



ICAZ-2023

# Abstract Book

**6<sup>th</sup> International  
Conference on Applied Zoology  
(ICAZ-2023)**

**December 18-19  
2023**

**(Hybrid Mode)**

**Tackling the Global Challenges Through the  
Applied Zoological Sciences**

**Department of Zoology, Govt. College University Faisalabad**

**in Collaboration with**

**The Applied Zoological Society of Pakistan (AZSP)**



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ICAZ-2023 18-19<sup>th</sup> December 2023

6<sup>th</sup> International Conference on Applied Zoology



## Welcome Remarks by AZSP Chairman



**Prof. Dr. Muhammad Ali**  
Chairman AZSP

**Dear Friends and Colleagues,**

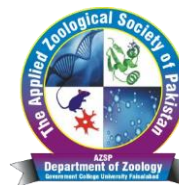
It is a great privilege to have you in the 6<sup>th</sup> International Conference on Applied Zoology-2023 (ICAZ-2023). This will be held from 18-19<sup>th</sup> December, 2023 under the shelter of The Applied Zoological Society of Pakistan in collaboration with Department of Zoology, Government College University, Faisalabad which includes 2 day's scientific sessions. On the behalf of the Applied Zoological Society of Pakistan (AZSP) I would like to extend our sincere gratitude for your contribution as a participant until the completion of ICAZ-2023. It is our sincere hope that this conference also provides stimulating environment and satisfaction to all the researchers from different national and international universities

We will all join hybrid mode of Conference on 18-19<sup>th</sup> December, 2023. Our AZSP central organizing committee, Prof. Dr. Farhat Jabeen, Prof. Dr. Tayyaba Sultana, Prof. Dr. Salma Sultana and Dr. Azhar Rasul has been working hard to managed and organize an exciting scientific program with multiple sessions for you to join in according to your interests. This global meeting will feature highly respected internationally renowned speakers who will share, discuss, debate, and dissect significant new developments and scientific advancements that will impact the future of Applied Zoological Sciences, and related fields. Do your best in your field and we hope that more people will be able to join this conference. I look forward to seeing you all at the conference

**Prof. Dr. Muhammad Ali (TI, SI)**  
Chairman, AZSP  
Vice Chancellor BZU, Multan

ICAZ-2023 18-19<sup>th</sup> December 2023

6<sup>th</sup> International Conference on Applied Zoology



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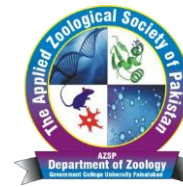
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**ICAZ-2023** 18-19<sup>th</sup> December 2023

**6<sup>th</sup> International Conference on Applied Zoology**



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Newcastle University, UK



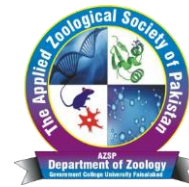
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**K-1/ICAZ-2023**

**The Biochemical Changes Induced by Grape Seed Extract and Low Level Laser Therapy After Bone Defect in The Rat Mandibles: An Experimental Study on the Rat Liver**

Zeliha Selamoglu

Ahmet Yesevi University, Faculty of Sciences, Department of Biology, Central Campus- Turkestan, Kazakhstan

**Abstract**

The present work tested the changes in the liver tissues of rats with experimentally fractured mandible (FM) following the use of Grape Seed Extract (GSE) and Low Level Laser Therapy (LLLT) in healing the fracture in dentistry. A vertical fracture line passing through the molar teeth was formed in the right mandibles of all subjects except for these in the control group, and the fracture was internally fixed with a four-hole microplate and four micro-screws. Malondialdehyde (MDA), reduced glutathione (GSH), superoxide dismutase (SOD), catalase (CAT) activities were analyzed to determine the changes caused by GSE and LLLT administration in rat liver tissues in fractured mandibles. It was determined that MDA and SOD levels in FM group and GSH and CAT activity levels in FM + GSE group and MDA levels in FM + LLLT group and GSH and CAT levels in FM + GSE + LLLT group increased statistically significantly to the control group on days 7 and 21. Biochemical parameters were analysed on the 7th and the 21st days, and it was investigated that the changes in oxidant / antioxidant system changes in rat liver tissue as a result of LLLT and GSE applications conducted for fracture recovery in mandible fractures, which are frequently encountered in dentistry and especially dental and maxillofacial surgery.

**Keywords:** Low Level Laser Therapy; Mandibular Fracture Recovery; Oxidative Stress; Grapeseed Extract; Liver; Rat.

**K-2/ICAZ-2023**

**Rapid and Efficient in Vitro Micropropagation of the Ground Aquatic Plants *Hemianthus callitrichoides* and *Riccia fluitans***

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**Abstract:**

Aquatic plants not only protect the biological balance of the water, but also form the first link of the food chain and are converted into animal protein. Important aquatic plants *Hemianthus callitrichoides* and *Riccia fluitans* form a thick cover on the bottom of the water, providing an important shelter for the aquatic animals. In addition to its use as an ornamental plant in aquariums, they have the potential to be used for the phytoremediation of water. In this study, different basic nutrient media, sugar sources, solidifiers and growth regulators and their various concentrations were tested for the rapid and efficient in vitro propagation of *H. callitrichoides* and *R. fluitans*. MS-based basic nutrient medium gave better results in *H. callitrichoides*, while SH nutrient medium produced the highest results in *R. fluitans*. However, the difference between half and full strength nutrient media was found to be insignificant. In addition, the highest rate of micropropagation in both plant species was obtained from nutrient media without agar or solidified with 1 g/l agar. Regeneration was significantly reduced with the use of high concentrations (4-7 g/l) of agar. Similar results were also obtained with the use of sucrose and use of high sucrose reduced the shoot regeneration and rooting. Moreover, in this study it was also determined that there is no need for growth regulators for in vitro propagation of *H. callitrichoides* and *R. fluitans*. Plants propagated in vitro were transferred to aquariums and provided 100% adaptation.



**K-3/ICAZ-2023**

**The Investigation of Giardiasis (Foodborne and Waterborne Diseases) in Buffaloes in Van Region, Türkiye:  
First Molecular Report of *Giardia duodenalis* Assemblage B from Buffaloes**

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**Abstract**

*Giardia duodenalis* (*G. duodenalis*) is an important zoonotic protozoan agent that causes foodborne and waterborne diarrhea in humans and other mammals. Molecular-based tests are critical in diagnosing giardiasis in humans and animals, identifying species, understanding the zoonotic potential and transmission routes, and evaluating taxonomy. Therefore, this study aimed to investigate the molecular characterization of *G. duodenalis* in buffaloes in the Van region in Türkiye. Buffaloes are a species that has been poorly studied in this regard. For this purpose, 100 fecal samples were collected from buffaloes in the Van region. The DNA extraction was performed using the GeneMATRIX STOOL DNA Purification Kit from stool samples. The nested PCR test was performed with the appropriate primers from the obtained DNA samples. The obtained bands suitable for sequencing were sent for sequence analysis, and the sequence results were aligned bidirectionally and compared with the database of GenBank by BLAST. As a result of the study, an 11% positivity rate for *G. duodenalis* was found in buffaloes, and assemblage E and assemblage B were isolated. To our knowledge, assemblage B in buffaloes was reported for the first time in this study. As a result, it was concluded that buffaloes are an important reservoir for waterborne and foodborne giardiasis.

**Keywords:** Assemblage B; Buffalo; Foodborne; *Giardia duodenalis*; First report

**K-4/ICAZ-2023**

**Herbs for Sustainable Food and Health**

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7RU.

**Abstract**

Many herb-based plants are an essential component of diets for all living organisms such as human and animal populations. These plants or their purified extracts can not only provide essential nutrients to sustain terrestrial and aquatic lives but also play an important role in supporting desirable ecosystems. Plants are known to absorb or utilise undesirable outputs of human activities to produce nutritional biomass and reduce greenhouse gas (GHG) emissions. This results in the creation of a harmonious environment without causing detrimental effects on the planet. Indeed, the existence of a diverse range of plants provides vital products that are used for both food and health of biological systems. These plant products could represent either a whole plant or its different components such as roots, branches, leaves, flowers and seeds. These plants or their components can be used in their fresh, dried, conserved, fermented and extracted forms. The diversified nature of culinary and healthy features of plants have always been recognised in ancient and modern civilizations. However, with the increasing awareness and advancing technology, the role of plants and herbs for food and health has been diversified. Therefore, herb-based plants offer an enhanced opportunity for us to re-investigate their role in promoting healthy eating while protecting the environment and livelihoods. The new insights may facilitate food security in achieving many Sustainable Development Goals of the United Nations. This paper will examine opportunities that could be fetched to utilise herbs or their by-products to meet the existing and future challenges of achieving food security, health and livelihood. **Keywords:** Herbs, Food security, Livelihood, Climate change



**K-5/ICAZ-2023**

**The Investigation of Inhibition Effect of Metal Complexes of Schiff Bases of Some Sulfa Drugs on Alpha-Glucosidase Activity**

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**Abstract**

Diabetes is a common metabolic disease characterized by abnormally high plasma glucose levels, leading to major complications, such as diabetic neuropathy, retinopathy, and cardiovascular diseases (1). By competitive and reversible inhibition of intestinal alpha-glucosidases, inhibitors set back carbohydrate digestion, prolong the overall carbohydrate digestion time, and thus reduce the amount of glucose absorption (2). In this in vitro study, nine derivatives of Sulfa-Schiff bases compounds were tested as  $\alpha$ -glucosidase inhibitors. Spectroscopic techniques examined each analog activity. All of the ligand complexes were found to be active when screened for alpha-glucosidase inhibition and exhibited IC<sub>50</sub> values ranging from 0.429 to 8.976  $\mu$ M. Compounds (1, 4, 5, 7, 8, and 9) demonstrated impressive inhibitory potential against the  $\alpha$ -glucosidase enzyme. Kinetic measurements were performed to calculate the inhibition type and ki constant for Compound 9. All derivatives underwent a molecular docking procedure to clarify their ligand-enzyme binding interactions using Molegro Virtual Docker software.

**Keywords:** Sulfa drugs Schiff base, Metal complexes,  $\alpha$ -glucosidase inhibition

**K-6/ICAZ-2023**

**Strategies for the Oriented Immobilization of Antibodies Through Linker-Mediated Approaches for Use in Immunosensors and Diagnostic Applications**

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**Abstract**

The alignment of antibodies on solid surfaces is crucial in determining the accuracy and detectability of immunoassays. The way antibodies are attached to the surface greatly influences their interaction with antigens. For optimal antigen binding, it is essential that the Fab regions of antibodies are correctly positioned away from the surface. Unfortunately, traditional methods such as physisorption and covalent conjugation result in haphazard immobilization, potentially compromising the functionality of the antibodies. To address this issue, the linker-mediated immunoassay (LMI) technique has been developed, enabling precise control of antibody orientation. This sharing delves into the fundamental principles of oriented antibody immobilization and highlights various target sites that can be targeted for controlled conjugation. It extensively examines a variety of linker-mediated immobilization techniques, utilizing noncovalent interactions such as Fc binding proteins, DNA-directed immobilization, biotin-streptavidin binding, and Fc binding peptides. The strengths and limitations of each strategy are thoroughly discussed, providing a comprehensive understanding of the cutting-edge LMI technology. The focus is on the oriented immobilization of whole antibodies and the promising potential this holds for future applications.

**Keywords:** Biosensor, Immunosensor, Oriented antibody immobilization, Linker-mediated immunoassay, Bioaffinity linker, Antibody immobilization



**K-7/ICAZ-2023**

**The Impact of Eutrophication on Zooplankton Community Structure and Dynamics**

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**Abstract:**

Eutrophication is a process that occurs when excess nutrients, such as nitrogen and phosphorus, enter a body of water. This can lead to changes in water chemistry that can significantly impact ecosystems. This can result in the growth of more plants and algae, which can harm the ecosystem. Zooplankton are a group of organisms that are particularly vulnerable to the effects of eutrophication. Zooplankton are small aquatic organisms that play a vital role in the food webs of many aquatic ecosystems. In this essay, we examine the effects of eutrophication on zooplankton community structure and dynamics. Specifically, we will examine the arguments for and against the idea that eutrophication has negative effects on zooplankton and consider the complexity of this issue. We will also examine the causes of eutrophication and its impact on zooplankton community structure and dynamics.

**Keywords:** Zooplankton community, causes-effects of Eutrophication, Ecosystem health.

**K-8/ICAZ-2023**

**Synthesis, Characterization and Anticancer Activity Studies of New Salicylate and Indazole Derived Compounds Based on Aryl Hydrazone Compounds**

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<sup>7</sup>Recep Tayyip Erdoğan University, Faculty of Health Sciences, Rize, Turkey.

**Abstract:**

Salicylic acid is a plant hormone that plays an important role in plant defense against various pathogens and external factors. Studies conducted in recent years show that this phenolic compound and its derivatives, collectively called salicylates, not only regulate plant defenses but also have beneficial effects on human health. Both natural and synthetic salicylates are known to have multiple targets in humans, thus exhibiting a wide range of pharmacological roles, including anti-inflammatory, anticancer, neuroprotective, and antidiabetic effects. The role of some salicylates, such as acetylsalicylic acid (aspirin), 5-aminosalicylic acid (mesalazine), and amorphrutins, in human diseases has been well studied *in vitro*. Based on recent studies, five natural salicylates, including amorphrutin, ginkgolic acid, grifolic acid, tetrahydrocannabinolic acid, and cannabidiolic acid, have demonstrated potential roles in different challenging human diseases. Considering the multi-target regulatory activities of these natural salicylates and their pharmacological roles in human health, we primarily focus on the synthesis, characterization and anticancer activity of original azosalicylate derivative compounds and pyridazine molecules. Experimental studies including activity studies have been carried out. The compounds are effective over breast cancer and resistant cancer cell lines. Array studies along with flow cytometry experiments (cell cycle and apoptosis) screened efficiency of the compounds. Binding experiments on breast cancer biomarker Hsp90 supported efficiency of the compounds as potential anticancer drug.

