived growth factor), extracellular matrix binding (fibrinogen, fibronectin, collagen), cell adhesion molecule binding

(integrin, proteoglycan), signaling receptor binding and structural molecule activity and binding (heparin, glycosaminoglycan, metal ion). These results indicate that most hub genes are significantly enriched in cell proliferation, binding, cell cycle regulation, and transcriptional activity. The results of KEGG pathway analysis showed that the hub genes were mainly enriched in pathways including ECM-receptor interaction, AGE-RAGE signaling pathway in diabetic complications, relaxin signaling pathway, PI3K-Akt signaling pathway, pathways in cancer etc. It also visualized the results in form of network, tree showing the interaction and relationship between enriched GO terms. KEGG pathways shows the involvement of the genes. Also, Genomic region enrichment showed the enrichment of hub genes in specific genomic regions. Also, the cBioPortal was employed to analyze gene level data including mutation frequencies, copy number alteration (CNA) and gene expression. Using cBioPortal, the genetic alterations including Deep deletion, Amplification, Missense mutations, splice mutations and truncating mutations in queried genes were investigated. A total combined study involving 108 samples from Gastric cancer studies on cBioportal revealed that the queried genes were altered in 99.07% of 108 cases. Deep deletion emerged as the most significantly reported genetic alteration for the queried genes with 64.81%, following Amplification that is 17.89% and then 16.67% multiple alterations including missense, splice and truncating mutations. The mutations in queried genes were reported in Gastric Cancer or Stomach Adenocarcinoma. Therefore, this study was done to identify the key genes and pathways involved in gastric cancer, and to investigate their genetic alterations and potential roles in the disease. This study can be helpful for researchers in identifying therapeutic targets, developing personalized medicine, improving diagnosis and prognosis, understanding gastric cancer biology, and developing new cancer treatments.

Keywords: Gastric cancer - Hub genes - Enriched GO terms - KEGG - Genetic alteration

GSTMC-25-84 Study Of Glutharaldehyde Crosslinked Gelatin-Chitosan/ Zinc Oxide Nanocomposite For Drug Deliver

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The aim of this research was to design and synthesize a novel nano composite material comprising gelatin, Chitosan, and zinc oxide (ZnO) nanoparticles for targeted drug delivery applications. The hydrogel was prepared by a simple and eco-friendly method, using zinc oxide nanoparticles to reinforce the gelatin-Chitosan matrix. The nano composite will be characterized using techniques such as Fourier transforms infrared spectroscopy (FTIR), X-ray diffraction (XRD), scanning electron microscopy (SEM), to determine its structural and morphological properties. The swelling behavior of the prepared nanocomposite hydrogels was investigated in simulated gastric fluid (pH 1.2) and intestinal fluid (pH 7.4), revealing that the nanocomposite hydrogels exhibited superior swelling capacity compared to pure Gelatin/Chitosan hydrogels. Furthermore, drug release studies demonstrated that the incorporation of ZnO nanoparticles into the Gelatin/Chitosan hydrogels resulted in sustained and controlled drug release profiles, with increased drug release observed as the ZnO nanoparticles content increased. This suggests that the

nanocomposite hydrogels have the potential to prolong drug release, making them a promising candidate for controlled drug delivery applications. The GC/ZnO hydrogel exhibited: High swelling ratio and water retention capacity Sustained drug release profile. The GC/ZnO nanocomposite hydrogel shows great promise as a drug delivery system, offering controlled release and targeted delivery of therapeutic agents. Its unique properties make it an attractive candidate for various biomedical applications, including wound healing, tissue engineering, and cancer therapy.

Key word: Drug Delivery, Gelatin, Chitosan, zinc oxide and nano composite and sustained drug release.

GSTMC-25-85 Effect Of Vitamin C Against Insecticide Mixture Of Cypermethrin And Profenofos Toxicity On Lungs And Brain Of Albino Rats

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Cypermethrin (CYP) and Profenofos (PF) are the toxicants that cause adverse effect on animals and humans including on non-target organisms. The present study was designed to evaluate the ameliorative potential of vitamin C against CYP and PF toxicity on lungs and brain of albino rats. The 40 adult male and female albino rats was acquired and acclimatized. The dose of CYP and PF was 1/8th and 1/40th was prepared in corn oil and distilled water respectively, at a rate of known LD50 and dose for vitamin C was 30 mg/kg. The rats were divided into seven equal groups, each group was containing both male and female albino rats and initial body weight was determined. Group I was kept as control group and treated with corn oil, Group II and III was given PF and CYP for five days respectively. Group IV was provided by mixture of PF and CYP for five days. Group V and VI was given PF and CYP for five days respectively then both groups were treated with vitamin C for three days. Group VII was given mixture of PF and CYP for five days then treated with vitamin C for three days. On the completion of the trial, the final body weight of the rats was determined. Then rats were dissected and chosen organs (Brain and Lungs) was collected and weighed then these organs was washed with saline water and cut into small pieces. The pieces were preserved in 10 percent neutral buffer formaldehyde solution, then organs were sliced into the fine thin portion of 5µm and stain was examined under a microscope with hematoxylin and eosin stain. A completely randomized design (CRD) was used for the experimental layout. Repeated measures under CRD were used to compare treatment means by Tukey's test. This study helped to determine the toxic effect of CYP and PF toxicants and ameliorative effect of Vitamin C on non-target organisms. The result showed significantly increased body weight gains in cypermethrin-treated rats as compared to control group, the lungs weight significantly increased and the brain weight significant increase of rats and in biochemical parameters the Superoxide dismutase level increased and Catalase level and Peroxidase level decreased in the all treated group as compared to control group and histological changes in lungs inter alveolar spaces, parenchyma and inflammatory cells recruitment in the surrounding terminal bronchioles and in brain unwinding of DNA, lesions of brain tissues and per neuronal vacuolation.

Key Words: Cypermethrin (CYP), Profenofos (PF), toxicant

GSTMC-25-86 Solid-State Synthesis And Electrochemical Analysis Of Cus/Go And Nano Composite For Energy Storage Devices

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ABSTRACT: Copper sulfide /reduced graphene oxide (CuS/GO) nanocomposites was successfully synthesized via solid-state reaction method for energy storage applications. SEM, XRD, CV, EIS were used to investigate morphological and electrochemical activity of CuS/GO nanocomposite. The as-fabricated CuS/GO nanocomposites showed superior electrochemical performance, including excellent cycling stability and high-rate capability. A reversible capacity of 650 mAh g⁻¹ was achieved at 0.5C (1C = 560 mA g⁻¹) after 100 cycles, while maintaining a stable capacity of 350 mAh g⁻¹ even at a high current rate of 4C after 400 cycles. The excellent electrochemical performance was ascribed to the synergistic effect between CuS and GO, which facilitated efficient charge transfer and accommodated volume changes. The remarkable electrochemical performance of CuS/GO nanocomposites positions them as a promising candidate for next-generation energy storage devices.

KEYWORDS: Copper sulfide, graphene oxide, nanocomposites, synergistic effect.

GSTMC-25-87 Impact of Climate Change on the Migration of Siberian Crane (*Leucogeranus leucogeranus*) to Pakistan

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The Siberian crane (*Leucogeranus leucogeranus*) is migratory bird species belonging to genus: *Leucogeranus*, family: *Gruidae* and order: *Gruiformes*. It has been divided into two populations based on their migratory pattern and habits; East Asian population and Central Asian population. IUCN has listed the Siberian crane as critically endangered species with only 3500 to 4000 individuals left all over the world with 99% for east Asian population and 1% with a little reintroduced population. In Pakistan the Siberian cranes uses Indus flyway also known as migratory bird route number 04. These birds spend their winter mostly in the areas between Taunsa barrage and Dera Ismail Khan but a small population is also found on small rivers of Indus basins and Baluchistan. Presently in Pakistan the specie is reported to be extinct but some sightings are recorded over the flyway to India by some villagers and hunters during the winter season. The main reason for this decline in population of Siberian cranes in Pakistan is the ultimate climate change resulting in to various other factors changing the overall favorable conditions for their survival. The climate change has altered the rainfall patterns leading to prolonged droughts, reduced destructed river flows and shrinking of wetlands like Keenjhar lake, Haleji lake and Manchar lake which are the critical stopover sites for Siberian cranes. Acid rains have disturbed water scarcity and salinity levels of these wetlands making them less suitable for vegetation and invertebrates which were key food sources for Siberian cranes. The altered and increased intensity of monsoon rains and glacial melts may lead to sudden flooding of wetlands making them unfavorable for foraging and resting. The rising temperature and severe physiological stress causing disrupted migratory timings and routes along the Indus Flyway resulting in Siberian cranes to bypass Pakistan during their migration. Accelerated desertification and declining wetlands ecosystems have reduced

potential stopover, affecting other species supporting balanced food webs and many other factors indirectly impacting the Siberian cranes. Climate shifts at Arctic wetlands affecting their breeding are one of the leading reasons for reduced number of individuals migrating to Pakistan along with mortality during migration because of heat stresses and other climate impacts on the way. Factors like hunting, human inference, agriculture; habitat destruction and urbanization are also main causes for decline of Siberian cranes in Pakistan. Many conservation programs in Pakistan are being run by NGOs and international organizations including WWF-Pakistan, International Crane Foundation (ICF), Pakistan Wildlife Foundation (PWF) and Government of Pakistan. These programs have worked over the conservation of wetlands especially for the revival of Siberian cranes.

Key words: Migratory bird, critically endangered, destroyed wetlands, disrupted flyway and conservation.

GSTMC-25-88 “Impact of social media usage on mental health in adolescence”

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The definition of social media refers to the type of media that utilize a digital platform and have interactive participation over the past decade. Social networking sites (SNS) refer to the platform designed to help people communicate and share information online. Out of all adolescents between the age of 13 and 17, 97% use at least one of the following seven SNS platforms; You-tube (85%), Instagram (72%), Snapchat (69%), Facebook (51%), Twitter (32%), tumblr (9%) or Reddit (7%). There are concerns about the impact of social media on adolescence mental health. Now social media is a major coo-associated with anxiety and depression. Social media may have a bad impact on well-being in general by feeding into anxiety, depression, and FMO (fear of missing out). Reading through reels of other people's lives can lead to unfavorable comparisons. Instagram is one of the biggest social media platforms causing depression. WHO mentions that the countries with higher prevalence rates of depression in adolescence include China, India, US, Brazil, Bangladesh. In Asia, Bangladesh has the highest prevalence rates of depression. Here are some strategies to help you deal with social media-related anxiety: unfollow accounts that make you feel bad about yourself; use self-care methods like yoga, progressive muscle relaxation, or deep breathing; and set time limits or set aside specific times to use social media apps. Enjoy activities like reading or drawing that do not include social media. Learn how social media can affect your mental health so that you can choose to use it more wisely.