**K-9/ICAZ-2023**

**Biodegradable Packaging Materials from Marine By-Products**

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**Abstract:**

In the food industry packaging is an important concern for preservation of food. Traditionally plastic packaging was used but now it is alarming due to enhanced environmental pollution by plastic waste. Nowadays scientists have main concern to use biodegradable packaging material to reduce atmospheric pollution and to get good





quality of food. Biopolymers which can be used for the packaging purpose can be obtained from plants, animals and from marine by-products. In this review marine by-products which have rich valuable components that are suitable as packaging material is discussed. Marine by-products produced from seafood processing has become a worldwide economic concern. Seafood wastes involved damaged fish, small size fish and those fish species which have less commercial value. In seafood industry during processing of fish, many other by-products which includes bones, skin, head, viscera and scales are produced as a waste. These by-products contain extent of collagen that can be changed into gelatin. Rich amount of chitin also can be produced from the by-products of mollusks and crustaceans. If these byproducts are dispose of, can be harmful for environment because of excretion of carbon dioxide and carbon monoxide during their decomposition. So they can be castoff in food industry as biodegradable packaging material. Those valuable products which are useful for food packaging can be obtained from seafood byproducts such as proteins (gelatins and peptides), fats (fatty acids and docosahexaenoic acid), polysides (chitosan, polysaccharide), oligo elements (nitrogen, phosphorus, magnesium and calcium) and pigments. Proteins obtained from fish have great ability of cross linking to produce biopolymers, a good property for the formation of packaging materials. Proteins, lipids and polysaccharides can be used individually or in combined form for the formation of edible films and coatings. These components are also suitable for film forming material because of their good cross linking and transparent properties. In conclusion, with the increasing consumer awareness in food safety, the demands for plastic packaging materials made from synthetic materials are gradually decreasing and the use of biodegradable packaging materials is gaining importance both in daily life and in industrial terms. Keywords: Biodegradable, Food Packaging, Biopolymer, Edible films, Polysaccharide

#### K-10/ICAZ-2023

#### Multi-Target Mechanisms of Nutraceuticals and Phytochemicals Against Alzheimer's Disease

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#### Abstract

Alzheimer's disease (AD) is a devastating neurodegenerative disorder that affects millions of people worldwide. The best-known pathophysiological features of AD are the aggregation of neurotoxic forms of amyloid- $\beta$  proteins in senile plaques and the accumulation of hyperphosphorylated tau proteins in neurofibrillary tangles, causing to cognitive impairment, memory loss, dementia, and eventually death. Because FDA-approved anti-AD drugs have only a symptomatic effect, the search continues for alternative and more effective therapeutic targets for the treatment of the disease. Therefore, there are new studies suggesting that nutraceuticals and phytochemicals with medicinal properties may play significant roles in the prevention and treatment of this debilitating disease. Natural compounds found in plants, known as phytotherapeutics may have neuroprotective effects and could potentially be used in the treatment of AD. Many phytochemicals have antioxidant, anti-inflammatory, and neuroprotective properties, which are particularly relevant in the context of AD. Oxidative stress and chronic inflammation are thought to contribute to the development and progression of AD. One of the reasons for this is their ability to target multiple signaling pathways involved in the disease, known as multi-target mechanisms. By targeting multiple pathways, nutraceuticals and phytochemicals have the potential to be more effective in treating AD than single-target drugs. For example, some phytochemicals, such as curcumin, resveratrol, epigallocatechin-3-gallate (EGCG), and quercetin have been shown to reduce inflammation, protect against oxidative stress, and inhibit the formation of beta-amyloid plaques, which are a hallmark of AD. In animal models of AD, these compounds have been shown to have neuroprotective effects by improving cognitive function and reducing inflammation and oxidative stress in animal models of AD. Despite the potential benefits of phytotherapeutics in the treatment of AD, there are also several challenges that need to be addressed in order to develop effective drugs. One of the major challenges is the lack of standardization in the preparation of plant extracts, which can lead to variability in the concentration and bioactivity of the active compounds. One challenge is that many phytochemicals have poor bioavailability, meaning that they are not easily absorbed by the body. Another challenge is the need for more rigorous clinical trials to evaluate the safety and efficacy of phytotherapeutics in the treatment of AD. Researchers are exploring various strategies to overcome this limitation,



including the use of nanoparticles and other delivery systems to enhance the absorption and distribution of phytochemicals in the blood-brain barrier. These trials need to be conducted using standardized protocols and endpoints to provide reliable data on the effectiveness of these compounds. Accordingly, mechanistic roles and molecular targets of nutraceuticals and phytochemicals in the prevention and treatment of AD are highlighted in this review.

**Keywords:** Alzheimer's disease, phytochemicals, neuroprotection, natural products, phytotherapeutics

**K-11/ICAZ-2023**

### **Mushrooms and their Medicinal Effects**

Mustafa Sevindik

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**Abstract:**

Since ancient times, people have turned to natural products in the treatment of diseases. In recent years, the possible side effects of synthetic products have increased the popularity of natural products. Many natural products such as plants, mushrooms and animals are used in complementary medicine in nature. Mushrooms are unique natural products that contain highly valuable bioactive compounds in these products. Since ancient times, humans have consumed many types of mushrooms from their natural habitats. In addition to their nutritional properties, these natural materials contain many different biologically active compounds. It has a high potential in the defense mechanisms of organisms that consume these natural substances, and in their nutritional value and use as food. About 100,000 species of cosmopolitan mushrooms have been named so far, and this number is growing. In addition to their nutritional properties, mushrooms also attract attention with their medicinal potential. In this study, we focused on the biological activities of fungi.

**Keywords:** Alternative medicine, Medicinal mushroom, Medicinal Lichens

**K-12/ICAZ-2023**

### **Interdisciplinary Biological Sciences towards Sustainable use of Biodiversity for Alternative Energy, Food and Health**

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**Abstract**

Energy, food and health are three important basic necessities of life. In current era due to fast climatic changes the energy, food and health security are important topics of discussion around the world and Pakistan particularly. Scientists in the World exploring alternative energy, food and health resources for sustainable development. Innovations and emerging technologies are the solution to find out sustainable utilization of plant and animal diversity. Pakistan is host to three of the world's biggest and most spectacular mountain ranges, the Himalaya, the Karakoram and the Hindukush (HKH). This project confined to explore the commercial products obtained from plant and animal diversity which play an important role in socio-economic welfare and sustainable development of livelihood in Pakistan. This area is endowed with a great diversity of flora and fauna due to variations in altitude, rainfall and climate. The native communities have centuries old knowledge about the plant resources utilization and depends upon directly or indirectly on these resources to meet their daily needs in the form of biomass energy, biofuels, nutraceuticals, pharmaceuticals, vegetables, fruits, medicines, wood, timber, fodder, nuts, honey, spices, food and many other NTFPs. Currently, biodiversity in this region is strongly influenced by dynamic climatic changes like rise in global temperature, pollution, fluctuation in rainfall, population pressure, agricultural expansion, deforestation, extensive livestock grazing, resource demand, and commercial timber extraction that intensify the rates of habitat loss, habitat degradation, and wildlife exploitation. Species richness and threats suggest that this area needs strong and prompt conservatory management of biodiversity. The study recommend the development of national parks, wild life sanctuaries, botanical gardens and herbaria based on in-situ and ex-situ conservation strategies in Northern areas of Pakistan to protect regional biodiversity for global acceptance. Indeed, conservation of biodiversity is fundamental to achieving sustainable development in this area particularly and world generally. Maintaining biodiversity is not only crucial for the sustainability in agriculture, energy, forestry, fisheries, wildlife, tourism, health, irrigation and power sectors Pakistan, but is also life line for the downstream people in other parts of Pakistan.



## K-13/ICAZ-2023

**Nipah Virus: Planet on the Verge of Another Pandemic?**

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**Abstract**

The Nipah virus (NiV) is a single-stranded –ve sense RNA virus belongs to the genus *Henipavirus* and family *Paramyxoviridae*. The name of the virus was derived from the village of Sungai Nipah (Nipah River Village) in Negeri Sembilan State, Malaysia, where the first case of NiV with symptoms of encephalitis was registered in 1999. The main reservoir of NiV is fruit bat (*Pteropus giganteus*) commonly known as flying fox. Zoonotic spillover is based on the hypothesis that a flying fox shedding NiV can occasionally infect one or more persons, and the infected individuals initiate the epidemic chain by spreading the virus via person-to-person transmission. To date, two different strains of NiV have been reported, named NiV Bangladesh (NiVB) and NiV Malaysia (NiVM). Naturally, dissemination of NiV occurs in the host via blood; ephrin (B2/B3) on leucocytes helps NiV bind with leucocytes, high expression of NiV receptors in the central nervous system made NiV a fatal pathogen. The basic reproduction number (R<sub>0</sub>) For NiV, is 0.48, but like Middle East respiratory syndrome (MERS), it has a low R<sub>0</sub> value and high mortality rates that is upto 60%. The latest information confirms the emergence of the NiV virus in India in September 2021. The World Health Organization (WHO) declared NiV as an epidemic threat and a priority pathogen in research and development activities especially from low and middle income countries (LMICs). In response, the Centers for Disease Control and Prevention (CDC) classified NiV as category C pathogen with bioterrorism threat. In near future, with the geographical range of fruit bats extending from Pakistan to South and South-East Asia to South China and Australia, it is likely that NiV outbreaks may occur because bats are the primary reservoir of the virus. In conclusion, creating or maintaining scientific impetus as well as investing in studies dealing with viruses and vaccine development should be a concern for world leaders and policy makers. The unconceivable impact of recent Covid-19 pandemic has devastated the world's economy and underscored the limitations of healthcare structures. Out of 215 countries, only a few are capable of dealing with the pandemic with full healthcare facilities to treat millions of patients. Although we can never know what the next epidemic or pandemic will be, preparation for the worst, including NiV, will reduce morbidity and mortality.

**Key words:** Nipah Virus, Pandemic, Zoonosis, LMICs

## K-14/ICAZ-2023

**Novel Treatment Strategies for Cutaneous Leishmaniasis: A Way Forward to Reduce the Global Disease Burden**

Fakhar-ud-Din

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**Abstract**

Leishmaniasis is considered to be one of the severe tropical diseases according to the World Health Organization (WHO). It affects about 350 million people all over the world. More than 2 million cases occur every year and 12 million people are already affected. Various routes of drug administration are used for the treatment of Leishmania, however the WHO recommended route of drug administration is the topical administration. Drug delivery through topical route against Cutaneous leishmaniasis (CL) is a constructive approach for improving the drug availability by targeting it to its site of action and reducing the toxicity associated with other routes of anti-leishmanial drugs. We recently developed novel drug carriers including deformable liposomes, niosomes, transferosomes and transthesosomes for various antileishmanial drugs including Sodium stibogluconate, Rifampicin, vancomycin and miltefosine (HePC). The basic purpose of these studies were to develop drug loaded novel nanocarriers for targeting the Leishmania infected macrophages in the dermis. Drug loaded transferosomes were prepared by ethanol injection method and the formulations were optimized for lipid to surfactant ratio at different stirring speeds. The optimized drug loaded transferosomal formulations were characterized in terms of their particle size, polydispersity index (PDI), zeta potential and incorporation efficiency. Moreover, TEM analysis, deformability index (DI), in-vitro release, ex-vivo permeation and macrophage uptake studies were also conducted. The drug-loaded transferosomes were further incorporated in the carbopol or chitosan gel and were assessed on the basis of their viscosity, pH, spread ability, drug content, in-vivo skin irritation and histopathological studies. All the studies proved the safety of topically applied transferosomal gel formulation. The macrophage cytotoxicity assay and anti-leishmanial activity were also conducted



both in vitro and in-vivo. The drug loaded transferosomes showed enhanced cytotoxicity potential as compared to the drug solution. Similarly, the anti-leishmanial activity on the intra macrophage amastigote model of *Leishmania tropica* showed the reduced IC50 value of drug loaded transferosomes as compared to drug solution, thus exhibiting better antileishmanial activity. Additionally, flow cytometry analysis and in-vivo study demonstrated enhanced apoptosis and better antileishmanial effects of the drug-loaded transferosomes. All the outcomes revealed that targeted delivery of anti-leishmanial loaded transferosomes could be attained by topical application of these antileishmanial drug loaded transferosomes for the treatment of CL.