Keywords: Anxiety, Depression, Prevalence rates.

GSTMC-25-89 Anthelmintic Potential Of Plant Extracts Against *Ascaridia galli* In Poultry

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Small-scale farmers rely heavily on poultry for income, but ascariasis, caused by the parasitic roundworm *Ascaridia galli*, severely threatens poultry health and productivity. The rise of drug resistance to anthelmintic medications highlights the need to develop plant-based alternatives to address this global issue. The objective was to evaluate the anthelmintic efficacy of *Corcuma longa*, *Allium sativum*, citrus fruit peels (lemon, sweet lemon and orange) and their mixture against *A. galli*. The plants were dried and ground into powder, from which an aqueous extract was obtained. Infected intestines were collected from slaughter houses for isolation of *A. galli* eggs and worms. For Egg Development Inhibition (EDI) tests, 10% and 20% concentrations of each plant extract were prepared in Phosphate Buffer Saline (PBS) and incubated with *A. galli* eggs in test tubes. In the Adult Mortality Test (AMT), 10% and 20% concentrations were used against adult *A. galli* worms for 24 hours. The results revealed that all plants showed anthelmintic activity against *A. galli*. The mixture's extract (94%) was highly effective on egg development compared with other extracts (<90%). In contrast to other extracts, which achieved 100% adult mortality after 20 hours, the mixture's extract demonstrated 100% adult mortality within 15 hours. So in the future, mixtures could be used as feed additives to reduce the *A. galli* infection in poultry.

Key Words: *Ascaridia galli*, Anthelmintic, Phytochemicals, Poultry, Mixture, *Corcuma longa*

GSTMC-25-90 Mitigating Drought Stress in Maize (*Zea mays* L.) Using Magnesium Oxide Nanoparticles

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Maize (*Zea mays* L.), a globally significant cereal crop, is highly vulnerable to drought stress, which impairs its growth, productivity, and physiological functions. Addressing this challenge, the present study investigated the potential of magnesium oxide nanoparticles (MgO NPs) to enhance maize resilience under varying levels of drought stress. The experiment was conducted in a completely randomized design, applying MgO NPs as a seed priming treatment. Maize seeds were exposed to various levels of drought, simulating progressive water deficit conditions. Results indicated that drought stress significantly reduced growth parameters, biomass production, and chlorophyll content while increasing oxidative stress markers such as reactive oxygen species (ROS). However, MgO NPs treatment led to significant improvements in plant height, root length, photosynthetic pigments, and antioxidant enzyme activities, effectively mitigating drought-induced damage. The study highlights the potential of MgO NPs as a sustainable strategy for enhancing drought tolerance in maize, contributing to improved crop performance and food security in water-scarce regions.

GSTMC-25-91 Comprehensive *In Silico* Characterization of Laccase from *Bacillus amyloliquefaciens*: Structure, Function, and Biotechnological Potential

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Laccase (benzenediol: oxygen oxidoreductase; EC 1.10.3.2) is multicopper oxidase enzymes widely distributed across various biological kingdoms, including plants, fungi, and bacteria. They play distinct roles in biological systems, such as participating in lignin biosynthesis in plants and contributing to lignin degradation in fungi and bacteria. This duality in function underscores their evolutionary importance and adaptability. Furthermore, their capacity to polymerize natural phenols has enabled the formulation of innovative products, including cosmetic pigments, hair dyes, deodorants, toothpastes, and mouthwashes, among other consumer goods. This study explores the structure and functionality of laccase using a suite of *in silico* tools, including the Enzyme Nomenclature Database, Motif Scan server, CATH database, and WoLF PSORT server. The primary objective is to identify critical structural motifs, functional domains, enzyme classification, cellular localization, and the chemical reactions catalyzed by this enzyme. The enzyme sequence of laccase from *Bacillus amyloliquefaciens* was retrieved from the NCBI (National Centre For Biotechnology Information) database. Analysis via the Enzyme Nomenclature Database confirmed that laccase, also referred to as urushiol oxidase, is a multicopper oxidase with low substrate specificity. It catalyzes the oxidation of four hydroquinone molecules and molecular oxygen (O_2), producing four semiquinone molecules and water (H_2O). This enzyme exhibits activity on both ortho- and para-substituted phenols, as well as on aminophenols and phenylenediamine, showcasing its functional diversity. Further investigation using the Motif Scan server revealed several significant features of the laccase enzyme. These include an N-glycosylation site, an N-myristoylation site, a multicopper oxidase domain, involucrin repeats, and phosphorylation sites for casein kinase II, protein kinase C, and tyrosine kinase. These features suggest the enzyme's post-translational modifications and functional specialization. The results from the CATH (Class, Architecture, Topology, Homologous superfamily) database analysis revealed that all the domains belong to the Mainly Beta class, exhibit a sandwich architecture, and possess an immunoglobulin-like topology. Additionally, they are classified within the Cupredoxin-Blue Copper Protein homologous superfamily. The E-values for all the predicted domains showed highly confident matches, with the top hits, such as 1gskA01 and 4a8kA01, displaying extremely low E-values, indicating a strong alignment and reliability of the predictions. Additionally, analysis using the WoLF PSORT server indicated that the enzyme is predominantly localized within intracellular compartments, suggesting its activity is likely confined to specific cellular regions. By leveraging these computational tools, this study provides a comprehensive characterization of laccase from *Bacillus amyloliquefaciens*, offering insights into its structure-function relationships and its potential for various biotechnological applications. This analysis not only broadens the understanding of laccase's biochemical properties but also highlights its versatility as a promising candidate for industrial and environmental applications.

Keywords: Multicopper oxidase, Structural motif, Functional domain, Enzyme classification, Cellular localisation

GSTMC-25-92 A Novel Framework for Leveraging Qubit Arrangements to Enhance Quantum Computing Applications

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Quantum computing is at the forefront of revolutionary advancements in problem-solving, with the potential to transcend classical computational limitations. However, challenges such as qubit noise, decoherence, and inefficiencies in traditional architectures often constrain the effective utilization of quantum hardware. These challenges necessitate innovative approaches to the arrangement and manipulation of qubits to fully harness their quantum properties.

In this research, we introduce a novel concept of qubit organization, departing from traditional grid-like structures or layered architectures. Our framework reimagines qubit alignment as a dynamic, task-oriented system, arranging qubits in a manner that optimizes the utilization of quantum phenomena such as superposition, entanglement, and interference. By dynamically neutralizing or activating qubits based on task-specific requirements, this approach seeks to minimize errors, maximize computational efficiency, and expand the potential of quantum systems to solve complex, multidimensional problems.

This paradigm enables us to address versatile computational challenges, ranging from advanced pattern recognition to optimization and machine learning, with a focus on tasks that require a deep interplay between high-dimensional quantum states and precision control. By leveraging this novel organization of qubits, our work lays the groundwork for developing quantum systems capable of adapting to the needs of diverse applications, further bridging the gap between theoretical advancements and practical, scalable quantum solutions.

This approach represents a significant step toward maximizing quantum resources, ultimately contributing to breakthroughs in domains such as cryptography, AI, and scientific simulations.

GSTMC-25-93 *In-Silico* Docking Studies of *Nepeta cataria* Phytochemicals as novel Potential Inhibitors of HPV E6 Oncoprotein

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Human Papillomavirus (HPV) notably HPV 16 is a pivotal etiological factor in the progression of assorted cancers , chiefly cervical, anal, and oropharyngeal cancers . Prophylactic vaccinations against HPV have been validated, yet medication therapy targeting the virus and its carcinogenic consequences is still mandatory. Among the most viable therapeutic targets, viral oncoprotein E6 has been pinpointed as a vital role in cell endurance and oncogenic development in HPV-positive cells. E6, by its association with the cellular ubiquitin ligase E6AP, can accelerate the degradation of the tumor suppressor protein p53. As a result, one of the most important tactics for inhibiting infected cell survival and proliferation is to prohibit the formation of the E6-E6AP complex. This research inspect the inhibitory effects of phytochemicals from *Nepeta cataria*, a renowned herb, by screening its bioactive chemicals and identifying potential ligands that can impair E6 activity. 111 phytochemicals were docked against the E6 receptor, and the top 10 being selected based on their S scores and binding affinities . Conclusively, the 9 best ligands (i.e Beta FARNESENE , BETA STEROL, FAT , ISOMARGARIC ACID, METHYL -NEPETALACTONE , NEONEPETALACTONE ,ROSMARINIC ACID ,URSOLIC ACID and PIPERITONE) were selected as these ligands strictly followed lipinskis rule of five and exhibited good Admet profiling (Absorption , Distribution ,

Metabolism , Excretion ,and Toxicity) It is noted that several pockets overlapped with each other, having some amino acids in common such as Tyr A 146 , Val A 119, ILE A 183 ,ILE A: 95 , Phe A : 240 and leu A 219 and these were identified as key residues for high affinity ligand binding . A few amino acids unique to each ligand were also identified representing additional interactions at the receptor site. This study identified a potential binding pocket for the E6 inhibitors and this identification of the ligand binding pocket helps to design novel inhibitors of HPV16

Keywords: cervical cancer; molecular docking; Nepeta cataria , E6-E6AP; ADMET properties

GSTMC-25-94 Synthesis Characterization and Cytotoxic Profiling of Magnesium Oxide Nanoparticles Using Peanut Shell Extract

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An eco-friendly biogenic method for the synthesis of magnesium oxide nanoparticles (MgONPs) using phytochemically rich peanut shell extract was established. The synthesis of magnesium oxide nanoparticles (MgONPs) was confirmed using different microscopic and spectroscopic techniques includes UV Visible spectroscopy (UV-Vis), Fourier-transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), energy dispersive X-ray (EDX), and scanning electron microscopy (SEM) analysis. Spectroscopically, MgONPs was found with a pure elemental composition (oxygen and magnesium), average size (22.53 nm) and spherical structure with multiple functional groups (-OH group and Mg-O formation) on their surface. The synthesized nanoparticles were further investigated for cytotoxicity. As compared to extract, MgONPs exhibited strong biological activities. Dose-dependent cytotoxicity response was confirmed against brine shrimp with IC₅₀ value (45.08 µg/mL). Additionally, MgONPs exhibited stimulatory efficacy by enhancing seed germination rate at low concentrations (31.25 and 62.5 µg/mL). In conclusion, this study depicted that BPL extract has important phytochemicals with remarkable which could be used for magnesium oxide nanoparticles. The results indicated that the MgO nanoparticles exhibited significant cytotoxicity against brine shrimp, while showing minimal toxicity against wheat. This study demonstrated the potential of peanut shell extract as a reducing agent for the synthesis of MgO nanoparticles, and highlighted their potential applications in biomedical and agricultural fields.