**Keywords:** Leishmania, Sodium stibogluconate; Rifamocine; Vancomycine; Miltefosine; Topical delivery; Transferosomes

**K-15/ICAZ-2023**

**Studies on the Gut Content and its Variation in relation to size of Freshwater Catfish, *Wallago attu* from River Indus**

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**Abstract:**

The studies on the gut content analysis of freshwater catfish, *Wallago attu* was carried out from November 2021 to January 2022 from the catch of local fishermen of River Indus. Total 65 fish of different size ranging from 20.0 to 45.5 cm and from 130 to 580 g in length and weight respectively were taken into account for the present investigations. The gut content analysis was revealed that the experimental fish mainly fed upon fish as most prefer food item (40%) in all three size groups (small, medium and large) followed by insects (25%) and third preference was worms with (15%) as recorded from the gut content of experimental fish. It was noted that the fish *Wallago attu* found to be carnivorous in feeding habit with piscivours preference

**Keywords:** Gut content, *Wallago attu*, River Indus, Seasonal variation and Feed preference

**K-16/ICAZ-2023**

**Bacteriocins: Characteristics & Potentials**

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**Abstract**

On one hand antibiotics play an important role in the disease prevention, and on the other hand increasing antibiotic resistance has posed serious threats to the health-care sector. That is why multiple efforts at global level are in progress to develop/explore new antibiotics. But at the same time, scientists are looking for new strategies to eliminate these antibiotic resistant bacteria. One promising approach is exploration of bacteriocins with inhibitory and bactericidal activities. Bacteriocins are antimicrobial peptides produced by various bacteria as part of their immune reactions or defense mechanisms. The large majority of all bacterial species are able to produce at least one bacteriocin, but most of them are unexplored. Bacteriocin-producing bacteria could be extracted from various conventional and unconventional sources. Bacteriocins are small cationic molecules with hydrophobic or amphiphilic characteristics, which exhibit a narrow to broad inhibitory activity against closely related and non-related species. These peptides are ribosomally synthesized and post-translationally modified which are initially produced as inactive pre-peptides and then converted into an active form (mature peptide). Apart from there use against antibiotic resistant bacteria, their use in cancer therapy is also evidenced. Future prospects of bacteriocins' potentials as well as promising applications generally and with reference to medical/pharmaceutical industries specifically will be discussed here.



**K-17/ICAZ-2023**

**Formulation Development and Optimization studies of Poorly Water Soluble Drug: In-vitro Release Characterization and Quality Attributes**

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**Abstract:**

Dexibuprofen is often prescribed to suppress pain and inflammation. The present research has been dedicated to optimize and taste mask the dispersible formulations, aiming medication compliance through quick action. The study initiated through process optimization by response surface (Design expert software, version 7.0.0). The five versatile and optimized sets were explored by direct compression. A contour plot presented graphically to narrate disintegration time and friability. The optimized batches were characterized for their micromeritic and physical evaluation. The outcomes of physical studies demonstrate satisfactory free flow properties. Whereas, the data of mass variation, thickness, mechanical strength, friability, in vitro disintegration and wetting time satisfied the compendial requirement. Additionally, assay and content uniformity found within acceptable limits. Responses of *in vitro* release declared excellent and fast dissolution profile. Dexibuprofen was also successfully granted biowaiver. All optimized formulations depicted the release pattern according to weibull kinetic model. The palatability and mouth feel was successfully reported by volunteers. Amongst, six trial batches, DEX-9 was the optimized formulation with noteworthy biopharmaceutical and quality attributes. FTIR, X-ray crystallography and electron microscope examination proved no interaction of various excipients with drug. All optimized formulations were subjected to accelerated stability protocol following ICH guidelines.

**Keywords:** Dexibuprofen, ICH, biowaiver, optimization, weibull, palatability, mouthfeel

**K-18/ICAZ-2023**

**Fisheries and Agricultural Integration for Food Security**

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**Abstract:**

The food security is a global challenge now days. To ensure the food security for future generation the scientists and researchers are engaged to introduce the new technology and methodology to maximize the production level in the field of agriculture. Aquaponics is a one of the food production system that might fulfill the future food demand. Aquaponic is a combine intensive system of aquaculture and hydroponics. In term of aquaculture we raise aquatic animals, especially fish, in tanks and through the hydroponic we cultivate the plants in a nutrient solution. It is the system to improve sustainability and develop an affordable small-scale food production system to tackle the problems of malnutrition and food insecurity. In general, in between the vegetable and fish there is a symbiotic relation in the aquaponic system, those are growing together in a control water circulation system. Aquaponic is one of the best sustainable developments of food production system not only in the urban area but also for the metropolitan cities. Home-based aquaponics is the typical forms of aquaponics for different urban development. The Aquaponic is a system that to fulfill all of three (environment, social economic) sustainable criteria. Therefore, it might be anticipated the assessment of impact in this system. It is still a rather new concept for food production. In future it might be promoted up to its maximum level, because of its significant food production.

**Keywords:** Agriculture, Fisheries, Integration, Food security.



**K-19/ICAZ-2023**

**Influence of Dietary Nucleotides Supplementation on Growth, Body Composition, and Blood Chemistry of *Channa marulius* (sole)**

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**Abstract**

Statement of the Problem: The main issue with snakehead farming is its carnivorous and cannibalistic behavior, which begins in the larval stage and continues until the adult stage. Various studies have shown that, cannibalistic aggressiveness in fish is difficult to cease, it may be reduced by introducing more natural food or weaning the fish to accept formulated feed. Awareness of nutritional needs at the initial stage and during growth is particularly important for successful snakehead larval rearing. Therefore, a 75 days study was designed by including dietary nucleotides as a functional and environmentally safe feed additive in the basal diet to reduce the cannibalism and enhance growth. Methodology: The experiment was conducted in 12 HAPAs (4 treatments each having 3 replicates) installed in an earthen pond. Four graded levels of dietary nucleotides were added in the isonitrogenous basal diet as 0.0%, 0.33%, 0.66%, and 1.0%, respectively. Findings: Significantly improved survival, final body weight, net weight gain, % weight gain, SGR was observed in treated groups (1.0, 0.66 and 0.33%) nucleotides supplementation compared to control (0.0%). Among treated groups T3 (1.0%) showed significant, higher values followed by 0.66% and 0.33%. In addition to this, the dietary nucleotides (1.0% inclusion) significantly improved the crude protein, crude fat, and dry matter by increasing dietary nucleotides supplementation level. Histological studies showed that inclusion of dietary nucleotides improved villi length, villi width and branch folding in the intestine while a depressed growth of villi and enhanced intestinal lumen has been observed in the control group. Furthermore, increased levels of SGPT, BUN, and TG were observed by increasing the nucleotides supplementation level whereas SGOT and blood glucose were observed opposite. Along with other parameters, the dietary nucleotides improved the nutrient digestibility as ADC (protein) ADC (fats) in the groups having higher concentration of dietary nucleotides while ADC (dry matter) was found higher in the control diet. Conclusion: dietary nucleotides supplementation upto 1.0% significantly reduced cannibalism, influenced growth performance, body composition, blood chemistry, nutrient digestibility, and gut histology of *Channa marulius*.

**Keywords:** Growth parameters, *Channa marulius* (sole), proximate composition, blood chemistry, nutrient digestibility, gut histology.

**K-20/ICAZ-2023**

**The Use of Laparoscopy for Fertility Enhancement in Small Ruminant: Status in Pakistan**

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**Abstract**

Assisted reproductive technologies like artificial insemination (AI) and embryo transfer (ET) are being employed as rapid tools to extend productivity of livestock industry. The vaginal and trans-cervical methods of AI and ET are routinely practiced; however, the fertility rate in terms of pregnancy is low following these methods in small ruminants. In case of AI, the sperm have to travel farther to the point of fertilization; therefore, large numbers of sperm (100-300 million sperm) are required per insemination. Conversely, in sperm sorting business and genetically engineered sperm to produce transgenic animals, a very limited numbers of sperm are available for insemination. Hence, the direct deposition of frozen thawed embryos is required for successful pregnancy. In this scenario laparoscopic method of sperm and embryo transfer is advantageous, since it is efficient and provide optimal pregnancy rate by using minimum number of frozen thawed sperm. In our recent studies the sheep inseminated by using 50 or 100 million sperm showed a maximum pregnancy rate. However, higher tendency ( $P = 0.07$ ) for twinning or prolificacy rate was observed in sheep inseminated by using 50 million sperm. Similarly, the pregnancy rate tended to be higher ( $P = 0.05$ ) in sheep bred through laparoscopic method (65%) than conventional insemination method (33.3%). In previous studies the overall pregnancy rates with laparoscopic AI and ET are reported upto 50-85 % and 45 % respectively. Based on our study it is concluded that optimum pregnancy rate could be achieved through laparoscopic AI by using minimal number of sperm (50 million/AI) in small ruminants. Furthermore, the laparoscopic AI is reported as the method of choice to get higher pregnancy rate in nulliparous sheep and goats and it has profoundly paved the way to improve fertility in small ruminants.



**Key Words:** Laparoscopic AI, Embryo transfer, Small ruminants.

**K-21/ICAZ-2023**

**Development of Ciprofloxacin Based Molecules as Anticancer Agents: Design, Synthesis, Anti-Cancer and Computational Studies**

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**Abstract**

Fluoroquinolones (FQs) constitute a major class of chemotherapeutics and are widely involved in treating bacterial infections. Their safety profile, tolerability, pharmacokinetic properties and high oral availability make them an excellent choice of treatment. Structural modifications of fluoroquinolones have resulted in new compounds possessing potent activity against various enzymes as well as cancer cell lines. Herein, different series of novel structural hybrids of ciprofloxacin linked with a variety of anilides and oxadiazoles were designed and synthesized. For this purpose, various starting precursors such as a variety of substituted *N*-bromoacetamides, 1,3,4-oxadiazoles, 1,2,4-triazoles and aryl glycidyl ethers were prepared and successfully coupled with ciprofloxacin ester and *N*-bromoacetamide of ciprofloxacin. Anti-tumor activity of prepared derivatives was assessed against various human cell lines such as breast (MCF-7), lung (A549), and liver (Huh-7 and Hep G2) cancer cell lines. The representative compounds were then *in-silico* modeled to explain the potential mechanistic insights for their anti-cancer activity.

**K-22/ICAZ-2023**

**Novel Strategies for functional and nutraceutical compound enrichment in Food Products**

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**Abstract:**

Nowadays, Consumer awareness regarding functional and nutraceutical food is growing increases globally. Novel trend arising from health-conscious consumer to take dietary supplements from naturally produce food as compared to the synthetic supplementation. There is an increasing demand of fortified food products that are enriched with naturally derived functional ingredients which replace synthetic supplements predicted to grow gradually. Numerous bioactive compounds are obtained from extract of fruits, vegetables, herb and seeds that can be used to fortify the food products to increase the nutritional quality of foods. This abstract explores the novel strategies employed to enhance the nutritional profile of food items, focusing on novel techniques for the enrichment of functional and nutraceutical compounds including microwave-assisted extraction (MAE), ultrasound-assisted extraction (UAE), high-pressure assisted extraction (HPAE), high voltage electric discharges assisted extraction (HVED), pulsed electric fields assisted extraction (PEF), supercritical fluids extraction (SFE), and others are lined up with the green technology and ready to furnish raw components on an industrial scale with ideal consumption of energy and synthetic substances.

**Keywords:** Functional ingredients; Bioactive compound; Fortified foods; Nutraceutical; Novel strategies; green technology; Extraction



**K-23/ICAZ-2023**

**Production and Characterization of Biochar from Organic Waste and its Application for Bioremediation in Diesel Contaminated Soils**

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**Abstracts:**

The pollution of the soil and water due to accidental/anthropogenic release of complex hydrocarbons has been a serious environmental problem all over the world. Current study focused on preparation of biochar from fruit and vegetable waste and sewage sludge and its application for bioremediation of diesel polluted soil. The diesel degradation was estimated by standard curve, FTIR and Gas chromatography. Physicochemical parameters like pH, EC, total carbon, total nitrogen, phosphorous, potassium in soil were analyzed during treatment. Microbiological analysis was performed by CFU count and dehydrogenase activity. Soil microbial diversity was analyzed by Illumina 16S RNA sequencing. Results showed that soil amended with biochar not only increased the soil pH, EC, nutrients and carbon content but also promoted the degradation rate of hydrocarbons up to 72.27%±0.50 for fruit/vegetable waste biochar and 75.63%±0.351 for sludge biochar. Highest removal efficiency was for SDN treatment with removal percentage of 82.86%±0.60 following VDN treatment with removal capacity of 78.51%±0.38 in naturally contaminated soil. Results proved that wheat growth and biomass production was highest at 0.5% concentration of biochar mixture while highest microbial count was observed with 1% sludge biochar. Our results conclude that the biochar amendment in soil at optimum level improve soil properties and stimulate soil microflora which in turn improves the agricultural performance of soil.

**O-1/ICAZ-2023**

**Empirical Antibiotic Therapy in the Intensive Care Units: A Multicenter Cross-Sectional Study From Punjab, Pakistan.**

Shahid Shah<sup>1</sup>, Ghulam Abbas<sup>2</sup>, Ayesha Aslam<sup>3</sup>, Haris Khurram<sup>4</sup>, Khadija Babar<sup>1</sup>, Muhammad Hanif<sup>5</sup>, Akhtar Rasul<sup>2</sup>, Usman Rashid Chand<sup>1</sup>, Muhammad Haris<sup>1</sup>

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**Abstract:**

Antibiotics use is extremely common and particularly in intensive care units (ICUs). The aim of this study was to describe the current situation of empirical antibiotic therapy in patients admitted to ICUs in Pakistan. **Methodology:** An observational cohort study was conducted in the hospitals of Punjab, Pakistan. Medical charts of ICU patients were used for data extraction. The 2021 WHO AWaRe antibiotic classification was used to describe the empirical antibiotic therapy in ICU patients. For data analysis, the quick Sequential Related Organ Failure Assessment (qSOFA) score was used to assess the severity of organ dysfunction in all patients. Frequencies and percentages were calculated to understand the antibiotic(s) prescribed pattern in first 24 hours. The chi-square test was used to measure the association of different characteristics with discharge condition. Decision tree using classification and regression tree (CRT) were used to classify the outcome of the patients. **Results:** A total of 403 patients (66.3% males and 33.7% females) were included in the study. Nearly half (49.4%) of the patients had severe acute respiratory infection (SARI), 45.4% had non-SARI infection while 5.2% had no infection. More than half of the patients (53.3%) were suffering from systemic inflammatory response syndrome (SIRS). Single antibiotic therapy was initiated as empirical antibiotic therapy in 67.5% patients within 24 hours of admission. Most of the empirical antibiotic therapy (78.9%) used belonged to watch group of AWaRe classification of antibiotics. Ceftriaxone and piperacillin and tazobactam combination were the antibiotics most commonly used as empirical antibiotic therapy in the first 24 hours of admission. About 47% of the patients receiving single antibiotic therapy recovered within 7 days of admission to ICU while 43% were expired and 8.8% were still hospitalized after 7 days ( $p < 0.001$ ). About half of the patients (50.3%) admitted to ICU with SARI were expired while 66.4% of the patients with septic shock were expired ( $p < 0.001$ ). **Conclusion:** Excessive use and a variation in empirical antibiotic usage patterns were observed in ICUs. It emphasizes





the significance of continual monitoring of antibiotic administration in ICUs.