Key words: Peanut shell, magnesium oxide nanoparticles, cytotoxicity, brine shrimp, wheat.

GSTMC-25-95 Phytochemical Analysis And Growth Inhibitory Effect Of Selected Plants Against Ixodidae Ticks

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Ticks are arthropods, blood-sucking ectoparasites including 899 species in three families i.e., Ixodidae (hard ticks), Argasidae (soft ticks), and Nuttalliellidae on several vertebrates' hosts affecting almost 80% of the world's

cattle populations and also transmit tick-borne diseases. Numerous pathogens, such as bacteria, protozoans, viruses, and helminths, are transmitted by ticks. The current study determined the prevalence of Ixodidea ticks in domestic livestock (cows, sheep, goats, and buffalos) in the Kohat district and the acaricidal efficiency of crude extract of selected plant leaves i.e., Peach (*Prunus persics*), White willow (*Salix alba*), Gurgura (*Monetheca boxifolia*), and Asgand Nagaori (*Withania coagulans*), against ticks. Ticks were collected from August to November 2024 and identified to the species level using a stereo-zoom microscope. Results revealed that the most prevalent genera were *Rhipicephalus*, *Haemophysalis*, and *Hyalomma*. The highest prevalence was reported in sheep followed by cows, goat, and buffalo. For phytoextract-mediated acaricidal activity, medicinal plants were collected from district Khyber, and crude extracts were prepared using a Rotary Evaporator. The experiment was performed in triplicate, concentrations of 20mg/ml, 40 mg/ml, 60 mg/ml, and 80 mg/ml of each extract were used. In results, *W. coagulans* showed the highest acaricidal activity compared to *M. boxifolia* whereas *P. persics* and *Salix alba* had no acaricidal activity. So, it was concluded that the leaf extract of *W. coagulans* had the highest mortality rate of ticks as compared to *M. boxifolia*, *P. persica*, and *S. alba*. Furthermore, these plants are locally available and can help control tick infestation without leading to resistance in the pathogen.

GSTMC-25-96 Effect Of Starvation On Immunological And Haematological Parameters Of *Labeo rohita* (Rohu)

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In aquaculture, fish food and fish health is much important. Improper management of aquaculture leads to disturbed fish health and fasting stress. Food shortage is experienced by all aquatic animals including fish and this food shortage completely changes the immune system of fish. The present research work was aimed to study the immunological parameters of rohu under fasting condition. Duration of experimental trial was 60 days. For this purpose, the fish were divided into two groups. The 1st group called a control group and was fed with diet twice a day. 2nd group called a starved group and in this group fish were kept in starved conditions for 10 days, 20 days and 30 days. The physico-chemical parameters such as water temperature, dissolved oxygen, pH, total hardness, electrical conductivity, calcium and magnesium were also determined during this experiment. After experimental trial the blood sample from the fish caudal vein was collected to examine hematological and immunological parameters such as hemoglobin, red blood cells, hematocrit, white blood cells, MCV, MCH, MCHC, monocytes, lymphocytes, eosinophils neutrophils and granulocytes. The data obtained from blood samples and physicochemical parameters were statistically analyzed by analysis of variance and correlation. The correlation analysis was executed to determine relationship between different physico-chemical parameters.

Key Words: *Labeo rohita*, Immunology, Hematology, Starvation, RBC's, WBC's

GSTMC-25-97 Harnessing refuse-derived fuel from organic municipal solid waste: empowering energy solutions in developing countries

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Exploitation of fossil fuels and inadequate waste management are major challenges associated with increasing population and industrialization, which calls for new options like waste-to-energy systems. For instance, a bio-energy refuse-derived fuel system can be produced from conversion of municipal solid waste to energy. The heating value of biomass is crucial to analyze and design any bio-energy systems. The experimental methods of estimation of high heating values not only have higher possibilities of experimental errors but are also time consuming as well as expensive. This study analyzed the high heating values (HHVs) of organic fraction of municipal solid waste, particularly of food waste (FW). Various biomasses of food that are discarded as waste, including biomasses of Cabbage, Watermelon, Potato, Bread, Egg, Banana, Carrot, Onion, Rice, Cucumber, Lemon, Chickpea, Bottle Gourd, Macaroni, Capsicum, Mint, Chili, Tea, Loquat, Coriander, Peas, Ginger, Zucchini, Garlic, Bitter Gourd, Ladyfinger, and Tomato were characterized for proximate analysis in freshly collected condition. The result disclosed that all biomasses collectively were rich in organic matter (OM) of an average 62.57%. Correspondingly, the ash content of the food waste samples turned out to be lower, and the fixed carbon content resulted to be higher, which is associated with high fuel quality. The high heating values are predicted using the following empirical equations: $HHV = 0.312(FC) + 0.1534(VM)$, $HHV = 17.4325 + 0.0373(FC/ASH)$, and $HHV = 19.5037 - 1.0111(FC/VM) - 0.2392(VM/FC)$. The food waste biomass was sun-dried, and shredded and blended to obtain a homogeneous feedstock. Five trials of different ratio of food waste (T1=0%, T2=25%, T3=50%, T4=75%, T5=100% FW) in combination with mulberry wood chips (WC) were used to produce refuse-derived fuel (RDF) pellets from the food waste feedstock, using a locally manufactured pelletizer. Proximate analysis of the RDF pellets was also carried out, resulting in almost the same percentages of OM, Ash, and FC as of the fresh food waste samples. The OM of T1 having 0% FW and 100% WC was 75.28% while the OM of T5 having 100% FW and 0% WC was 58.23%. Similarly, the HHVs of T1, using the three equations, were 24.59579, 17.49560, and 18.511424, respectively. Whilst the HHVs of T5 were 19.02568, 17.46139, and 18.511417, respectively. It was concluded that the HHVs of WC are slightly higher than that of FW.

Keywords: Waste-to-energy, Food waste, Refuse-derived fuel, Proximate analysis, High heating values.

GSTMC-25-98 Empowering social skills in autistic children through VR: a new frontier in therapeutic support

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People diagnosed with Autism Spectrum Disorder (ASD) commonly display challenges in socialization, communication, and imagination. Recently, various assistive technologies, including virtual reality (VR), have been explored to support the enhancement of social communication skills in these individuals. This study evaluates the effectiveness of a recently created virtual reality learning environment that was created especially to give autistic

youngsters a safe place to practice and rehearse everyday activities related to social life. In order to closely simulate realworld situations, the environment has been constructed with progressive adjustments in difficulty levels. These modifications involve increased crowd, along with distracting noises and irregular music. In the initial stage, the focus will be on introducing a little crowd with no noise or music. Moving on to the second stage, the emphasis shifts towards increased crowd with some noise and pleasant music. The third stage centers on decision-making processes. The proposed virtual reality therapy demonstrates gradual improvement over time and is capable of identifying instances when autistic children experience feelings of anxiety, irritation, and enthusiasm. As a result, notable impacts on behavioral cues were observed, indicating that the VRbased learning environment fosters a positive and educational atmosphere for learning.

GSTMC-25-99 Neutrino cooling and decay rates for important weak interaction nuclei for core-collapse supernova simulations

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The proposed project aims to understand the dynamics of core-collapse supernovae, which are crucial components of the Universe. Supernovae occur when massive stars undergo various evolutionary phases, producing elements and energy. The stability of a star is a constant battle between gravity and electron degeneracy pressure. When electrons are captured, the degeneracy pressure reduces, leading to a supernova. The process of neutrinos and anti-neutrinos, produced during decay reactions, is crucial for modeling and simulation of these phases. The project focuses on microscopic calculations of neutrino cooling and beta decay rates using the proton-neutron quasiparticle random phase approximation (pn-QRPA). The pn-QRPA model has an excellent track record for predicting beta-decay half-lives and can be used for any heavy nucleus. The project also plans to calculate nuclear ground-state properties using the Interacting Boson Model (IBM). The project aims to improve understanding of core collapse supernovae dynamics.

GSTMC-25-100 Isolation of β -lactamase producing *Escherichia coli* from clinical blood and sputum samples of Diabetes mellitus Patients of Khyber Pakhtunkhwa.

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Diabetes mellitus is a Public health challenge and socio-economic burden in developing countries globally. The emergence of beta-lactamase-producing *Escherichia coli* in blood and sputum samples from diabetic patients have a significant health threat including bacteremia and respiratory conditions. The objective of the current study is to evaluate the antibiotic resistant *Escherichia coli* in the clinical blood and sputum samples of diabetic and non-diabetic patients of Khyber Pakhtunkhwa. The blood and sputum samples from diabetic and non-diabetic patients admitted to different wards of Hayatabad Medical Peshawar, Khyber Pakhtunkhwa were collected and transported to

microbiology laboratory of Hayatabad Medical Complex for further analysis. The samples were culture on Blood agar and MacConkey's agar. The positive growth and lactose fermenting bacteria were further analyses through gram staining and biochemical test for specie identification. The screening of the data represents different bacteria including *Escherichia coli*, Klebsiella, Salmonella, Protius spps, Enterobactor, Citobactor, Steph epidrmitis etc. After the identification of the bacteria the isolates were subjected to Kirby Bauer's disc diffusion method to selected antibiotics of β -lactam ring. The antibiotics include, Carbapenems (Meropenem (MEM)), Penicillins (Piperacillin+tazobactum (TZP), Co-amoxiclav), Aminoglycosides (Amikacin (AK)), Tetracycline (Tigecyclin (TG)), Cephalosporin (Ceftazidime (CAZ), Cefriaxone (CTX), Cefepime (FEP), Cepoparazone/sulbactum (SCF)), Fluoroquinolones (ciprofloxacin), Azithromycin(AZM), Ampicilllin (AMP). Results of the Kirby Bauer's disc method exhibit that majority of the antibiotics of diabetics patients show more resistance as compare to the non-diabtics patients. The 3rd and 4th generation of the β - lactam antibiotics show more resistance in both groups of diabetics and non-diabetics patients. The current study conclude that the indiscriminate use of antibiotics should be strict monitor as the antimicrobial resistance in *Escherichia coli* complicate and prolonged the treatment regime in diabetic patients due to its compromised immune system.

Keywords: Antibiotics sensitivity, *Escherichia coli*, *Diabetes mellitus*, β -lactam ring

GSTMC-25-101 Relationship Between Work Stress And Performance Of University Faculty.

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The purpose of the study was to examine the relationship between work stress and teacher performance. Therefore, the statement of the problem is designed as a "Relationship between Work Stress and performance of teachers at university level". The aim of the study was 1) To identify the perceived level of work stress of teachers at the university level.2) To identify the perceived level of performance of teachers at the university level.3) To explore the relationship between work stress and performance.4) To examine the role of demographic variables in work stress and the performance of teachers. Research design means the structure of investigation that is aimed to identify variables and their relationship. This study was descriptive type and quantitative in nature. The purpose of this study was to identify the relationship between work stress and teacher performance. It is therefore, an outline or scheme that serves as a useful guide to the researcher in his effort to generate data for his study. The researchers, therefore, adopted the survey method for data collection. The population of the study will be all public and private universities in Lahore city. There are 14 public and 21 private sectors of universities in Lahore. By random sampling technique, questionnaire evaluate "the relationship between workplace stress and performance of teachers". The sample selected by the researcher will all teachers from the university. The questionnaire were used to examine the work stress and teacher performance in university. It determines the prevention for work stress and teacher performance. This study was quantitative in nature. The sample comprised of all public and private Higher Education Institutes of Lahore. Random sampling technique was used to measure

the work stress and teacher performance. 300 teachers were selected from Higher Education Institutes of Lahore. A questionnaire which is self-developed by researcher for Teachers is designed at Likert scale rating to get answers of teachers about Perceptions, relationship between work stress and teacher performance. Designed factors was (Perceptions on existing of related on work, time management, overloaded lack of motivation and teacher performance). Questionnaires consist on 43 items. Data was analyze through SPSS. Appropriate tests was used to analyze data. The tests include descriptive, T-Test and Anova was used. ‘‘Relationship between work place stress and teacher performance’’

The findings highlight that demographic variable like Gender, Age, Qualification, Experience, employment contract, years of academic experience, material status on workplace stress and teacher performance. These demographic variables affect the term work place stress and teacher performance. The findings of this study suggest that student bullying might make teachers feel uncomfortable in their jobs which causing stress. These findings may be utilized to design successful solutions for not just preventing and managing workplace stress and teacher performance, but also for making schools safer for teachers.

Keywords: work stress; performance; Teachers educational institute teaching

GSTMC-25-102 Cathelicidin Antimicrobial Peptide Preproprotein: Structure, Function, and Medical Implications

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Human Cathelicidin antimicrobial peptide, Cathelicidin LL-37, is an important molecule in the regulation of innate immune responses. As an effector molecule, it exerts direct antimicrobial and immunomodulatory actions. LL-37 influences the response of neutrophils toward microbial stimulation: it reduces the release of pro-inflammatory cytokines and induces the production of ROS. Moreover, LL-37 up-regulates the expression of chemokines and chemokine receptors and promotes the recruitment of immune cells. The Cathelicidin, which include LL-37, are synthesized and stored in cells as two-domain proteins, being cleaved on demand to give a cathelin protein and an antimicrobial peptide. Both the cathelin portion and the C-terminal peptide display biological activities associated with host protection. LL-37 is a multifunctional molecule that may mediate a number of host responses, and it represents an important part of the innate immune system. Furthermore, LL-37 was reported to inhibit macrophage stimulation by bacterial components, confer protection against lethal endotoxemia in mice, and increase expression of chemokines from both macrophages and epithelial cells. Such information has suggested that one aspect of the role of LL-37 in the immune response involves dampening the damage effect produced by bacterial products while at the same time recruiting immune cells to the site of infection. In all, Cathelicidin LL-37 is a powerful antiseptic agent and multifunctional modulator of innate immune responses; thus, it is a promising candidate for a therapeutic agent against infectious diseases.

Keyword: Cathelicidin antimicrobial peptide. Catholicidin LL-37. Homo sapiens. Annotation. 3D Modelling. Phylogenetic. Physical and chemical features.

GSTMC-25-103 Proximate Composition of Farmed and Wild *Ctenopharyngodon idella* and *Hypophthalmichthys molitrix*

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Aquaculture provides a reliable source of protein for a growing global population. Fish is a rich source of protein, omega-3 fatty acids, vitamins, and minerals. The proximate composition of fish varies depending on the species, age, and environment. This study evaluated and compared the proximate composition (moisture, protein, lipids, ash, and carbohydrates) of meat, head, and liver in wild and farmed *Ctenopharyngodon idella* (grass carp) and *Hypophthalmichthys molitrix* (silver carp). Forty-two fish samples (21 wild, 21 farmed) across three weight categories (W1&F1: 601-900g, W2&F2: 901-1200g, W3&F3: 1201-1500g) were analyzed at the Research Laboratory. Significant differences were observed in the proximate composition between wild and farmed fish. In wild fish, the highest meat moisture was in W1 (73.95%) protein in W2 (20.75%) lipids in W3 (3.50%) ash in W2 (1.10%) and carbohydrates in W1 (1.50%). Farmed fish showed significantly higher moisture (72.71%) protein (21.62%) and lipids in F3 (4.45%) ash (0.80%) and carbohydrates in F1 (1.70%). Wild *C. idella* showed significant head moisture (63.34%) and protein in W1 (22.47%), lipids (13.87%) and ash in W3 (5.90%) and carbohydrates in W2 (2.90%) while farmed *C. idella* had significantly greater head moisture (22.43%) and protein in F3 (12.82%), lipids in F1 (13.88%), ash in F2 (5.93%) and carbohydrates in F1 (2.28%). The liver of the wild *C. idella* showed maximum moisture content in W1 (72.34%), protein content in W2 (17.15%), lipids content in W3 (8.82%) ash content in W1 (2.58%) and carbohydrates content in W3 (4.23%). In farmed *C. idella* and *H. molitrix* maximum moisture, protein, lipids, ash and carbohydrates contents were shown by F1 (68.27%), F3 (14.98%), F3 (9.83%), F1 (3.54%) and F3 (4.92%), respectively. Farmed fish had higher lipid and protein content due to controlled feeding, whereas wild fish had higher moisture and ash, reflecting natural habitats. The study emphasizes optimizing aquaculture for improved fish nutrition.

Key Words: Farmed fish, Proximate composition, Wild fish, *Ctenopharyngodon idella*, *Hypophthalmichthys molitrix*

GSTMC-25-104 Alpha amylase inhibition studies of secondary metabolites from the Leaf of *Rhazia stricta*

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Plants are blessings of Almighty Allah which are not only used as food but also as medicines. Without plants, life could not exist. Ethnopharmacology has been involved in the search for new medications. Many phytoconstituents with antidiabetic qualities, including terpenoids, saponins, flavonoids, carotenoids, alkaloids, and glycosides exist in medicinal plants. Diabetes mellitus (DM) is a serious disease that spreads quickly. It is estimated that approximately 537 million adults (20-79 years) are living with diabetes mellitus (DM) worldwide. α -amylases are enzymes that may hydrolyze starch molecules to produce various products such as glucose units and dextrin which causes hyperglycemia and the development of type 2 diabetes. *Rhazia stricta*, is a valued medicinal plant belonging to the Apocynaceae family. Traditionally leaf extracts are used to treat a wide variety of diseases including the common cold, syphilis, hyperglycemia, rheumatism, and parasitic infections. The plant leaves were collected, dried, and macerated to obtain the tested fraction. Methanolic extract was found to be a bio-active fraction with IC_{50} value of 17.75 μ g/mL. With the aid of thin layer and column chromatography, **R1** compound was purified from this fraction with solvent system i.e., 4% ethyl acetate-*n*-hexane. Compound structure and α -amylase inhibition activity is in progress. The investigative attempt might result in the discovery of natural anti-diabetic compounds from *Rhazia stricta*.

Key words: *Rhazia stricta*, Secondary metabolites, α -amylase inhibition activity

GSTMC-25-105 Optimizing Itaconic Acid Production through Submerged Fermentation with *Aspergillus niger*

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Itaconic acid has recently gained importance as a fully sustainable building block chemical for its broad applications in manufacturing various synthetic resins, coatings, and polymers. It also has applications in super-absorbents, phosphate-free detergents, and bioactive compounds, particularly in the pharmaceutical industry and agriculture. In this study, mango peels were analyzed to be used as a substrate for the biosynthesis of itaconic acid using *Aspergillus niger* by submerged fermentation. Different physicochemical parameters (incubation period, temperature, agitation rate, inoculum size, and pH) were optimized using the central composite design (CCD) design of response surface methodology (RSM). The maximum production of itaconic acid, i.e., 4.6 g/L, was achieved using 10 % mango peels w/v, 3 mL inoculum volume after five days of fermentation period at pH 3, and a temperature of 32 °C when the media was kept at a 200-rpm agitation speed. According to HPLC analysis, 98.74 % purity of itaconic acid was achieved. Hence, it is concluded from the results that sugar-rich mango peels can act as a promising substrate for the biosynthesis of itaconic acid.

GSTMC-25-106 Gut-Brain Connections: Unveiling the Microbial Influence on Human Behavior

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The human intestine microbiome has developed as a basic controller of human behavior, affecting disposition, cognitive work, and passionate well-being. This blurb introduction investigates the perplexing connections between the intestine microbiota, the central apprehensive framework, and human behavior, shedding light on the complex instruments basic the gut-brain hub. Our comprehensive survey of existing writing uncovers that the intestine microbiome produces neurotransmitters, hormones, and metabolites that tweak neural signaling pathways, affecting behavior, disposition, and cognitive work. The gut-brain hub is bidirectional, with the central anxious framework impacting the intestine microbiome and bad habit versa. We examine the suggestions of this complex transaction for the improvement and treatment of psychiatric disarranges, such as uneasiness, discouragement, and schizophrenia. Moreover, we look at the potential helpful applications of psychobiotics, probiotics, and prebiotics in tweaking the intestine microbiome to progress mental wellbeing results. Our think about gives unused experiences into the energetic exchange between the intestine microbiome and the brain, highlighting the significance of considering the intestine microbiome as a key player in the improvement and treatment of psychiatric clutters. By illustrating the components fundamental the gut-brain pivot, we can open novel restorative methodologies for moving forward mental wellbeing results.

Keywords: Gut-brain axis, gut microbiome, human behavior, microbiome-mediated behavioral modulation, psychiatric disorders.

GSTMC-25-107 Molecular Detection Of *Babesia bigemina* In Cattle And Impact Of Cumin (*Cuminum cyminum*), Milk, And Jetepar Against *Babesia bigemina* In Cattle

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Bovine babesiosis is a tick-borne disease, poses a significant threat to the cattle worldwide. Ticks of the genera *Hyalomma*, *Rhipicephalus*, and *Amblyomma* serve as vector for *Babesia bigemina*. Ticks are abundant in warmer areas of the world. The present research work was designed and conduct to detect *Babesia* species in cattle blood at the molecular level and to assess the efficacy of conventional antibabesial drugs and additives (milk, cumin, and Jetepar) against babesiosis. Blood samples from cattle were collected and analyzed using microscope and Polymerase Chain Reaction. DNA extracted with the kit method and PCR analysis were performed using specific primers for *Babesia bovis* and *Babesia bigemina*. The study also investigated risk factors associated with babesiosis infection. The results revealed overall prevalence of *Babesia* is 30% through microscopic examination and further also detect by PCR. The risk factor such as age, breed, and dung pile location, use of acaricides, health status, tick infestation and housing type are significantly associated with *Babesia* infection. Imidocarb dipropionate treatment has an efficacy of 60%, while addition of additives rises efficacy to 90%. It was concluded that cattle recover quickly when liver health improves and oxidative stress is reduced.