#### O-2/ICAZ-2023

### Facile Synthesis, *In-Silico* Docking Studies and Antiseizure Potential of 1,3,4-Oxadiazole-Based Carbamothioate Molecules

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#### Abstract:

In present work, a series of novel structural hybrids of 1,3,4-oxadiazole and carbamothioate was designed by chemical modification of 2-(4-isobutylphenyl) propanoic acid. Target compounds (7a-f) were synthesized in significant yields (84–88 %) by coupling compound (4) with different electrophiles under different reaction conditions. The structures of oxadiazole based carbamothioate derivatives were confirmed by spectroscopic (FTIR, 1H NMR, 13C NMR) and physicochemical methods. During *in-vivo* experimentation, all synthesized compounds were tested through 6 Hz (32 mA) and PTZ (80 mg/kg) mouse seizure models. The 7b and 7c showed significant outcomes ( $P < 0.05$ ) in terms of seizure severity, protection and mortality. The behavioural outcomes of PTZ tests were further strengthened with video-electroencephalogram (vEEG) findings in which EEGs were analyzed for epileptic spikes to understand the impact of 7b and 7c treatment on these ictal activities. The 7b was found most efficient in reducing the seizure spiking activity in brains of PTZ-treated mice while both 7b and 7c significantly reduced overall PTZ-induced seizure severity. The molecular docking studies also predicted the BBB permeability, reduced binding energies and good compound interaction with GABAA receptors and SV2A protein. Therefore, the observed pharmacological outcomes might be attributed to the GABAA agonistic and SV2A modulating potential of these oxadiazole-carbamothioate hybrid compounds

**Keywords:** Epilepsy, 1,3,4-oxadiazole, Electroencephalogram, Seizure

#### O-3/ICAZ-2023

### Ecofriendly Phytosynthesized Zirconium Oxide Nanoparticles As Antibacterial and Antibiofilm Agents Against *Acinetobacter baumannii*

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<sup>1</sup>Institute of microbiology, Government College University Faisalabad, Pakistan

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#### Abstract

The worldwide increase of multi-drug resistance has directed the researchers to focus on ecofriendly ways of nanoparticles synthesis with effective antivirulence properties. Here, we report the antibacterial and antibiofilm potential of zirconium oxide nanoparticles (ZrO<sub>2</sub> NPs) synthesized from aqueous ginger extract against multi-drug resistant (MDR) *Acinetobacter baumannii*. The results indicated that ZrO<sub>2</sub> NPs were of tetragonal shape with average diameter of 16 nm. Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) values for *A. baumannii* were 15.6 and 62.5 µg/ml, respectively, as revealed by broth microdilution assay. Exposure of bacterial cells to ZrO<sub>2</sub> NPs resulted in reactive oxygen species (ROS) generation which in turn led to cellular membrane disruption as observed by an increase in leakage of cellular contents, such as proteins, sugars, and DNA. The antibiofilm activity was evaluated by microtiter plate assay and the results revealed that the percentage inhibition of biofilm was found to be 14.3-80.6%. ZrO<sub>2</sub> NPs also obstructed the chemical composition of biofilms matrix by reducing the proteins and carbohydrate contents. These findings suggested the *in vitro* efficacy of phytosynthesized ZrO<sub>2</sub> NPs as antibacterial and antibiofilm agents that can be exploited in the development of alternative therapeutic options against MDR *A. baumannii*.



## O-4/ICAZ-2023

### Assessment of Prescribing Pattern and Appropriateness of Antibiotics Prescribed for Pediatric Acute Respiratory Tract Infections

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#### Abstract

**Background:** Antibiotics are essential in the management of acute respiratory tract infections (ARTIs), which place an immense burden on the pediatric population. Our objective was assessment of prescribing pattern and appropriateness of antibiotics prescribed for pediatric ARTIs. **Methodology:** This cross-sectional research was carried out from January to June 2023 at tertiary care hospitals setting in Punjab, Pakistan. Patients of the hospitals who were 18 years or young were enrolled in the study and data was collected through survey questionnaire and medical records. From the British National Formulary for children, the antibiotic prescribing pattern and appropriateness were assessed. Frequencies and percentages were calculated. Decision tree using Classification and Regression tree (CRT) method was used to classify the characteristics effect the death. **Result:** Results revealed that a total of 1144 ARTIs patients were diagnosed and 964 of them received antibiotics. Most reported infections were LRTIs that includes bronchopneumonia (30.59%), pneumonia (24.83%) and bronchiolitis (10.14%). Antibiotics mostly prescribed for LRTIs were cephalosporins, macrolides and penicillins. Commonly used route for administration was parenteral (85%). Irrationally prescribed antibiotics were carbapenems (25.4%), glycopeptides (23.1%), cephalosporins (17.1%), macrolides (16.5%) and penicillins (11.3%). The results of CRT model showed that death rate increased due to comorbidities, gestational age and no. of clinical characteristics. **Conclusion:** Pediatric LRTIs were more commonly treated with cephalosporins, macrolides, and penicillins than URTIs. Although the majority of antibiotic prescriptions were written appropriately, there were certain instances of irrational prescribing

## O-5/ICAZ-2023

### Efficacy of Probiotic on Growth and Hematological Analysis Of *Catla catla* Fingerlings

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#### Abstract

This experiment was formulated to assess the efficiency of probiotics isolates on growth and hematological parameters of *Catla catla* that was fed on multi-strains probiotics based test diet. This commercial test diet was divided into seven test diet which were supplemented with different levels of probiotics (0, 0.5, 1, 1.5, 2, 2.5, 3 gKg<sup>-1</sup>) in fingerlings feed. The outcomes of the experimental work exposed that highest growth performance and most optimum hematological indices of *C. catla* fingerlings were found at 2.5 gKg<sup>-1</sup> of probiotics respectively supplemented based test diets. It was also noted that supplementation of probiotics at 2.5gKg<sup>-1</sup> were beneficial to manufactured eco-friendly and economical fish diets which was formulated by using oil seeds meal based test diets. The present study concluded that supplementation of probiotics at 2.5 gKg<sup>-1</sup> is essential for maximum growth and hematology of *C. catla* fingerlings fed SFM meal based diet.

**Keywords:** *C. catla*, Growth, Hematology, Probiotics (Protexin), SFM



## O-6/ICAZ-2023

**Combining Experimental and Computational Models to Investigate the Anti-inflammatory Effects of *Ocimum basilicum* Seeds Extract**

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**Abstract**

Since long, medicinal plants being used in different traditional treatment system as therapeutic agent to treat variety of illness. This study was carried out for identification of phytochemical constituents, *in-vitro* and *in-vivo* anti-inflammatory activity of *Ocimum basilicum* seeds extract. GC-MS analysis of *O. basilicum* seeds revealed the presence of 24 phytochemicals having 9,12,15-Octadecatrienoic acid and n-Hexadecanoic acid with high percentage. *In-vitro* and *in-vivo* anti-inflammatory potential was carried out by Bovine serum albumin assay and carrageenan induced rat paw edema model respectively. In BSA assay, *O. basilicum* has 58.40 ±2.16% inhibition as compared to standard drug with 61.30±1.81% inhibition at 1000 ug/ml. Using carrageenan induced paw edema model, plant extract at 100, 200 and 400mg/kg doses demonstrated significant anti-inflammatory activity. 400mg/kg dose has highest rate of inhibition as compared to the 2<sup>nd</sup> phase of inflammation. Gross morphology and histopathological studies showed restoration of keratin and epithelium layer. Overall, these studies showed that ethanolic seeds extract of *O. basilicum* is an important medicinal plant, with both central and peripheral anti-inflammatory activities supporting its traditional use for therapeutic purposes.

**Keywords:** *Ocimum basilicum*, anti-inflammatory, Carrageenan, *In-vitro*, *In-vivo*

## O-7/ICAZ-2023

**Combined application of CuONPs and *Bacillus sp.* for Improving Growth of Spinach Plants in Chromium Contaminated Soil**

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**Abstract**

Chromium (Cr) is classified as a toxic metal as it exerts harmful effects on plants and human life. Bacterial-assisted nano-phytoremediation is an emerging and environment friendly technique that can be used for the detoxification of such pollutants. In current study, pot experiment was conducted in which spinach plants were grown in soil containing chromium (0 mgkg<sup>-1</sup>, 5 mgkg<sup>-1</sup>, 10 mgkg<sup>-1</sup>, 20 mgkg<sup>-1</sup>) and treated with selected strain of *Bacillus sp.* and Cu-O nanoparticle (CuONPs). Data related to plant's growth, physiological parameters, and biochemical tests was collected and analyzed using an appropriate statistical test. It was observed that under chromium stress, all plant's growth parameters were significantly enhanced in response to co-application of CuONPs and *Bacillus sp.* Similarly, higher levels of catalase (CAT), superoxide dismutase (SOD), malondialdehyde (MDA), and Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) were also observed. However, contents of anthocyanin, carotenoid, total chlorophyll, chlorophyll a & b, were lowered under chromium stress, which were raised in response to the combined application of CuONPs and *Bacillus sp.* Moreover, this co-application has significant positive effect on total soluble protein, free amino acid, and total phenolics. From this study, it was evident that combined application of *Bacillus sp.* and CuO NP alleviated metal-induced toxicity in spinach plants. The findings from current study may provide new insights for agronomic research for the utilization of bacterial-assisted nano-phytoremediation of contaminated sites.

**Keywords:** CuONPs; *Bacillus*; Chromium Stress; Spinach; Nano-bioremediation



## O-8/ICAZ-2023

**An invitro and in silico investigation for antibacterial potential of *Loigolactobacillus coryniformis* BCH-4 against human pathogenic bacteria**

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**Abstract**

The lactic acid bacteria produce bioactive metabolites having antagonistic effect against various pathogenic microorganisms. In the current study, the active metabolites were extracted from cell free supernatant (CFS) of *Loigolactobacillus coryniformis* BCH-4 using solvent based extraction with ethyl acetate and thereafter fractionated by silica gel column chromatography. Of all collected fractions, the active fraction F23 showed an effective inhibition of pathogenic bacteria; *Escherichia coli*, *Bacillus cereus* and *Staphylococcus aureus*. The observed MIC and MBC values against these pathogenic bacteria were 15.6±0.34, 3.9±0.59, 31.2±0.67 µg/mL and MBC were 15.6 ± 0.98, 7.8 ± 0.45, and 62.5 ± 0.23 µg/mL respectively. Additionally, F23 fraction concentrations (0.5×, 2×, 4×, and 8× MIC) also depicted sustainable biofilm inhibition of these bacteria. The bioactive metabolites present in the F23 fraction are phthalic acid, myristic acid, mangiferin, 16-hydroxypalmitic acid, apigenin, and oleandomycin, elucidated by using Electrospray ionization mass spectrometry (ESI-MS/MS) technique. In silico approach also supported the binding interaction between metabolites and receptor proteins of bacterial pathogens by docking analysis. Conclusively, the present study suggested that *Loigolactobacillus coryniformis* BCH-4 could be considered to be an attractive and underexplored natural reservoir of bioactive metabolites, whose further investigation might lead to beneficial pharmacological potential drugs.

Keywords: Bioactive metabolites, Antibacterial activity, Biofilm inhibition, ESI-MS/MS

## O-9/ICAZ-2023

**Screening of *in vitro*, *in ovo* and *in silico* biological activities of *Justicia adhatoda* from Soan Skesar Valley, Punjab, Pakistan.**

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**Abstract**

*Justicia adhatoda* (family Acanthaceae) is an indigenous plant of Soan Skesar valley with copious biological prospective. In present study, four methanolic, acetic, chloroform & *n*-hexane extracts of *J. adhatoda* were checked for *in vitro* biological potentials by phytochemical profiling, bioactive contents, HPLC analysis and antioxidant assays. Results showed that the plant exhibited the maximum TPC as 41.6 ± 0.4 mg. GA.E/g and TFC as 52.3 ± 0.3 mg QE/g by methanolic extract, which may related to higher antioxidant potential of extract. The antioxidant profile of the *J. adhatoda* revealed that all the extracts have antioxidant potential and display the highest antiradical behavior in the pattern of methanolic > acetic > chloroform > n-hexane, through DPPH, FRAP, OH radical scavenging, and NO radical scavenging assays. Plant's efficacy against Newcastle viral disease was tested by *in ovo* in SPF- embryonated chicken eggs. Which indicate that 400 µg/mL of methanolic extract showed high survival rate with 0% mortality. Further, *in silico* studies showed the binding interactions between receptor protein and phytoactive components of plant which provide the way for pharmacological and drug-likeness activities for future studies. The present studies highlighted that all extracts especially methanolic extract of *J. adhatoda* exhibited the best phytochemical profile, active phyto-contents, antioxidant and antiviral properties that can be further explored for novel drug development.

Keywords: Phytochemicals, antioxidant, antiviral, Newcastle disease, molecular docking.



## O-10/ICAZ-2023

**Anti-ulcerative colitis effect of Santonin against Diclofenac-induced Inflammatory Bowel Syndrome**

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**Abstract**

Diclofenac is a commonly used NSAID that is usually prescribed for its anti-inflammatory, analgesic activities in patients with ulcerative colitis also known as inflammatory bowel syndrome (IBD). However, it has been established that diclofenac is responsible for gastrointestinal problem that lead to sever IBD. The present study was aimed to find protective effect of Santonin, a natural compound of *Artemisia spp* to treat diclofenac-induced colitis in rats. The rats were induced IBD by diclofenac and oral admisnitrated santonin at 60 mg/kg for 14 days. The inflammatory cytokines (IL-6, IL-1 $\beta$ , TNF- $\alpha$ ) were reduced after treatment of santonin in rats with colitis. PCR was performed to measure the relative mRNA expression of prostaglandin-E2 (PGE2), myeloperoxidase (MPO), inducible nitric oxide synthase (iNOS), cyclooxygenase-2 (COX-2), cyclooxygenase-1 (COX-1) in treated and untreated rats. The mRNA expressions (COX-1/2, PGE2, and MPO) were downregulated in santonin treated rats with IBD. The histology of intestine tissue was performed and observed necrosis, pyknosis, cloudy swellings in intestinal mucosal cells. The treatments of santonin were restored the normal histoarchitecure of intestine rats with IBD. This study was highlighted the anti-ulcerative colitis effect of santonin. While the anti-ulcerative colitis activity of santonin is related to the downregulation of COX-1/2, PGE2, and MPO in intestine along with reduction inflammatory cytinines. Hence, the pateins with IBD that are using diclofenac as anti-inflammatory drugs might be recommended santonin after appropriate clinical trials.

## O-11/ICAZ-2023

**Iron oxide nanoparticles of *Moringa oleifera* improve iron deficiency anemia in rat model**Zanab Qasim<sup>1</sup>, Huma Umbreen<sup>1\*</sup>, Aisha Tariq<sup>1</sup>, Farah Noor<sup>1</sup><sup>1</sup>Department of Nutritional Sciences, Government College University Faisalabad**Abstract**

Now-a-days, there are many medicinal plants in traditional medicine which are used to prevent, control, and treat iron deficiency problems especially anemia but the major drawback about using this plant is the low bioavailability of its ingredients. Therefore, the major objective of this study was to prepare iron oxide nanoparticles by green synthesis method from *Moringa oleifera* leaves extract and to evaluate it in male albino rats induced with iron deficiency anemia. Iron oxide nanoparticles were synthesized by green synthesis method. The prepared nanoparticles were characterized in *vitro* for morphology, particle size, crystallinity and ultraviolet-visible (UV-Vis) absorption. In *vivo* studies were performed to evaluate the efficacy of the prepared nanoparticles in treating iron-deficient anemic rats compared to the *Moringa oleifera* leaves powder. Forty five rats of average weight was distributed in 5 groups and each group would contain 3 replicates and each replicate containing 3 rats and this study was continued for 21 days. In *vitro* results like x-ray diffraction (XRD) patterns, scanning electron microscope and UV-Vis absorption spectrum confirmed that the prepared nanoparticles were iron oxide nanoparticles. In *vivo* results indicated that iron oxide nanoparticles showed effective restorative action, returning haemoglobin (Hb) concentration to normal levels compared to the *Moringa* leaves powder. These results revealed that iron oxide nanoparticles proved as an effective treatment against iron deficiency anemia. The results obtained in this research work clearly indicated a significant potential of iron oxide nanoparticles as an effective treatment of IDA.

**Keywords:** Iron deficiency Anemia, *Moringa oleifera*, Nanotechnology, Iron oxide nanoparticles



O-12/ICAZ-2023

***Berberis brandisiana*; A Herbal Remedy to Combat Diabetes**

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**Abstract**

*Berberis brandisiana* Ahrendt, belongs to Berberidaceae family traditionally used in diabetes, arthritis and tumors. It is enriched with alkaloids, flavonoids and phenolics. Its efficacy in preventing high fructose diet induced diabetes has not yet been assessed. This study aims to investigate potential efficacy of hydro-methanolic extract of *Berberis brandisiana* (HMEBB) by using high fructose diet (HFR-Diet) fed diabetic rats. Male Wister rats were given high fructose diet (60%) for 8 weeks and oral doses of HMEBB (150 and 300 mg/kg) were administered for 6 weeks. After 14<sup>th</sup> weeks of study, HMEBB treated groups exhibited significant decrease in FBG level, modified serum albumin, lipid profile and uric acid levels and significantly ( $p < 0.001$ ) modulated HbA1c, serum insulin, uric acid, eNOS, bilirubin level, lipid profile, electrolytes level as compared to only HFR-Diet exposed diabetic rats. Moreover, HMEBB treated animals demonstrated cellular architecture preservation by modulation of TNF- $\alpha$ , IL-6, adiponectin, leptin and levels of SOD, CAT and MDA significantly improved. Tissue architecture of pancreas, liver, kidney, heart and aorta was restored in histopathological study. Whereas, HMEBB revealed up regulation of candidate genes thus exhibited notable results in treatment of diabetes, dyslipidemia and declined inflammation in HFR-Diet fed diabetic rats.

**Keywords:** *Berberis brandisiana*, Adiponectin, Ketohexokinase, Molecular docking

O-13/ICAZ-2023

**Potential of A Phytoalkaloid As Novel Therapeutic Agent For Diet Induced Diabetes**

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**Abstract**

Berbamine (Berb.) is a bis-benzylisoquinoline alkaloid derived from Aerial parts of *Berberis brandisiana* (Berberidaceae) own immunomodulatory, antioxidant, anti-inflammatory and cardiovascular effects. Its efficacy in preventing high fructose diet induced diabetes has not yet been assessed. This study aims to investigate potential efficacy of berbamine (Berb.) by using high fructose diet (HFR-Diet) fed diabetic rats. Male Wister rats were given high fructose diet (60%) for 8 weeks and oral doses of Berb. (80 and 160 mg/kg) were administered for 6 weeks. After 14<sup>th</sup> weeks of study, (Berb.) treated groups exhibited significant decrease in FBG level, modified serum albumin, lipid profile and uric acid levels and significantly ( $p < 0.001$ ) modulated HbA1c, serum insulin, uric acid, eNOS, bilirubin level, lipid profile, electrolytes level as compared to only HFR-Diet exposed diabetic rats. Moreover, (Berb.) treated animals demonstrated cellular architecture preservation by modulation of TNF- $\alpha$ , IL-6, adiponectin, leptin and levels of SOD, CAT and MDA significantly improved. Tissue architecture of pancreas, liver, kidney, heart and aorta was restored in histopathological study. Whereas, (Berb.) revealed up regulation of candidate genes thus exhibited notable results in treatment of diabetes, dyslipidemia and declined inflammation in HFR-Diet fed diabetic rats.

**Keywords:** Berbamine, Adiponectin, Ketohexokinase, Glucose transporter- 5



## O-14/ICAZ-2023

**Exploiting *Moringa oleifera* Potential to Combat Iron Deficiency in Rats.**Ayesha Rasool<sup>1</sup>, Razia Noreen<sup>1\*</sup>, Amna Sehar<sup>1</sup>, Huma Umbreen<sup>2</sup>, Kiran Aftab<sup>3</sup><sup>1</sup>Department of Biochemistry, Government College University Faisalabad, 37000, Punjab, Pakistan<sup>2</sup>Department of Nutritional Sciences, Government College University Faisalabad, 37000, Punjab, Pakistan<sup>3</sup>Department of Chemistry, Government College University Faisalabad, 37000, Punjab, Pakistan**Abstract**

Anemia is a medical condition characterized by a scarcity of robust red blood cells or hemoglobin, leading to decreased oxygen transportation and symptoms such as fatigue and weakness. It represents a prominent global health issue, especially affecting children (40%), women of reproductive age (37%), and low-income countries like Pakistan, where factors such as malnutrition and limited access to healthcare contribute to its prevalence. This investigation was conducted with the purpose of examining the influence of the ethanolic leaf extract of *Moringa oleifera* on anemia induced by phenylhydrazine in rats. The iron content of *Moringa oleifera* leaf extract from different varieties (Faisalabad, Multan, and India) was determined. The findings revealed that the Faisalabad variety had the highest iron content and used further in the experiment. The rats were segregated into six distinct groups, comprising a normal control group, a negative control group, a positive control group, and three experimental groups receiving varying doses of the ethanolic leaf extract. Anemia was induced by administering phenylhydrazine intraperitoneally at a rate of 40 mg/Kg for two consecutive days, while the extract was orally administered to the rats for a duration of 21 days. Following the treatment period, the animals were humanely euthanized, and blood samples were collected for subsequent analysis. The study assessed the impact of the extract on hematological and biochemical parameters. All groups receiving *Moringa oleifera* extract, particularly the group given a dose of 650 mg/Kg, showed significant improvements in iron concentration, hematological parameters, and biochemical markers compared to the untreated anemic group. In conclusion, the ethanolic leaf extract of *Moringa oleifera* exhibits notable anti-anemic efficacy by enhancing hematological parameters and augmenting iron levels. These findings underscore its promising potential as a hematoprotective agent and a nutraceutical abundant in iron, presenting innovative therapeutic benefits for the restoration of bodily functions. Moreover, the extract is considered safe and can effectively manage anemia.

**Keywords:** *Moringa oleifera*, Anemia, Phenylhydrazine hydrochloride, Atomic absorption spectrophotometry, Hematological parameters.

## O-15/ICAZ-2023

**Green Synthesis of Spinach based Iron Nanoparticles: A promising Way to Combat Iron Deficiency Anemia**Aisha Tariq<sup>1</sup>, Huma Umbreen<sup>1\*</sup>, Zanam Qasim<sup>1</sup>, Farah Noor<sup>1</sup><sup>1</sup>Department of Nutritional Sciences, Government College University Faisalabad**Abstract:**

A significant percentage of the population, especially women and children, are affected by a widespread health issue of iron deficiency anemia (IDA). Traditional methods of treating IDA involve iron supplements that are often chemicals which also cause adverse health effects and their effectiveness also needs to be addressed. Green synthesis of nanoparticles has attracted a lot of interest because of their sustainable and environmentally friendly nature as solutions to these problems. For the purpose of increasing bioavailability of iron, spinach leaves extract was used for the green synthesis of iron oxide nanoparticles, due to the high iron content of spinach. These spinach-based iron oxide nanoparticles (FeNPs) were characterized by Fourier Transform Infrared Spectroscopy (FTIR), X-ray Diffraction (XRD), UV visible spectroscopy and Scanning Electron Microscope (SEM). To investigate the efficiency of spinach based FeNPs in comparison with pharmaceutical agent for the treatment of IDA, 45 male albino rats of weight 120-150 g were divided into five groups; Two control groups (positive and negative) and three groups were treated with spinach powder, iron supplement, and spinach-FeNPs individually through oral gavage. FeNPs caused a significant increase in the level of red blood cells, haemoglobin, serum ferritin and serum iron as compared to all other groups. These results showed that spinach-based iron oxide nanoparticles can be used as a successful therapy in iron deficiency anemia. **Keywords:** Iron deficiency anemia, Iron supplementation, Green synthesis, Spinach, Iron oxide nanoparticles



## O-16/ICAZ-2023

**Development of SCAR marker using PCR based RAPD primers for Molecular based identification of *Cotesia glomerata* (Braconidae: Hymenoptera)**

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**Abstract:**

The rich insect diversity in agro-ecosystem have diverse role including pollination, acting as pest and as parasitoids. The balance in ecosystem is maintained by pest and parasitoid relationships. Among parasitoids members of Braconidae family (Order Hymenoptera) play a central role in controlling the herbivore pests including Lepidoptera. But due to high genetic variability among braconids, morphological identification do not provide accurate and precise information. Present hold the aim to develop Species Characterized Amplified Region (SCAR) marker for precise molecular based identification. In this regards DNA of all 15 available species of braconids collected from three districts of Punjab namely Faisalabad, Gujranwala and Multan was extracted by CTAB method and was amplified by using RAPD primers of OPA series. From all polymorphic bands amplified by RAPD primers 9 unique fragments were identified in 7 species of braconids. A unique band of 670 bps from *Cotesia glomerata* was eluted and subject to sequencing. Sequence was queried in NCBI BLAST for sequence based identification. From the sequence 2 SCAR primers (forward and reverse primer of 18 mer) were developed and tested on all DNA templates derived by DNA extraction. Developed SCAR primer show attachment on same position on DNA template of *C. glomerata*. This specific amplification distinguished *C. glomerata* from all other selected species. Such type of studies are useful in species specific and accurate identification of parasitoid species for devising significant biological pest control measure.

## O-17/ICAZ-2023

**Curcumin Nanoparticles Help to Heal Hep G2 cell: An In-vitro Study**

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**Abstract**

Curcumin is natural polyphenolic component of curcumin that has been in use due to its healing and anticancer properties. Curcumin has been extensively analyzed for various biological activities; however, has the low bioavailability due to its large particle size. Therefore, the present study had been planned to use curcumin as nanoparticles (Curc-NPs) so as to increase its bioavailability for wound healing in vitro studies. The major objective of the study was to prepare Curc-NPs and to observe its effect in healing of cancerous wounds. Curcumin loaded Nano-particles were prepared and characterized by Fourier Transform Infrared Spectroscopy (FTIR), X-ray Diffraction (XRD) and Scanning Electron Microscope (SEM) methods. XRD analysis showed the crystallized nature of Curc-NP while in FTIR analysis, peaks denoted that Nano curcumin had same functional bonds & groups even after the wet milling treatment. SEM analysis indicated the spherical symmetry of Curc-Nps. In-vitro studies had been conducted in HEP G2 cells, the nanoparticles were incubated with these cells and effect was observed during the process of metastasis. Furthermore, anti-metastatic potential of these nanoparticles had also been observed for these cells. Wound healing assay was performed to observe the cell death through anti-metastatic activity. The study's findings revealed considerable effects of Curc-NPs on HEP G2 cells by reducing the growth of tumor cells. Curc-NPs had shown positive impact on controlling the hepatocellular carcinoma.