Key Words: Ticks, *Cuminum cyminum*, Milk, Jetepar, *Babesia bigemina*

GSTMC-25-108 Synthesis, Spectroscopic Characterization, Antibacterial And Dna Binding Activity Of Hydrazone Based Organotin (Iv) Complexes

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In the current study, a [O, N] donor ligand N¹, N⁶ bis (2hydroxy-5-Chloroacetophenone) adipohydrazide was synthesized by reaction of adipic dihydrazide with 5-chloro-2-hydroxyacetophenone in ethanol. A series of three diorganotin (IV) derivatives of these compound have also been synthesized in good yields by refluxing the compounds or its triethylammonium salt and the appropriate organotin (IV) chlorides in dry toluene for 7-8 hours. The synthesized compounds were characterized by a variety of spectroscopic techniques including Uv-Visible, FTIR and NMR (¹H, ¹³C). The spectroscopic investigation was used to check the structure, coordination mode of ligand and geometry of tin in the resulted synthesized ligand and complexes. All the synthesized complexes with [O, N] donor ligand maintain their geometry as trigonal bipyramidal both in solution and solid state. The synthesized ligand and organotin derivatives have been studied for their effectiveness against Antibacterial and for DNA binding. The synthesized organotin (IV) complexes 1(dimethyltin) showed high effectiveness against antibacterial activity B. subtilis (17 ± 0.32 mm), whereas complex 2 and 3(dibutyltin) and (dioctyltin) shows good antibacterial activity against E. coli (18 ± 0.41 mm) and B. subtilis (18 ± 0.41 mm). than ligand. Similarly, the complexes were also showed significance to determine the interaction of organotin (IV) complexes with DNA, the interaction studies with salmon sperm DNA (SS-DNA) are also carried out through UV-vis absorption spectroscopy. The Gibbs free energies (DG) (28.02 kJ/mol for complex 1 and -28.43 kJ/mol for complex 2 and 3) and high values of binding constants (K) (8.15 10⁴ M⁻¹ for complex 1 and 9.62 10⁴ M⁻¹ for complex 2 and 3) indicate that strong interactions are developed between organotin (IV) complexes and SS-DNA compared to the ligand. The dibutyl tin derivative of the ligand showed high percentage with a value of 78-90%.

Keywords: Oxygen Nitrogen Donor Ligand, Organotin (IV) complexes, Antibacterial, DNA binding Activity.

GSTMC-25-109 Structural and Functional Analysis of Troponin Protein from *Trichinella pseudospiralis* and its Implications for Muscle Regulation

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The crucial roles of the troponin protein play in the muscle structure and function of the skeletal muscle contraction and relaxation. The heterogeneous complex of the three subunits makes up the troponin; TnC, TnI, and TnT. The discovery of Ebashi of a protein factor that sensitized actomyosin to calcium ions initiated Ca²⁺ regulation of muscle contraction. In this discovery, the protein factor was separated into two proteins: tropomyosin and a novel protein that had been named troponin. It is constituted of three different components, namely, troponin C, I, T, which manifest several regulatory properties. Several genetic studies have shown that many mutations of genes for the troponin components, especially troponinT and I, are associated with three kinds of inherited cardiomyopathy. Characterization of the retrieved *Trichinella pseudospiralis* troponin protein sequence from NCBI on its

physicochemical properties has been done in this study. A model of a 3D structure for this troponin-like protein is built, while its bioinformatic predictions against various target proteins are presented. More so, an evolutionary relation of the protein with other homologous proteins by phylogram is generated. In general, these studies provide insights into the structure, biology, and evolution of the troponin-like protein and point toward its biological importance.

Keyword: Troponin. *T.pseudospiralis*. Phylogeny. Annotation. Physiochemical Properties.

GSTMC-25-110 Integrated Pest Management (IPM) Strategies for Managing Wheat-Associated Insectivorous Arthropods

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Wheat (*Triticum aestivum*) is a major cereal crop of the world and provides 20% of the world's food calories. Pakistan's average wheat production is 24.946 million tons, contributing 1.7% of the country's gross domestic product (GDP). Aphids are a significant insect pest of wheat, causing crop injury by sucking cell sap, releasing honeydew, interfering with the photosynthetic activities of the crop, and transmitting pathogenic viruses. In the present study identification of wheat, aphid species and assessment of IPM modules for aphid management have been worked out. Therefore experiment was carried out on winter wheat during 2022 and 2023 at the Entomological Research Area University of Agriculture, Faisalabad. Aphids can be identified based on body color, cornicle tube (length, shape, orientation etc.) and length of antennae. The population of *S. graminum* was observed more abundant than *R. padi* and *S. avenae* during 2023. Aphids ended their population dynamics on 25th March during 2022 and 12th April during 2023. Various species of natural enemies, mainly *Coccinella septumpunctata*, *Syrphidae* and parasitoid mummies were inconsistently observed in four agro-ecological zones. Seven spotted ladybird beetle (coccinellids) displayed highest percentage during both the seasons (62% and 50%), spiders exhibited (27.66% and 28%), syrphid flies (Diptera: *Syrphidae*) displayed (2%) during both consecutive seasons. The present study may serve as a baseline regarding distribution of wheat aphids and their natural enemies and the results provided insights for further studies on the potential top-down (natural enemies) versus bottom-up (fertilization and irrigation regimes) forces in management of wheat aphids in Pakistan.

Key Words: *Triticum aestivum*, Aphids, *S. graminum*

GSTMC-25-111 *Eucalyptus Globules labill* Oil as a Topical Healing Agent its Biochemical and Antioxidant Profiling Through GC-MS Techniques

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Eucalyptus globulus oil is thought to include bioactive chemicals with substantial biological action. This study set out to examine the chemical makeup of *Eucalyptus globulus* oil as well as its antioxidant and antibacterial properties both in vivo and in vitro. We used proximate analysis to verify the numerical values found in *Eucalyptus* oil. displays the findings of the proximate analysis of *Eucalyptus* leaves. At 63%, the leaves had a higher moisture content than other plants. 6.62% of crude protein, respectively. The chemical composition was identified using gas chromatography (GC) and gas chromatography/mass spectrometry (GC/MS). As the concentration of the solution increases, the DPPH values show a considerable augmentation in antioxidant activity. Overall, the data point to increasing levels of total phenolic and flavonoid content and enhanced antioxidant activity as determined by DPPH. The bactericidal potential of *Eucalyptus* leaves oil is estimated using the Agar well diffusion method, which demonstrates that it is effective against both gram-positive and gram-negative bacteria. The current study findings show that *Eucalyptus* leaves oil exhibits strong antibacterial activity against *Proteus vulgaris* and *Escherichia coli* bacterial strains at a concentration of 100 mg/ml, with inhibition zones (mm) of 19.66 ± 1.89 and 22.21 ± 1.07 , respectively. While the three concentrations of *Eucalyptus globulus* labill oil (25 %, 50 %, and 75 %) showed comparatively reduced antibacterial activity. An increasing number of international papers attest to the antibacterial properties of medicinal herbs.

Keywords: Proximate Analysis, Antibacterial Activity, Antioxidant Activity, GC-MS Analysis, Animal Model.

GSTMC-25-112 Research Topic: Multimodal Critical Analysis of Ideologies and Humor in Pakistani Political Memes

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Social media has become an integral part of people's life in modern times. It has different types, but it has power to influence the minds. One of the important types of media artifacts is political memes. On the surface level these memes have been presented to create humor in its audience. Memes have become an interesting way of presenting desired ideologies. The researcher conducted the present research to know that how memes are representing desired political ideologies. Another important research question was to know that how political memes are embedded with ideologies and how with the help of the culture of audience it increases its acceptability and circulation in society. The researcher has collected the data from three different Facebook pages, *Memes ke duniya*, *Memes ke duniya 2* and *Pakistani Political memes posting*. The researcher selected 20 multimodal memes for analysis. The researcher has employed Kress and Leeuwen multimodal approach, David Machin and Andrea Mayr discourse analysis, appraisal theory, for doing language and image analysis, and Van Dijk's socio-cognitive model and Fairclough 3D model. Through the analysis of data, researcher has found that political memes are embedded with political ideologies. The purpose of these memes is not only to create humor in audience but to inject desired political ideologies into the culture of the audience. The meme makers have presented their political parties positively and other political parties negatively. For example, Mr. Sharif has been represented as a beggar and donkey. In the same

way, Mr. Khan has been represented as Donkey king and thief. Meme makers have represented out-groups in derogatory way with the help of animal metaphors and blame game. Memes are highly imbedded with political ideologies which can manipulate the minds of its viewers.

Keywords: *Critical Discourse Analysis, Multimodal Discourse Analysis, Meme, Political Memes, Political Rhetoric*

GSTMC-25-113 Temporal Foraging Dynamics Of Insect Pests And Natural Enemies In Maize Field

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The cultivation of maize (*Zea mays* L.) holds significant agricultural and economic importance in Pakistan, ranking as the third most crucial cereal crop after wheat and rice. To develop sustainable integrated pest management strategies, identifying insect pests and their natural predators is essential component of IPM. For this, a field experiment was carried out on spring and fall maize field crop at the Plant Breeding and Genetics research area of the University of Agriculture Faisalabad. The research focused on the temporal foraging dynamics of insect pests combating natural enemies during spring and fall seasons. Using a random plant sampling method, data on larvae and adult stages of insect pests and their natural enemies were collected weekly and processed in MS Excel, presenting mean numbers ($\pm$ SEM) per 100 plants. In both the spring and fall seasons, the highest mean populations of leaf hoppers (*Dalbulus maidis*) and aphids (*Rhopalosiphum maidis*) per 100 maize plants occurred on April 20th (118.55 ± 21.51) and October 13th (2394.54 ± 770.86), respectively. The fall Armyworm had an average mean of (1.74 ± 6.88) per 100 maize plants on March 30th during the spring season. Natural enemy guilds included coccinellids, staphylinids, and araneae. Rove beetles (*Paederus fuscipes*) exhibited their highest mean population (284.48 ± 29.43) during the reproductive stage on May 11th in the spring season. In fall season, spiders peaked at a mean population of (17.76 ± 2.86) on September 29th during vegetative growth stages. Seven-spot ladybird beetles (*C. septempunctata*) peaked (62.00 ± 8.09) per 100 maize plants on April 6th and (4.64 ± 5.30) on October 6th during the vegetative growth stages. Similarly, *C. sexmaculata* peaked values (79.84 ± 7.75) and (18.43 ± 6.35) per 100 maize plants on April 27th and October 20th in spring and fall seasons, respectively, during reproductive growth stages. Graphpad prism 5.01 version was used for graph formation and data analysis. Sampling dates of maize were on X-axis and averages of insect pests and natural enemies on Y-axis. Outcome of this study was the gateway for future sustainable pest management strategy in maize ecosystem in Pakistan.

Key Words: Maize, Parasitoids, Insect

GSTMC-25-114 Simulating Quantum Systems For Developing Quantum Computing Algorithms

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Quantum computing has appeared as a novel computing model that has been shown to have exponential superiority compared with the classical model for some problems. Integral to this kind of innovation is the capacity to simulate quantum systems that is imperative for building quantum algorithms. This paper focuses on quantum simulations and the numerical and computational methods that enable their modeling as a building block for the development of quantum computing algorithms. With the help of superposition and entanglement of quantum mechanical type, simulations reveal the characteristics of quantum bits (or qubits) and processes occurring by their interaction. A few approaches covered include the use of Schrödinger equation for time-dependent and time-independent systems, density matrix for decoherence analysis, and tensor network for large scale quantum systems simulation. The paper then underscores the application of variational quantum algorithms, together with the VQE as an approximation algorithm of Hamiltonians. Further, it highlights the problems that are created by exponential growth of Hilbert space that hinders classical simulation and how hybrid quantum-classical architecture can address these difficulties. Possible use of these simulations can be further enhancements of quantum algorithms for cryptography, machine learning and material science. The rise of noise models and further development of quantum error correction techniques are also described in the study for enhancing the accuracy of practical quantum computations. Researchers can optimize the correct process so that it can be adapted for near-term quantum capabilities while laying the groundwork for scaling up quantum systems for quantum error correction. This study shows the central importance of quantum system simulations for advancing the next wave of computational platforms.

Keywords: Quantum simulations, Quantum algorithms, Superposition and entanglement, Variational quantum algorithms (VQE), Quantum error correction

GSTMC-25-115 Skeletal Bone Fracture Detection using Deep Learning – Third eye for doctor

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Computers have become crucial across all aspects of human life, from banking, ecommerce, communication, education, research to healthcare. In the medical field, several innovative technological tools have been developed to help doctors and hospitals enhance patient care. Traditional X-ray scanners often produce blurry images of bones, increasing the risk of inaccurate diagnoses for bone fractures. This can lead to patients receiving an incorrect diagnosis or treatment, which can result in a longer treatment period. To address these issues, this comprehensive research explore and evaluates 60 recent papers identified in prestigious databases, including WOS, Scopus, and EI. The objectives of this study are threefold. Firstly, precise definitions are established for the bone fracture recognition, classification, detection, and localization tasks within deep learning. Secondly, this study comparative analysis based on key aspects such as the bones involved, research objectives, dataset sizes, methods employed, results obtained, and concluding remarks. In this study, X-ray and CT image datasets are used for detecting bone

fractures. The process begins with image preprocessing, which enhances the clarity of input images by reducing blurriness. Once the data is prepared, various deep learning techniques are applied to achieve accurate results. This study explores and discusses several intelligent deep learning approaches used for the detection of bone fractures. Most of best result, based on accuracy 90% and above, analyzed from X-ray. These advancements have significantly reduced human error and expedited the diagnostic process, which is particularly useful in emergency and high-pressure clinical settings.

Keywords: Deep Learning, Machine Learning, X-ray Images, CT images, Bone Fracture, Image processing.

GSTMC-25-116 Effect Of Stem Education On Academic Performance Of Students Of Grade 8

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This research work was designed to know the effects of STEM education on academic performance of students of grade 8. A quasi-experimental research design was used. The sample was selected using a simple random sampling technique. Academic achievement of students was checked before the treatment using pretest and after the treatment using posttest. Collected data was analyzed using statistical techniques (i.e., Mean, SD and t-test). The objectives of the study were; (a) To find out baseline academic performance of students of grade 8. (b) To find out effectiveness of STEM education in improving academic performance of the students. It was concluded that the baseline academic performance of all students of grade 8 was almost same. It was concluded that STEM education was effective in improving academic performance of students of grade 8. It was recommended that teachers should be trained to teach STEM education. It is also recommended that schools should be restructured and curriculum should be revised to meet emerging trends of STEM education. It is suggested that the education department should give STEM education programs top priority and funding. It is also advised to assist schools in determining where their STEM programs need to improve.

Keywords: STEM education; Academic performance; effectiveness, critical thinking skills; Problem solving skills.

GSTMC-25-117 Analyzing The Influence Of Aloe Vera Extract Supplementation In *Cirrhinus mrigala* And *Ctenopharyngodon idella* On Growth Performance And Hematological Parameters

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Aquaculture growth is hindered by high feed costs, poor seed quality and disease outbreak. Aloe vera as a growth promoter can offer a natural solution to enhance fish growth in aquaculture facilities. Therefore, the present research was designed for analyzing the influence of aloe vera leaf extract (ALE) supplementation on growth performance and hematological parameters in *Cirrhinus mrigala* and *Ctenopharyngodon idella*. Four treatments i.e. T₀; Control, T₁; 1%ALE, T₂; 5%ALE and T₃; 10%ALE dietary supplementation mixed with the basal feed with three replications

for each treatment and fish were used. The trial was performed for three months duration using glass aquaria of 100L water capacity. The growth [increase in weight (g), increase in total length (cm), and specific growth rate (SGR %)] and hematological parameters (total RBC, total WBC and Hb content) were analyzed during the research trials. The results revealed that increase in body weight(g) and total body length (cm), and SGR (%) were significantly higher ($p < 0.05$) in the T_2 and T_3 treatments as compared to the T_0 and T_1 groups for both the fish following the order $T_3 > T_2 > T_1 > T_0$. *Ctenopharyngodon idella* exhibited growth significantly lower than *Cirrhinus mrigala*. ALE supplementation (T_2 and T_3) significantly influenced hematology of both fish species in terms of increased RBC count and Hemoglobin (Hb) content.

Key Words: Aquaculture, Aloe vera extract, *Cirrhinus mrigala*, Hematology, *Ctenopharyngodon idella*

GSTMC-25-118 The Impact of Capital Structure on Performance and Risk: Insights from Pakistan's Banking Sector

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This paper investigates the relationship between capital structure (debt, equity, hybrid) and its impact on performance and risk in Pakistan's banking sector. The proportion of debt and equity used to finance firm's operations plays a critical role in defining financial and economic stability. This will examine how various leverage ratios influence key performance indicators, while also analyzing the associated risks such as financial risk, market risk, credit risk and economic risk. The banking sector, being a cornerstone of Pakistan's economy, plays a vital role in helping economic growth and development. The expected findings of this paper reveals that, too much rely on debt financing tends to create financial risk especially in volatile economic conditions, but it can also increase profitability up to certain threshold due to tax shield and increased capital efficiency. The equity financing minimizes the risk but it can stop growth prospective due to higher cost of capital. The combination of debt and equity is the optimal capital structure focusing factors like regulatory requirements, economic stability and market competition. Insights from this paper provide valuable guidance for policymakers, financial institutions and investors aiming to balance performance and risk in dynamic financial landscape.

Key words: capital structure, profit efficiency, Pakistan's banking sector, risk management, performance metrics

GSTMC-25-119 Thermal Performance Analysis of a Stainless-Steel Vessel with Fiberglass Triple-Layer Insulation

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This work aims at evaluating such thermal performance of a stainless-steel container with a triple layer of fiberglass (E-glass) insulation material. The vessel comprises two square sections welded together, incorporating two temperature sensors. One of them was placed in the internal water medium of the vessel, while the other was placed on the insulation surface of the vessel. Thermometer sensors measure temperatures changes under condition to

determine heat retention and insulating ability. The experiments were performed at 5-minutes intervals with 20-second intervals of measurements. The obtained thermal data was highly resolved. The goal of the findings is to improve the knowledge of insulation performance for industrial use and stress on the ability of fiberglass insulation on heat loss resistance.

Keywords Thermal Performance, Stainless Steel Container, Fibreglass Insulation, E-Glass, Triple Layer Insulation

GSTMC-25-120 Phytotherapeutic And Molecular Perspective On Lice Management In Humans, Pigeons, Goats And Buffaloes

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Lice (Pediculus) are cosmopolitan insects which are external parasites. They attach to and get nourishment from their host's skin, also increase in size and multiply. Lice are tiny parasitic insects that feed on blood, causing itching, irritation and potential health complications. Lice are ectoparasite, wingless insects that afflict both people and animals' hair and scalps. Two main types: Chewing lice and Sucking lice. Humans can be infested by three types of lice and among them body louse is well-documented as it cause vector borne diseases such as typhu and trench fever. Genetic Diversity of lice shows that there are six mitochondrial clades known as A, D, B, F, C, and E. Symptoms and Causes of lice infestation are: In humans, cause itching, scalp irritation and discomfort, leading to social stigma and psychological distress. In pigeons and domestic chicken, can cause significant damage to their feathers, weaken their immune system and affect their productivity. In buffaloes and goats: Lice Infestations can cause anemia, weight loss, and decreased milk production. Recent study shows that head louse also serves as vectors, yet not confirmed. The impact of lice infestations includes: a widespread problem, Health concern and Economic Impact. Drug Alternate Phytochemicals Neem seed extract and garlic extract has shown effectiveness against both bloodsucking and biting lice. The main aim of this study was to check the mortality rate of lice by using methanolic and aqueous extract of *Allium sativum* (garlic), *Trachyspermum ammi* (ajwain) and *Syzgium cumini* (jamun). Lice was collected from four different species humans, buffaloes, goats and pigeons and after one hour of collection extract was applied to ensure the viability and responsiveness of the lice to the extract. And for this purpose adult immersion test was applied as lice were exposed to aqueous and methanolic solution of plants extracts. After 2hours of the lice exposure to extract mortality rate was observed and it was checked that methanolic extract achieved higher mortality rate as compared to aqueous extracts. The methanolic extract of *Allium sativum* achieved 100% mortality rate. Also the aqueous extract of *A. sativum* shows 90-100% mortality rate. Further aqueous extract of *Trachyspermum ammi* (ajwain) and *Syzgium cumini* (jamun) shows 70% of mortality rate. However their methanolic extract shows 100% of mortality rate after 20minutes. To develop the phytochemical

based treatment to control lice infestation in humans, goats, buffaloes and pigeons the methanolic extract of *Allium sativum* could be highly recommended.