**Key Words:** curcumin, hepatocellular carcinoma, nanoparticles, wound healing





### O-18/ICAZ-2023

#### Evaluation of the therapeutic role of *Alpina galanga* against breast cancer

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#### Abstract

Breast cancer is a major cause of cancerous deaths in women worldwide, and there is a need to explore new therapeutic options. *Alpina galanga* is a medicinal plant traditionally used for various ailments, including cancer. Our objective is to evaluate the therapeutic potential of *Alpina galanga* against breast cancer. We evaluated *Alpina galanga*'s anticancer capabilities and according to our findings, *Alpina galanga* prevented breast cancer cells from proliferating. *Alpina galanga* is a medicinal plant with anti-inflammatory, antioxidant, and anticancer effects. This research is to assess *Alpina galanga*'s potential as a breast cancer treatment. Research findings imply that the plant has strong anticancer effects, and it can accelerate apoptosis, slow down cell proliferation, and inhibit tumour growth in breast cancer cells. The presence of bioactive substances such as flavonoids, phenolics, and terpenoids in *Alpina galanga* is linked to the mechanism of action. It is safe for therapeutic usage and the outcomes of this study suggest that *Alpina galanga* contains promising anticancer properties against breast cancer. Further clinical studies are required to investigate the efficiency and safety of *Alpina galanga* in breast cancer patients.

Keywords : *Alpina galanga*, Breast cancer, Antiproliferative activities

### O-19/ICAZ-2023

#### Assessment and Distribution of Atrazine Pesticide in Water, Sediment, and Fish of the River Indus

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#### Abstract

Atrazine, (2-chloro-4-ethylamino-6-ethylamino-1,3,5-triazine), serves as a widely employed pesticide in the realm of agriculture to combat pests. It stands as the world's most utilized synthetic triazine herbicide, possessing toxic properties. This herbicide is predominantly applied to combat emerging weeds in crops such as maize, sorghum, sugarcane, and other fruit crops. It was introduced during the 20th century and is commonly used either in solution with other herbicides or alone for agricultural purposes. Atrazine pesticide was detected in replicate in water, sediments, and fish from three sites of River Indus including Attock (S1), Khushal Garh (S2), and Chashma Barrage (S3). These sites are heavy polluted sites receiving agricultural runoff from nearby agricultural fields around the River Indus. A total of 27 samples (9 from each site) were analysed from all the three sites of River Indus for Atrazine pesticide by using High performance liquid chromatography (HPLC). The results of the assessment of ATZ show the widespread occurrence of atrazine in the River Indus ecosystem. Elevated concentrations of atrazine were detected in both water and sediment samples, indicating a significant contamination of the river Indus. Fish samples from different species were analysed for atrazine residues to evaluate the potential bioaccumulation and biomagnification of the herbicide in the aquatic food chain. The findings indicated the presence of atrazine residues in fish tissues. The results obtained from water, sediments, and fish indicate that the measured concentrations of atrazine in the River Indus exceeded the recommended limits set by FAO and WHO, suggesting a potential detrimental impact on aquatic organisms and ecosystems. This study highlights the significant presence of atrazine in the water, sediment, and fish of the River Indus, emphasizing the urgent need for effective management strategies to mitigate the potential ecological and health risks associated with this herbicide.

**Keywords:** Assessment, ATZ, HPLC, FAO, WHO,



## O-20/ICAZ-2023

**Monitoring of aflatoxins in captive avifauna feed**

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**Abstract**

Aflatoxins are the most common types of mycotoxins that are further categorized as AFB1, AFB2, AFG1 and AFG2. They are toxic metabolites and produced by fungi mostly *Aspergillus flavus* and *Aspergillus parasiticus*. In the present research aflatoxins B1, B2, G1 and G2 were monitored in the bird's feed. A total of 40 feed samples were collected in summer and monsoon season from cages of ten bird species at Lahore Zoo. The thin liquid chromatography (TLC) method was used to detect and estimate the level of aflatoxins. Upon quantification out of 40 samples, 19 feed samples were contaminated and 17 were within permissible range while 2 feed samples were contaminated beyond the permissible range. AFB1 was detected in all 19 samples whereas B2, G1 and G2 were not detected in any sample. The overall percentage of contaminated feed samples was less in summer (35%) as compared to monsoon season (65%). Statistical analysis was done by Independent sample t test by using SPSS version 22 and significant differences (<0.05) were noticed in aflatoxins levels in summer and monsoon season. However, non-significant differences were noticed among the feed samples of different birds by one way ANOVA. It was concluded that the storage condition of feed samples were found better in Lahore zoo however, in monsoon season there is need of special care by feed regulating authorities of the Zoo so that spread of aflatoxins can be reduced.

**Keywords:** Aflatoxins, Thin Liquid Chromatography, summer, monsoon

## O-21/ICAZ-2023

**Balancing Technological Progress and Environmental Responsibility in the 21<sup>st</sup> Century: A Call to Action against Climate Change**Nargis Naheed<sup>\*</sup>, Naheed Bano<sup>1</sup>, Zareena Ali<sup>2</sup>, Rimsha Waheed<sup>1</sup>

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**Abstract**

The 21<sup>st</sup> century has witnessed remarkable technological advancements that have significantly elevated the quality of life for people. However, these advancements have also given rise to the critical issue of climate change. Notably, innovations such as faster transportation, and accelerated industrialization have contributed to the overall improvement in living standards. Nevertheless, these very technological conveniences have posing a grave threat to the global climate. The detrimental environmental impact stems from activities such as the burning of fossil fuels, the proliferation of motor vehicles, and the rapid growth of industrial sectors. These activities release greenhouse gases into the atmosphere, including carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), and sulfur oxides (SO<sub>x</sub>). Consequently, these gases have precipitated rapid alterations in climate patterns, manifesting as phenomena such as devastating floods, a rise in global average temperatures, and extensive forest fires. Furthermore, climate change has triggered a cascade of secondary effects, including exacerbated air pollution, the loss of biodiversity, diminished agricultural production, and rampant deforestation. To confront this urgent issue, the global community must take resolute measures to mitigate its impacts. While several climate agreements, such as the Kyoto Protocol and the Paris Agreement, have been ratified, their execution has often fallen short of expectations. To effectively address climate change, it is imperative to implement strategies like afforestation, harnessing renewable energy resources, pollution control measures, and fostering international collaboration. By committing to these efforts, it can aspire to eliminate the looming climate crisis, fostering a sustainable environment for future generations.

**Keywords:** Climate change, Greenhouse gases, Mitigation strategies, Environmental impact, Technological advancements



O-22/ICAZ-2023

**Biological weed control in aquaculture system**

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**Abstract**

**Background:** There is close interaction between the conditions of weed growth and the fish production and yield demanded. As a large number of weed in pond means there will be a big chances of fish mortality and oxygen depletion in water. Weedicides cannot be applied in water as these will cause mortality of fish and other aquatic organisms.

**Methods**

- i. assess the limnology of the lake, especially aspects of the impact of the drains water input, sea water input and sewage input on the water quality, fish and aquatic plants;
- ii. assess the impact of annual herbicide spraying of water hyacinth on fish and water quality;
- iii. consider the current socio-economic value of the fishery

**Results**

In some old water body, there is a considerable backlog of maintenance and replacement work, in particular many of the buildings, including the pump houses, equipment such as fish screens, etc. The ponds 1.0–1.5 m deep each provided with independent inflow and drainage sluices. A fish sump around the edge of the ponds is important. Most bunds are accessible by vehicle. The current condition of the ponds reflects both the nature of the site and pond construction as well as subsequent pond management. The eastern portion was constructed on what was apparently salt marsh and demonstrates a low level of reed growth. The western area was constructed on a reed swamp and these ponds now support massive stands of reeds.

**Conclusion**

The presence of weeds - emergent, floating and submersed - on the lake produces three important impacts: the loss of Lake Surface, and therefore productive capacity for fishery purposes. It makes access by the fishermen into such areas difficult or impossible, and therefore reduces the fish catch. The overgrown areas represent fish Refugio, important from the conservation viewpoint.

Keywords: Weeds, grass carp, swamp, weedicides,

O-23/ICAZ-2023

**A Biochemical and Histological Approach to Determine the Toxic Effects of Oral Administration of Pyriproxyfen on Reproductive System in Adult Female Rats.**

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**Abstract**

Pyriproxyfen is a pyridine-based broad-spectrum insect growth regulator pesticide which works as an analog of juvenile hormone and is thereby extensively used on different crops to control pests. The present study was designed to find the possible reprotoxic effects of pyriproxyfen in adult female Sprague-Dawley rats through histological and biochemical approach. For this purpose, adult female rats were assigned to four groups (n=10 animals/group) and were administered with 0mg/kg (control), 62mg/kg (G1), 124mg/kg (G2), and 186mg/kg (G3) of pyriproxyfen dissolved in distilled water. After 28 days of treatment, the rats were dissected, blood and reproductive tissue samples were collected, weighed and analysis for body mass index determination, blood glucose levels, total protein concentration, lipid profile, ovarian histology and reproductive hormonal profiles were performed. The results showed that pyriproxyfen exposure caused a significant ( $p<0.05$ ) reduction in the ovarian, uterine, kidney, heart, and liver weights. A significant decrease ( $p<0.01$ ) in the blood glucose levels and altered estrous cyclicity were evident. In addition, decrease ( $p>0.05$ ) in total protein levels was observed. An increase in triglyceride and total cholesterol concentration of all the PYR treated groups, while significantly lowered high density lipids concentration was seen in G2 treated rats as compared to control. An observable reduction ( $p<0.001$ ) in plasma concentration of Estradiol and progesterone, while a highly significant drop ( $p<0.001$ ) in plasma cortisol level between control and all the treated groups was witnessed. Ovarian histomorphological analysis showed a tormented basal membranes, increased empty spaces, tissue decompaction, degenerated follicles, disassembled epithelium in high dose treated group (186mg/kg). It is concluded from the current study that oral administration of PYR in adult female rats leads to lowered body and



organ weights, decreased blood glucose levels, disturbed normal estrous cycle, increased triglycerides and total cholesterol, reduced high density lipids concentrations and damaged ovarian architecture, affecting reproductive function in rats.

**Keywords:** Endocrine disruptor; Pyriproxyfen; Reprotoxic effects; Insecticide; Ovarian histology.

**O-24/ICAZ-2023**

**Assessing the Biochemical and Reproductive Biomarkers to Evaluate Health Consequences of Heavy Metals Exposure among Male Brickkiln Workers in District Layyah, Punjab Pakistan**

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Reproductive Physiology lab, Department of Zoology Quaid-i-Azam University Islamabad, Pakistan

**Abstract**

The current study was designed to examine the impact of brick kiln emissions containing heavy metals on the reproductive health and biochemical status of brick kiln workers in Layyah, Pakistan. This study involved (n=300) workers and (n=200) non workers. Demographic data, health history and body mass index (BMI) were assessed. Blood samples were collected to determine heavy metals concentration, hematological profile and liver function test. Blood was centrifuged and plasma was collected and kept at -20°C to study biochemical variables between two groups. The results showed a significant decrease in BMI and DBP while increase in SBP and blood sugar among workers. Analysis of heavy metals in blood showed an elevated level of lead and cadmium in workers as compared to non-workers. Increased white blood cells (p=0.004), platelet count (p=0.001), alkaline phosphatase (p=0.001), alanine transaminase (0.000), aspartate aminotransferase (0.001), bilirubin total (p=0.000) and oxidants level while decreased hemoglobin (p=0.001), red blood cells (p=0.001), albumin (p=0.003), protein (p=0.001) and antioxidant enzyme were evident among workers as compared with the non-workers. Significant increase in total cholesterol (p=0.003), low-density lipoprotein (p=0.000) and triglyceride (p=0.001) while significant decrease in high-density lipoprotein (p=0.000) and testosterone levels (p=0.001) were seen among workers as compared with non-workers. Present study demonstrate increase in heavy metal burden in blood of brick kiln workers and caused reproductive health issues due to higher oxidative stress conditions. Alternate technology is needed to be developed and brickkilns should be replaced.



## O-25/ICAZ-2023

**Evaluation of Reproductive Toxicity Induced by Oral Administration of Methanolic Leaf Extract of *Adiantum Venustum* Don in Adult Male Rats: A Histopathological and Biochemical Approach**

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**Abstract**

Traditional medicines have been used as antifertility agents since ancient times. For the last few decades, efforts are being made to develop safe, reversible and effective male contraceptives on a global scale. The current study was designed to uncover the antifertility properties of methanol leaves extract of *Adiantum venustum* Don. In adult male rats. Adult male Sprague Dawley rats (n=20) weighing 170±10g were divided into four groups each having 5 animals. The first group named as control group is dosed with the normal saline solution. Second group (MLE I) was treated with 125 mg/kg plant extract via oral gavage, third (MLE II) and fourth (MLE III) groups were administered with dose of 250 mg/kg and 500 mg/kg leaf extract respectively. After 28 days of treatment, dissections were performed and reproductive organs were removed for evaluation of sperm viability, epididymal sperm count, daily sperm production, histological, hormonal and biochemical analysis. Compared to control group, a significant decrease in sperm viability (p<0.01) was observed in MLE III. Non-significant reduction in epididymal sperm count was observed in MLE II and MLE III groups as compared to control. Highly significant decrease (p<0.001) in daily sperm production was noticed in all the treated group as compared to control. Compared to control group, body weight was significantly increased in all treated groups ((p<0.01), (p<0.001), (p<0.001)) respectively. Reproductive organ weight of treated groups decreased significantly by {(p<0.01), (p<0.001), (p<0.001)} for paired testes and by {(p<0.01), (p<0.001), (p<0.001)} for epididymis respectively. Accessory organs weight of treated groups significantly decreased by {(p<0.01), (p<0.01), (p<0.001)} for seminal vesicle; and by ((p<0.05), (p<0.05), (p<0.01)) for prostate gland respectively. *Adiantum venustum* treated groups showed significantly decreased in plasma testosterone level by {(p<0.01), (p<0.001) and (p<0.001) respectively. Treated animals showed significant decrease in concentrations of antioxidants whereas, significant increase in levels of thiobarbituric acid reactive substances (TBARS) and reactive oxygen species (ROS) was also evident. The present data revealed that functional sterility could be induced in male rats by the treatment of methanolic leaf extract of *Adiantum venustum* Don. These plant based oral contraceptives have the potential to control male fertility. The extract has shown to cause significant decrease in sperm Viability, epididymal sperm count and daily sperm production. The oxidative stress induced by the plant extract in testicular tissue might be the reason of effects. Histomorphological studies showed degeneration of seminiferous tubules, enhanced interstitial spaces, low leydig cells count, disturbed germinal epithelium and arrest of spermatogenic process. In conclusion, the present work demonstrated that functional sterility could be induced in male rats by *Adiantum venustum* methanolic leaf extract treatment. However, this plant has revealed a potential to be utilized for male contraception.

## O-26/ICAZ-2023

**Determination of Phenolic compounds in aqueous fraction of *Periploca aphylla* by HPLC analysis**

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**Abstract:**

Purpose: Phenolic compounds are one of the ubiquitous and leading groups of plant metabolites. The biological properties of phenolic compounds include antiatherosclerosis, antiinflammation, endothelial function improvement, anticancer, antiapoptosis, cardiovascular protection, cell proliferation and angiogenesis inhibition activities. *Periploca aphylla* belongs to the family Asclepiadoideae. Traditionally, it is employed for the treatment of several diseases including cerebral fever, swellings, tumors, as diuretic and stomachic. In the present study, Phenolic compounds were assessed in the aqueous fraction of crude methanolic extract of *P. aphylla*. Methodology: High Performance liquid chromatography (HPLC) analysis was performed to detect the presence of phenolic compounds. Results: HPLC analysis of the aqueous fraction revealed the presence of rutin, catechin (flavonoids), gallic acid and caffeic acid (phenolic acids) in it. Conclusion: Hence, it can be concluded from this study that the use of *P. aphylla*



for the cure of different diseases might be due to the presence of these phenolic compounds.

Key words: *Periploca aphylla*, Phenolic Compounds, HPLC

O-27/ICAZ-2023

**Current scenario of environmental pollution & its solution by anthropogenic activities in changing climate of the earth; A critical review**

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**Abstract**

Environmental pollution is an undesirable change in biological, chemical & physical characteristics of any components of environment i.e. air, soil & water that may harmfully affecting all living organisms. It is an alarming issue in the world of today. The negative effects of a polluted environment are becoming very severe due to the degradation of environmental conditions and loss of habitat. The climate and environment are inter-affected by one another in different ways. This literature review annotates current level of environmental pollution, its causes, recommendations to eradicate this problem and its effects in Pakistan. It is the most prevailing issue in the present era. A good environment is the essence of life. The aims and objectives of this critical review are to explore importance of clean and green environment which is most protective & productive environment on surface of the earth and maintain the fragile economy of a country. It also helps in maintaining the natural environment and climatic conditions favorable for survival, growth and development of all living organisms on the earth's surface. Humans are destroying the environment to compete with their needs like population explosion, urbanization, industrialization, transportation and deforestation etc. Such increasing human activities are the main causes of environmental pollution directly. It is an alarming situation because it disturbs the natural environment, changes climatic patterns and threats to life conservation. Awareness programs should be launched to aware people about their activities and conservation of sustainable environment. Different strategies and laws should be made regarding to environmental protection and ensure the implementation of these laws. The best method to stop environmental pollution is plantation activities. As some plant species are acting as pollution sink because plants are considered as natural lungs of environment. It was concluded that if haphazard population growth and constructions of new such structures go on at present rate in Pakistan without understanding the significance of trees in the environment then there will be more destruction for all living organisms in future. So, a humble request to all humanity is that adopt the "green revolution which is the best solution to arrest the environmental pollution" for a sustainable environment to keep it clean and green.

**Key Words:** Anthropogenic activities, Environmental pollution, Green revolution, Natural lungs, Plantation.

O-28/ICAZ-2023

**Evaluation Of Genetic Diversity And Genome Fingerprinting Of Bitter gourd Genotypes (*Momordica charantia*) By Molecular Marker**

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**Abstract**

Random Amplified Polymorphic DNA (RAPD) was used to evaluate such relationship among three genotypes of bitter gourd. Amplification of the genomic DNA from each of the three genotypes of bitter gourd using all the 10 decamer primers revealed a variety of RAPD patterns. Out of these 10 primers, five showed stable pattern with a set of major DNA fragments and were the most effective in detection of genetic polymorphism in the studied populations of Bitter gourd. The 10 decamer oligonucleotides on an average generated 244 fragments, of which 85 (34.8%) were polymorphic. A range of 15 to 47 bands was amplified from RAPD primer used in the study. The degree of polymorphism among primers was different. The approximate size of the amplified fragments ranged from 250 to 1000 bp. Coefficients were utilized to generate dendrogram by using an unweighted pair group method with arithmetic average (UPGMA) tree. According to the genetic similarity dendrogram constructed for all 244 traits for three genotypes detected using 10 primers, all studied Bitter gourd from the three different varieties of Bitter gourd can be



subdivided into two clusters, of which cluster one comprises of two varieties of Bitter gourd (CBT-36 & PKBT-1), and cluster two comprises of one variety (BG-7017). The mean genetic distance between varieties of Bitter gourd within cluster 1 is 0.3232 (32 %), within cluster 2 is 0.4419 (44 %). The genetic distance between clusters 1 and 2 was near about 0.1187 (11.8%).

**Key words:** Amplified Polymorphic DNA, Bitter gourd, genotype, primer, DNA fragments.

#### O-29/ICAZ-2023

### Growth performance and survival rate of euryhaline fish *Oreochromis niloticus* under the influence of different salinity level

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#### Abstract

Pakistan has endowed with wide range of aquatic and land resources which are extremely saline, and they can be utilized for culturing for euryhaline fish species like *Oreochromis niloticus* (Nile Tilapia). The present study was conducted to analyse growth performance and survival rate of *O. niloticus* under the influence of different salinity levels. For this purpose, fingerlings were collected from the Fish Seed Hatchery, Faisalabad and 90-day trial was conducted in glass aquaria under different salinity levels i.e., 3.8, 4.8, 5.8 and 6.8ppt. Growth parameters; survival rate, specific growth rate, feed conversion ratio and specific growth rate were measured on weekly basis while, physiochemical parameters were daily monitored on daily basis. Fish were fed with formulated feed by 6% of its body weight on daily basis. SGR and FCR were lowest in T0 while highest in T4. End results indicate that the higher salinity levels have pronounced effect on fish growth which might be due to improved osmoregulation, temperature, electrical conductivity. The pH showed positive correlation with growth while negatively correlated with dissolved oxygen. Fish weight and length were linearly correlated. The order of growth performance and survival rate is T4>T3>T2>T1>T0.

**Keywords:** Euryhaline Nile Tilapia, Salinity

#### O-30/ICAZ-2023

### Effect of Varying Stocking Density to Acute Crowding Stress and Growth of *Oreochromis niloticus* Reared in Biofloc Culture System

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#### Abstract

The present research was designed to evaluate the effect of varying stocking density to acute crowding stress and growth of *Oreochromis niloticus* reared in biofloc culture system. The experiment was conducted for a period of 4 months at Fish Nutrition Laboratory, Department of Zoology, Wildlife and Fisheries, University of Agriculture, Faisalabad. Biofloc inoculum was prepared by adding pond soil, ammonium sulfate/urea and starch as carbon source. Fish were grouped into two different stocking densities; (T<sub>1</sub>) 20 fish m<sup>-3</sup> and (T<sub>2</sub>) 35 fish m<sup>-3</sup> fed on 25% crude protein @ 6% of body weight. The increase in body weight and length were recorded on weekly basis. The data obtained was analyzed statistically by applying 2 sample t-test. The weight gain of Nile Tilapia in T<sub>2</sub> was 5.716 ± 0.42g while, T<sub>1</sub> was 5.016±0.42g. The length gain in T<sub>2</sub> was 0.72±0.047 and T<sub>1</sub> which was 0.59±0.051cm. The FCR value was observed lower in T<sub>2</sub> which was 1.84±0.02 and slightly increased in T<sub>1</sub> which was 2.002±0.03. It was observed that higher SGR was recorded in T<sub>2</sub> 2.249±0.07 and lower in T<sub>1</sub> 2.166±0.08. Results of crowding stress showed that there were significant differences among treatments. The level of catalase in liver was 54.13 in T<sub>2</sub> and T<sub>1</sub> was 56.30 U/mg. The value of SOD in liver was 29.40 in T<sub>2</sub> and T<sub>1</sub> was 32.10 U/mg. The GPx in T<sub>2</sub> was 4.9 and T<sub>1</sub> was 5.9 U/mg. Physico-chemical parameters viz. ammonia, nitrate, nitrite and total dissolved solids (TDS) were monitored on daily basis. The average value of ammonia in T<sub>2</sub> was 0.55±0.02 which was greater than T<sub>1</sub> 0.52±0.02 mg/L. The result showed that the value of Nitrate in T<sub>2</sub> was 10.34± 0.71 which was greater than T<sub>1</sub> 6.62± 0.46 mg/L. The result represented that the value of Nitrite in T<sub>2</sub> was 0.38±0.008 which was greater than T<sub>1</sub> 0.226± 0.005 mg/L. The average value of TDS in T<sub>2</sub> was 672.57±6.40 which was greater than T<sub>1</sub> value 645.09± 5.02 mg/L.

**Keywords:** Biofloc, *Oreochromis niloticus*, Stress, Ammonia, Nitrite, Nitrate, TDS



O-31/ICAZ-2023

**A preliminary study of the role of trail pheromones in route learning behavior and the diversity of ants (Hymenoptera: Formicidae) in different cropping systems of district Faisalabad, Pakistan**

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**Abstract**

This study focused on ants, which are not only the most diverse but also one of the most well-known groups of insects on Earth. We aimed to explore their diversity, abundance, richness, and evenness by collecting samples from various locations, including cropping zones indoor and outdoor household sites in the district of Faisalabad by using aspirators and hand-picking methods. Simpson and Shannon diversity indices were used to assess ant's diversity, which provides insights into species richness, evenness, and dominance. Further, the role of trail pheromones in ants' ability to navigate complex routes was also studied. Our study hypothesized that trail pheromones play a significant role in ant foraging on complex routes, aiding navigation and route learning. Our research primarily focused on ant workers and their foraging behavior on doubly bifurcating trails with four endpoints. These initial findings provide valuable insights into ant diversity and the role of trail pheromones in learning complex routes. The diversity of ant species was assessed by using the Simpson index (h), which yielded a value of 0.0902 for ants from various locations in Faisalabad. The Shannon index (d) for all ant species in the Faisalabad district was 0.87. Our findings suggest that trail pheromones, often produced by queen ants, significantly facilitate ants' route learning, aiding worker ants in efficiently reaching their desired destinations, such as food sources. This preliminary information contributes to a better understanding of the challenges associated with route learning in the absence of trail pheromones and helps us to explore the ecology of ants in different ecosystems.

Key words: Ants' Biodiversity, Pheromones, Route learning

O-32/ICAZ-2023

**Comparative impact of metals (Ca, Mg and K) on silk production, larval development and life cycle of silkworm (*bombyx mori*) under laboratory conditions.**

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**Abstract**

Economically, the silkworm is a very significant insect being a valuable producer of silk. In Pakistan, Sericulture is one of the important cottage industries that improve the socioeconomic status of the rural regions and solves the problems of unemployment. Nutritionists working with silkworms have been experimenting with different nutritional additions to mulberry leaves to provide a healthier feeding source. Silkworms taking a significant amount of minerals can increase protein synthesis and decrease the length of their stages of growth. The purpose of this research was to explain the effect of Potassium, Calcium, and Magnesium in different concentrations of 0.5M, 1M, 1.5M, and 2M on larval length, weight, food consumption rate, cocoon shell weight, and mortality rate. The results of our study indicate that all these parameters increased with increasing concentration of nutrients up to a certain limit of 1.5M concentration of Potassium, Calcium, and Magnesium resulted in the highest larval lengths 6.3cm, 6.1cm, and 5.8 cm respectively in the 5<sup>th</sup> instar and was highest than 2M concentration and control group. Larval weight was highest in the 1.5M group but lower in the 2M as compared to the control group. Larval weight was 14.832g, 13.082g, and 6.150g at 1.5M gained more weight as compared to 12.105g, 11.808g, 4.450g at 2M and 11.90g, 9.647g, 4.450g in control groups of Calcium, Potassium, and magnesium respectively. Larval mortality increased with increasing concentration above certain limits and was a maximum of 35%, 25%, and 20%, at 2M concentration 15%, 20%, and 32% at 1.5M concentrations for Calcium, Magnesium, and Potassium respectively. Food consumption was high 30.367g, 21.76g, 29.113g at 1.5M as compared to 19.91g, 26.712g, and 21.622g for 2M concentration, Ca, Mg, and K respectively. Economical parameters like cocoon weight was 6.08g, 4.87g, 5.548g at 1.5M concentration gained high weight as compared to 2.965g, 4.475g, and 3.56g for 2M concentration Ca, Mg and K respectively. Significant results were obtained by addition of the metals to the overall life cycle of the Silkworm. Our research will help in a deeper understanding of the role of Ca, Mg, and K on silkworm growth, silk yield, and overall sericulture industry.