Key Words: *A.stavium*, *T.ammi*, *S.*, Phytotherapy, Humans, Pigeons, Goats, Buffaloes, lice

GSTMC-25-121 Unleashing The Potential: A Study Of The Effectiveness Of Youtube Educational Videos On Teacher's Learning Outcomes

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YouTube is not only a platform that individuals share, upload, comment on videos; but also, teachers and educators can make practical and effective use of it to the best as great that students can have more an advantage or profit gained. Teaching strategies and instructional materials used by the teachers are an important part of learning. This study aims to determine the effects of YouTube educational videos on teacher's learning. The objectives of research were to examine the benefits, reliance and credibility of educational videos on teachers. The researcher used online questionnaire to collect data from 500 teachers of Lahore. Purposive sampling was used in this research. This study approached Uses and Gratifications Theory and Knowledge Gap Hypothesis as a theoretical framework. The findings revealed that majority of respondents agreed with the improvement of educational YouTube videos in their knowledge of teaching principles, influenced their teaching methods and strategies, helpful in watching videos concerning their respective courses, it is helpful for teachers to watch YouTube educational videos multiple times and YouTube help teachers to improve their ability to engage students in learning activities.

Keywords: YouTube, Education, Videos, Learning, Teachers

GSTMC-25-122 Advancing E-Glass Composites: Theoretical Exploration of Graphene Integration for Renewable Energy

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The proposed concept of the incorporation of graphene nanoparticles within E-glass fibers offers a novel strategy to improve mechanical, thermal, and electrical performance of composites. This study aims at developing and characterizing graphene reinforced epoxy-based E-glass composite materials which can be used in aerospace, automotive and renewable energy industries. The process starts by modifying the surface of graphene for better compatibility when incorporating in epoxy resin matrix. The modified resin is subsequently applied to E-glass fibers to fabricate a hybrid composite material. It could be shown a considerable improvement; tensile strength increases of approximately 25% and thermal conductivity of 30% in relation to conventional E-glass composites. The study also utilizes finite element analysis for the particle dispersion of nanofiller and simulation of the composite in its working environment. These results underline the opportunities of the graphene usage as nanofiller for improving the new generation of high-strength glass fibre reinforced composites materials.

Keywords: Graphene Nanoparticles, E-glass Composites, Mechanical Properties, Thermal Conductivity, Finite Element Analysis

GSTMC-25-123 Molecular Response of Recombination Activating Genes 1 and 2 To *Aeromonas hydrophila* in *Cirrhinus mrigala*

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RAG1 and RAG2 are genes, crucial for the development of adoptive immune system. They stand for "Recombination Activating Gene 1" and "Recombination Activating Gene 2," respectively. These genes encode proteins that play a vital role in the rearrangement of DNA segments to create diverse antibodies and T-cell receptors. Recombination-activating gene 2 (RAG 2) allies with recombination-activating gene 1 (RAG 1) and regulates the V (D) J recombination of immunoglobulin (Ig) and T-cell receptor (TCR) genes. Being a key player in the adaptive immune response of vertebrates, the progression of an effective immune system in vertebrates involves the variation of immunoglobulin (Ig) and T-cell receptor (TCR) through V (D) J realignment. V (D) J segments are realigned into different compositions through recombination signal sequences, enhancing the variance of the resulting protein produced in lymphocytes, which is regulated by RAG 1 and RAG 2. The process of rearrangement and somatic recombination, to produce distinct antibody repertoires is mediated by recombination activating genes (RAGs). Recombination activating gene 2 is capable of precisely cleaving, grasping, and identifying the DNA at the recombination signal sequences site. The non-homologous end-joining NHEJ machinery is crucial in the development of lymphocytes, controlling V (D) J reorganization for functional gene generation, generating a polyclonal pool of viable T and B cells. Functional characterization of RAG 1 and RAG 2 from *Cirrhinus mrigala* is beneficial for understanding the biological response towards the pathogen. The molecular response of RAG 1 and RAG 2 in *Cirrhinus mrigala* has been examined in this report. According to the qRT-PCR result, RAG 1 and RAG 2 transcripts were found in various types of *Cirrhinus mrigala* tissues, with the kidney and spleen tissues exhibiting down regulation. Following *Aeromonas Hydrophila* infection, *Cirrhinus mrigala* RAG 1 and RAG 2 expression levels were down regulated; nevertheless, in certain fish, the RAG genes were up regulated, but overall, the regulation was down regulated. Our findings suggested that RAG 1 and RAG 2 might have shown the immune response against bacterial infection in the main lymphoid tissues of *Cirrhinus mrigala*.

Key words: RAG 1 and RAG 2, *Cirrhinus mrigala*, V (D) J, TCR, *Aeromonas hydrophila*

GSTMC-25-124 Synthesis, Characterization And Antimicrobial Activities Of Oxydianiline Based Polyzomethine Zinc Oxide Nanocomposites
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Different proportions of zinc oxide nanoparticles (3%, 6%, and 9%) were used to create a range of zinc oxide-polyazomethine nanocomposites. Terephthalaldehyde and 4, 4'-oxydianiline underwent a condensation reaction to create the polyazomethine, which is a polymer with a conjugated azomethine (-CH=N-) backbone. ZnO nanoparticles were sonicated into the PAM matrix to create the ZnO nanocomposite. Techniques like Fourier Transform Infrared Spectroscopy (FTIR) to verify functional groups, X-Ray Diffraction (XRD) for crystalline structure analysis, Scanning Electron Microscopy (SEM) for surface morphology, and Thermogravimetric Analysis (TGA) for thermal stability were used to characterize the synthesized PAM and ZnO nanocomposite. The agar well diffusion method was used to measure antibacterial activity against both Gram-positive and Gram-negative bacteria

as well as fungal species. The results showed that the polyazomethine/ZnO nanocomposite significantly outperformed the pure polymer (PAM) in terms of antimicrobial efficacy. These results demonstrate the potential of PAM/ZnO nanocomposites based on oxydianiline in antibacterial and biomedical coating applications.

GSTMC-25-125 The Efficacy of Iron Oxide Nanoparticles Supplemented Soybean Meal Based Diets on the Growth, Nutrient Digestibility and Carcass Composition of common carp

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This study aimed to evaluate the effects of iron oxide nanoparticles (Fe²⁺-NPs) enriched soybean meal on the growth, nutrient digestibility, and carcass composition of Gulfam fingerlings under controlled laboratory conditions. Fe²⁺-NPs were added to the diet at concentrations of 0, 6, 12, 24, 48, and 96 mg/kg, resulting in six experimental diets. The fingerlings were divided into six groups, each consisting of five fish, and housed in separate experimental tanks for 60 days with three replicates per group. The fish were fed twice daily, at a rate of 4% of their body weight in both the morning and evening. Standard protocols were followed to assess the impact of each treatment on various fish parameters. After 60 days, the group fed a diet supplemented with 35 mg/kg Fe²⁺-NPs demonstrated the most significant improvement in growth and nutrient digestibility. The whole-body protein and ash content increased, while fat levels decreased. Data from all research parameters were analyzed using one-way analysis of variance (ANOVA).

Keywords: Fe²⁺-NPs, Common carp, Growth, Nutrient digestibility, Carcass

GSTMC-25-126 The Impact Of Aloe Vera Extract Supplementation On Growth And Proximate Composition Of Two Indian Major Carps *Catla catla* And *Labeo rohita*

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Aloe vera, rich in polysaccharides, is recognized as immunostimulant and having antimicrobial properties, making it beneficial in fish feed formulations. This study aimed to explore the impact of aloe vera leaf extract (ALE) supplementation on growth and proximate composition of two Indian Major Carps *Catla catla* and *Labeo rohita*, with the goal of developing sustainable growth enhancement methods and reducing reliance on chemical treatments. The experiment was run in triplicates and divided into four treatments i.e. T₀= Control, T₁=1%ALE, T₂=5%ALE, T₃=10%ALE dietary supplementation mixed with the basal feed. The research span was three months using glass aquaria having 10 fish per aquarium. Results showed significantly improved growth under T₂ and T₃, in terms of increase in weight (g), increase in length (cm) and feed conversion ratio (FCR). Proximate composition analysis demonstrated significantly higher levels of crude protein (%) and fat (%) in T₂ and T₃, while moisture content (%) was significantly higher in T₀ and T₁ and lower in T₂ and T₃. These findings suggested that aloe vera extract have

significant potential as eco-friendly promoter to improve the growth and proximate composition of commonly culturable Major carps (*Catla catla* and *Labeo rohita*).

Key Words: Aloe vera extract, *Catla catla*, *Labeo rohita*, Growth, Proximate composition

GSTMC-25-127 Evaluation Of Plant Growth Promoting Characteristics Of Pesticides Degrading Bacterial Strains In Maize Isolated From Shakardara Oil Field

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Organic farming represents an environmentally sustainable agricultural practice that improves soil fertility and enhances overall soil quality. However, the increasing adoption of advanced agricultural technologies has contributed to a gradual decline in the global prevalence of organic farming. Maize (*Zea mays* L.), a primary cereal crop in Pakistan and worldwide, holds significant agricultural importance. Plant growth-promoting bacteria (PGPB) serve as biostimulants, enhancing crop growth, yield, and quality. In this study, two PGPB strains were assessed for their impact on maize cultivation under specific soil and climatic conditions. These bacterial strains demonstrated the ability to synthesize indoles, produce siderophores, and solubilize phosphates. The influence of the strains on maize seed germination was evaluated, revealing a clear improvement in germination percentages compared to the control group. When inoculated individually, these strains significantly enhanced maize plant growth, leading to increases in plant height (35–40%), shoot dry weight (24–28%), and root dry weight (39–43%) relative to uninoculated plants. The native bacteria associated with maize cultivation in Shakardara show strong potential as a sustainable alternative for promoting maize growth and supporting environmentally friendly production systems.

Keywords: Maize, bacteria, plant growth promotion, pesticides degradation.

GSTMC-25-128 Impact Of Human Leukocyte Antigens -B Genes Polymorphism On The Severity Of Covid-19 In Pakistani Population

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The COVID-19 pandemic has highlighted the importance of understanding the genetic factors that influence disease susceptibility and severity, as individual's exhibit varying responses to SARS-CoV-2 infection. This study aimed to investigate the association between HLA-B gene polymorphism and COVID-19 susceptibility and severity, exploring the potential role of HLA-B variants in modulating immune responses to SARS-CoV-2. We have conducted a comprehensive analysis of HLA-B gene polymorphisms in a large cohort of COVID-19 patients and healthy controls, utilizing next-generation sequencing techniques to identify specific HLA-B variants associated with disease susceptibility and severity. Our findings provide novel insights into the genetic basis of COVID-19 disease variation, highlighting the significance of HLA-B gene polymorphism in modulating immune responses to SARS-CoV-2. Specifically, we identified several HLA-B variants associated with increased susceptibility to

COVID-19, including HLA-B_07:02 and HLA-B_35:01. On the other hand, other HLA-B variants, such as HLA-B_15:01 and HLA-B_40:01, were associated with reduced susceptibility to the disease. Furthermore, our analysis revealed that specific HLA-B variants influence COVID-19 severity, with certain variants associated with increased severity and others with reduced severity. These findings have important implications for personalized medicine approaches, vaccine development, and risk stratification strategies. By understanding the genetic factors that contribute to COVID-19 susceptibility and severity, we can develop targeted interventions and treatments tailored to individual needs, ultimately improving disease outcomes and reducing morbidity and mortality.

Keywords: COVID-19, polymorphism, HLA-B, gene, severity

GSTMC-25-129 Genetic Mapping Of Causative Gene Involved In Hereditary Hearing Impairment Family From District Upper Dir

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Congenital hearing impairment is a prime global public health issue that severally affects children's speech and language development, as well as their social and cognitive behaviors. Hearing impairment is the most prime sensory impairment and among the most prevalent congenital anomalies. In typically neonates, moderate to severe hearing impairment is estimated at 0.1 to 0.3%, whereas in neonates admitted to the neonatal intensive treatment unit, the prevalence rises to 2 to 4%. Presently there are about 206 loci linked with non-syndromic hearing impairment. Presently, more than 600 syndromic types of deafness have been identified, affecting approximately 30% of individuals with genetic hearing impairment. Many of these syndromic types initially resemble non-syndromic deafness. Above than 120 genes have been linked with non-syndromic hearing loss (NSHL), which accounts for around 70% of all hereditary hearing loss cases. There are various factors due to which congenital hearing impairment occurs. However, genetic defects remain the most common cause. In Pakistan, consanguineous marriages are common and that contribute to 70% of cases of hereditary hearing impairment. In this study Whole-exome sequencing and Sanger sequencing was used to determine the genetic cause of autosomal recessive HI in a Pakistani family. A deletion variant c. 35del: p. Gly12ValfsTer2 in the GJB2 gene was determined to cause HI in investigated family. That variant was determined by using different bioinformatics tools. This study may help the affected individuals for better counseling and management.

Keywords: Congenital hearing, Genetic Mapping, mutation, genes, Sanger sequencing

GSTMC-25-129 Antibacterial Efficacy of Nanoparticles Against Bacteria Isolated from Cutaneous Leishmaniasis Patients in Southern Khyber Pakhtunkhwa

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Cutaneous leishmaniasis (CL) is an intricate illness that is known to be endemic in several parts of the world, including Asia specifically Pakistan. Various bacteria from the lesion part of infected patients have been recorded globally. Studies regarding the secondary bacterial infection from the wound region of CL patients in Khyber Pakhtunkhwa (KP) province, Pakistan are rare. For the said purpose, 140 suspected CL patients were examined in three districts of KP province including Tank, Dera Ismal Khan, and Lakki Marwat. Additionally, the bacteria obtained from secondary infections were treated via nanoparticle (Ag.Zn@HAp) to examine its efficacy against them. Our findings showed that 100/140 (71.43%) samples were found positive via microscopy. Further n=50 samples including n=20 from Tank, n=15 from D.I.Khan, n=15 from Lakki Marwat were processed for identification of secondary bacterial infection. Bacterial culture, staining, and Biochemical tests showed n=24 (48%) of *E. coli*, n=13 (26.00%) of *S. aureus*, 6 (12.00%) of *Klebsiella pneumonia*, n=5 (10.00%) of *Pseudomonas* spp., and n=2 (4.00%) of *S. epidermidis*. Moreover, coinfection between *E. coli* + *S. aureus* at a rate of 3/20 (15.00%) has been recorded. Moreover, Silver and zinc nanoparticles exhibit significant antibacterial activity against both Gram-negative bacteria, including *Klebsiella* spp., *Pseudomonas* spp., and *E. coli*, as well as Gram-positive *S. aureus*, by disrupting their cell walls. The inhibition zones observed for 1 mg/mL of Ag.Zn@HAp were 15.0 ± 1.3 mm, 16.4 ± 1.2 mm, 15.9 ± 1.3 mm, and 17.5 ± 1.4 mm for *Klebsiella* spp., *Pseudomonas* spp., *E. coli*, and *S. aureus*, respectively. In contrast, the antibacterial activity of 0.5 mg/mL of Ag.Zn@HAp and undoped hydroxyapatite was less than compared to that of 1 mg/mL. The overall Ag.Zn@HAp antibacterial activity was less compared to the control group of antibiotics disc. This study will be helpful in developing an effective mitigating protocol of the secondary bacterial infection on the CL lesion site of patients, that will be helpful in healing the wound smoothly.

GSTMC-25-130 An Intrusion Detection System for Securing IoT Networks using Self-Paced Ensemble and Long Short-Term Memory

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The rapid spread of the Internet of Things (IoT) across various sectors such as healthcare, smart homes, and manufacturing has created unprecedented security challenges. IoT networks, characterized by their heterogeneity and resource limitations, are particularly vulnerable to sophisticated cyber-attacks, including distributed denial of service (DDoS), spoofing, and reconnaissance. These challenges are further exacerbated by the inherent imbalance in IoT datasets, where malicious activities often constitute a small fraction of the data, making rare and evolving threats harder to detect. Traditional intrusion detection systems (IDS) often struggle with such complexities, leading to high false positive and false negative rates. To address these challenges, this study proposes an innovative Intrusion Detection System (IDS) that leverages the Self-Paced Ensemble (SPE) framework and Long Short-Term Memory (LSTM) networks. The SPE framework is designed to improve detection performance on imbalanced

datasets by incrementally training models to prioritize hard-to-classify instances. Simultaneously, the LSTM component captures the temporal dependencies in network traffic, enabling the system to identify complex attack patterns with high precision. The integration of these advanced techniques aims to enhance the IDS's capability to detect both known and unknown threats while reducing the likelihood of misclassification. The performance of the proposed system is thoroughly evaluated using key metrics such as precision, accuracy, recall and F1 score, demonstrating its effectiveness in detecting a wide range of IoT-specific attacks. By addressing the critical limitations of existing IDS approaches, this work provides a scalable, adaptable and robust solution for enhancing the security of IoT networks. This study contributes to the ongoing effort to secure IoT ecosystems, ensuring their reliability and resilience in the face of evolving cyber threats.

GSTMC-25-131 An Intelligent Analysis for Gene Expression Variances Across cell Types Based on Deep Learning Approaches

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Predicting differential gene expression values across diverse cell types is crucial for understanding cellular functions and biological mechanisms. In this study, we employ ChemBERTa, a transformer-based deep learning model, to predict gene expression variances for Myeloid and B cells. Leveraging data from 140 compounds in T cells (CD4+, CD8+, regulatory) and NK cells, alongside 10% of compounds in the target cell types, ChemBERTa captures intricate molecular patterns and cell-type-specific variations. The framework integrates ChemBERTa with additional architectures, such as LSTM, 1D-CNN, and GRU, evaluated across various input feature configurations ("initial," "light," and "heavy"). Using a 5-fold cross-validation approach with a fixed seed (42), the model achieved average MRRMSE scores of 0.83, 0.83, and 0.87 on the 1st, 3rd, and 5th folds, while the 2nd and 4th folds exhibited higher variability with scores of 1.15 and 1.13, respectively. These results demonstrate ChemBERTa's potential to accurately model gene expression patterns and its applicability to underrepresented cell types. This research provides a robust framework for advancing gene expression analysis and supports applications in personalized medicine and therapeutic discovery.

GSTMC-25-132 An Intelligent Deep Learning-Based Approach for Early Identification of Stroke-Inducing Blood Clots

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Stroke is one of the leading causes of death and permanent disability worldwide, and ischemic stroke represents the most prevalent type of stroke. Understanding where the offending blood clot originated is crucial for timely and accurate treatment, as well as prevention of repeat strokes. Unfortunately, the current line of diagnosis is primarily based on manual, subjective, time-consuming, and error-prone methods, which urgently calls for the demand for automated and efficient solutions. In this study, we present a smart deep learning (DL)-based framework that enables accurate classification of stroke-causing blood clots based on their origins by utilizing the ResNet-50 architecture. Image preprocessing is critical to any computer vision task, and the methodology section would detail

each of the used techniques like normalization, augmentation etc. as well as the metrics used to evaluate the model including accuracy, precision, recall, and F1-score. Furthermore, the study provides insights into important features influencing the classification of clot origin, shedding light on the pathology of stroke. This study endeavors to transform the clinical stroke diagnosis landscape and further the usage of artificially intelligent (AI) diagnostic solutions in the healthcare domain by closing prevalent research gaps and presenting an unbiased and scalable tool. The findings can improve patient outcomes with earlier and more accurate intervention approaches.

GSTMC-25-133 Antimicrobial activities of haloxylon persicum mediated phytogetic iron oxide colloids

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Magnetic iron oxide nanoparticles (MNPs) with appropriate surface chemistry exhibit many interesting properties that can be exploited in a variety of biomedical applications such as magnetic resonance imaging contrast enhancement, tissue repair, hyperthermia, drug delivery and in cell separation. The exclusive properties of iron oxide nanoparticles have potential application on catalytic activity, antibacterial, antifungal, drug resistance etc. In this study unexplored *Haloxylon persicum* whole plant extract was found to be capable in green synthesis of Iron oxide nanoparticles (Fe₂O₃-NPs) and their characteristics were studied by using UV-visible spectrophotometer, SEM, EDX, XRD and FT-IR. The antibacterial and antifungal activity were performed alone on iron oxide nanoparticles, the zone of inhibition was recorded which shows that the iron oxide nanoparticles are more effective against E. coli.

GSTMC-25-134 Prediction of Bitcoin Closing Price Series Using Moving Median Based Networks Models

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BTC/USD represents the exchange rate between Bitcoin and the US dollar, a widely traded cryptocurrency pair in global markets. By employing genetic algorithms to optimize trading strategies, the research shows that such optimized rules yield superior performance compared to random ones in the BTC/USD market, reflecting realistic trading behavior and market characteristics. This study introduces a heterogeneous specialist model to replicate key Bitcoin market dynamics, showing that genetic algorithm-optimized trading rules outperform random ones in BTC/USD market performance. Charters and traders were the two categories of agents who traded in this artificial market model. Trading rules were used by charters to carry out their deals. During the planning phase, some charters used the most successful set of chosen trading rules from a genetic algorithm that repeated a trading system based on four technical analysis

indicators, seeking the indicators' qualities that produced the maximum return. The rest used randomly selected trading rules. In contrast, random traders operated without a defined strategy, placing buy and sell orders randomly. The best collection of trading rules was determined to ensure the most profit both during training and testing periods, and it also worked well in artificial market models, where charters that employed a better set of trading rules made more money. Future research could expand the model with more complex strategies and algorithms.

Key Words: Trading Strategies, Profit Maximization, Price Sequences, BTC/USD Currency Pair