**O-33/ICAZ-2023**

**Effect of Organophosphate Pesticide on Glutathione S-transferase activity of *Labeo rohita***

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**Abstract**

Glutathione S-transferase (GST) is a cytosolic enzyme that detoxifies xenobiotics during phase II of the biotransformation process. Glutathione forms covalent bonds with electrophilic compounds by the process of conjugation. Conjugation is essential for maintaining normal physiological functions and xenobiotic detoxification. GST activity has been proposed as a potential biomarker of susceptibility to the existence of potentially hazardous xenobiotics in aquatic species. The activity of glutathione S-transferase and total protein contents in liver, gills and kidney of *Labeo rohita* under sub-lethal concentrations (1/3<sup>rd</sup> and 1/7<sup>th</sup>) of chlorpyrifos for 28 days was determined. After 7 days, sampling was performed. Physico-chemical properties of the test media were also monitored. Results of current research work demonstrated that when chlorpyrifos exposed fish were compared to controls, GST activity was increased in all selected organs (liver, gills and kidney). Comparison among concentrations (1/3<sup>rd</sup> and 1/7<sup>th</sup>) revealed that 1/3<sup>rd</sup> of LC<sub>50</sub> caused a greater increase in GST activity. Total protein contents in all selected body organs of chlorpyrifos exposed fish were decreased with the passage of time. Among all the concentrations 1/3<sup>rd</sup> of LC<sub>50</sub> cause greater decrease in protein contents. The total protein contents in various organs of *Labeo rohita* followed the order: liver > gills > kidney.

Key words: *Labeo rohita*, Organophosphate pesticide, Glutathione S-transferas

**O-34/ICAZ-2023**

**The impact of bio-toxin in Neuro-secretory cells of aquatic animals (fish *Labeo rohita*).**

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**Abstract:**

The adverse effects of bio-toxin (neurotoxin) has been studied in different aquatic animals. Bio-toxin is a biological origin and toxic waste material of many living organisms. *Clostridium botulinum* and *Clostridium tetani* secrete very potent neurotoxins, which are responsible for neurological disorders in humans and aquatic animals, botulism and tetanus, respectively. Neurosecretory cell, a type of neuron, or nerve cell, found in hypothalamus, whose function is to translate neural signals into chemical stimuli. The conc. Of neurotoxin has more powerful effects in the maturity and health of aquatic animals (fish *Labeo rohita*). The survival rate of rohu is more than others. Fish divided into two batches, each group consist of 20 fish. Fish of batch A placed into a clean glass pond whereas fish of batch B placed into polluted bacterial ponds. After studied of thirty days, result concluded that the batch A fish has most active and healthy neuro-secretory cells, whereas the bacterial spores produce neurotoxic effect on normal hormonal secretions from neuro-secretory cells, breeding behavior and developmental stage of organism in batch B.

**O-35/ICAZ-2023**

**Evaluation of toxic effects of dioxin on hematology and serum biochemistry of grass carp**

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<sup>2</sup>Department of Zoology, University of Jhang, Jhang, Pakistan

**Abstract**

Dioxin compounds are toxic pollutants produced through various industrial processes, particularly the burning of industrial waste. They have been found to impose detrimental effects on fish, including neurological disorders, immune system impairment, and development of cancer, leading to increased mortality rates. In this study, we examined the changes in hematology and serum biochemistry of Grass carp (*Ctenopharyngodon idella*) exposed to Dioxin. For the experiment, fish samples were distributed into three groups: a control group and two treatment groups exposed to different concentrations of Dioxin for 75 days duration. The physicochemical parameters of the water were monitored regularly. During experiment, blood samples were collected at different time intervals. The results revealed significant decrease in total RBCs, HCT, and Hb levels in the treated groups in comparison to the



control group. Conversely, total number of WBCs, MCV and MCH showed significant increases in the treatment groups. Furthermore, treatment groups exhibited a significant decline in serum glucose, protein, and triglyceride levels, while cholesterol levels increased significantly as compared to the control group. There was a significant correlation identified between the physicochemical parameters of water and Dioxin toxicity. These findings were statistically analyzed using Analysis of Variance (ANOVA) and Tuckey's test by using Statistix<sup>8.1</sup>.

O-36/ICAZ-2023

#### Studies on the changes in antioxidant enzyme activity induced by parathion in *Hypophthalmichthys molitrix*.

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<sup>1,2</sup>Department of Zoology, Wildlife and Fisheries, University of Agriculture, Faisalabad, Pakistan

#### Abstract

Parathion is a pesticide that has noxious and potential accumulative effects on fish organs, physiology, and enzymatic activity. Pesticides also induce oxidative stress in fish. The purpose of the present study was to evaluate the changes in antioxidant enzyme activity induced by parathion in *Hypophthalmichthys molitrix*. For the experiment, fish samples were divided into two groups. One was the control group (without pesticides), and the other was the treatment group (with pesticides). In the acute phase, the various concentrations of parathion given to fish ranged from 0.2-1.8 mg/L<sup>-1</sup> for the determination of LC<sub>50</sub> and lethal concentration during the 96-hour experiment. Parathion LC<sub>50</sub> for *H. molitrix* was noted as 1.817+0.37. After this, fish sampling was taken at different intervals (24, 48, 72, and 96 hours), and targeted organs were isolated for the analysis of antioxidant enzyme activity. Superoxide dismutase (SOD) and Catalase (CAT) enzyme activity was noticed in fish organs that were exposed to various concentrations of parathion and showed different fluctuating levels: Liver> gills> kidney> muscles> heart. Physio-chemical parameters were maintained at optimum levels. The probit analysis method was applied to find the LC<sub>50</sub> and LC<sub>99</sub>. Tukey and ANOVA were used to evaluate the comparisons and means of the observed data.

O-37/ICAZ-2023

#### Estimation of DNA breakage in peripheral blood erythrocytes of *Oreochromis niloticus* during chronic exposure to pesticide mixture

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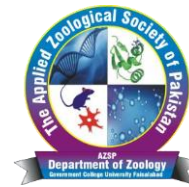
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#### Abstract

Runoff from various fields and industries contain highly toxic pesticides and their residues that persist in aquatic environment thereby posing a serious threat to aquatic fauna and flora. Laboratory experiments were conducted to evaluate the DNA breakage/damage in peripheral blood erythrocytes of *Oreochromis niloticus* through employing single cell gel electrophoresis (SCGE). Fingerlings of *Oreochromis niloticus* (tilapia) were exposed to four sub-lethal concentrations of pesticide mixture (chlorpyrifos+endosulfan+bifenthrin) i.e. 1/3<sup>rd</sup>, 1/4<sup>th</sup>, 1/5<sup>th</sup> and 1/6<sup>th</sup> of LC<sub>50</sub> along with negative and positive control for the duration of 90-days (three months). DNA breakage were examined by using three parameters viz. %age of damaged nuclei, genetic damage index (GDI) and cumulative tail length of comets (CTL). After 90-days of exposure period, comet slides were prepared and examined under Epi-Fluorescence microscope for damage assessment. Pesticide mixture gave significantly (p<0.05) variable DNA breaks in fish erythrocytes at various exposure concentrations. Dose dependent DNA breakage in terms of %age of damaged nuclei and GDI were observed, with highest damage at 1/3<sup>rd</sup> of LC<sub>50</sub> as compared to control groups. Incidence of CTL was also observed higher due to 1/3<sup>rd</sup> of LC<sub>50</sub> exposure, as evident from their mean value 876.10±0.38µm while it was significantly lower (3.40±0.03µm) due to negative control. This study also confirmed that the single cell gel electrophoresis or comet assay is a useful tool for assessing the breakage of DNA in fish and might be appropriate as a part of environmental monitoring programs and toxicology studies.

**Key Words:** Tilapia, pesticide mixture, DNA breaks, genetic damage index



O-38/ICAZ-2023

**Spatial Modeling of Cutaneous Leishmaniasis in Quetta and Understanding Current Uprising Trend of The Disease**

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**Abstract**

The Cutaneous leishmaniasis (CL) is becoming an uprising health issue in Quetta city. This questionnaire and researchers' personal observations based study encompasses the variables associated with the spread of the very disease and its risk factors. We have analysed the effects of various indigenous fronts, seasonal interactions, past journeys, residing conditions, insecticides utilization, types of scars, relation with fauna presence, spatiotemporal analysis of patients, age-specific disease opatterns, characteristics of lesions and variations in disease pattern among different professionals. We have also reported very first time, to best of our knowledge, the hotspot analysis for probability of finding disease vector in Quetta by analyzing the real time GPS data of patients. The results suggest a connection of travel history of Pashto and Hazara community with possible vector import, even if patient himself/herself not travelled to neighboring countries i.e. Afghanistan and Iran respectively. Data also identified the presence of reservoir hosts as one of the major factors for more CL cases compared to households having no pets.

O-39/ICAZ-2023

**Ameliorative Potential of *Olea ferruginea* Fruit Pulp Extract Against Ccl4 Induced Testicular Histopathology in Mice**

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**Abstract**

Testicular histo-ameliorative capacity of wild olive (*Olea ferruginea*) fruit pulp extract (OFPE) against intra-gastric CCl<sub>4</sub> acute (4mL/kg body weight) exposure was investigated in mice. There were 3 groups' (n=10) vis-à-vis: Control (0.1mL corn-oil at 0, 24 and 48hrs), CCl<sub>4</sub> (2mL/kg CCl<sub>4</sub> at 0 and corn-oil at 24 and 48hrs) and CCl<sub>4</sub>+OFPE (2mL/kg CCl<sub>4</sub> at 0 and 0.1ml OFPE at 24 and 48hrs). For histopathological studies testes were recovered on euthanasia after 96hrs of the first treatments. In contrast to the control; interstitial tissue damage, necrosis of the sertoli cells, loss of spermatogonia and disruption of alignment of the spermatogenetic cells (spermatogonia, spermatocytes, spermatids and tailless sperm-heads) in the seminiferous tubules were seen in CCl<sub>4</sub> group. Partial rehabilitation of the interstitial tissue, increased density of spermatogonia, and realignment of spermatogenetic cells and, aggregations of the dislocated spermatogenetic cells were seen in the center of the tubules in CCl<sub>4</sub>+OFPE group. Micrometric data showed significant (p<0.05) lesser cross-sectional area (CSA) of the seminiferous tubules in CCl<sub>4</sub>+OFPE as compared to control and CCl<sub>4</sub> groups. The CSAs of the spermatogonia and spermatocytes showed significant increase in CCl<sub>4</sub> than control and CCl<sub>4</sub>+OFPE groups. The sperm head size in control (15.99±1.63) remained significantly (p<0.05) lower than CCl<sub>4</sub> (33.64±6.72) and CCl<sub>4</sub>+OFPE (23.52±1.91) groups. Contrarily the sperm tail length in control (88.35±5.89) remained significantly higher (p<0.05) than the CCl<sub>4</sub>+OFPE (65.90±2.58) and CCl<sub>4</sub> (57.29±3.54) groups. Results show that acute exposure of CCl<sub>4</sub> in mice can ruin testicular microanatomy whereas OFPE bears rapid rescuing potentials under this debilitating condition.

Keywords: Testicular histopathology, CCl<sub>4</sub>, *Olea ferruginea*



## O-40/ICAZ-2023

**Estimation of Nickel In Various Organs of the Male *Mus musculus*, Using Inductive Coupled Plasma Technique**

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**Abstract**

Nickel is the 24th most adequate component in the earth covering a sum of 3% of the earth's crust and utilized at industry level. The dietary prerequisite of nickel is 50–80µg/g but excess amounts of nickel are detrimental. This research was aimed to assess the assimilation of nickel in heart, stomach and kidney by using ICP and to measure the therapeutic potential of pomegranate extract against nickel-induced toxicity. For this purpose, 80 sexually mature male *Mus musculus* were divided into 8 groups (C, D-I, D-II, D-III, D-I+A.D, D-II+A.D, D-III+A.D, A.D). Doses were administered for 30 days followed by pomegranate peel extract administration as A.D after one hour. Mice were dissected on the 32nd day. Heart, stomach, and kidney tissue samples were prepared for ICP and histological assessment. The stomach exhibited a high nickel concentration compared to heart and kidney. The results were subjected to one-way ANOVA. Histopathological examination of stomach and intestine revealed atrophy of muscular mucosa and villi, mucosal degeneration, mucosal inflammation, necrosis and fibrosis of villi. So, in conclusion nickel can alter the physiology of stomach and intestine by accumulation more frequently in stomach than heart and kidney which can be reverted by pomegranate extract's antioxidant properties.

**Keywords:** Nickel, Inductive Coupled Plasma, Pomegranate, Analysis of variance, Necrosis, Mucosal inflammation.

## O-41/ICAZ-2023

**Determination of Acute Toxicity of Arsenic Nanoparticles and Effects on Antioxidant Enzymes in *Mus musculus***

Madeeha Arshad<sup>\*1</sup>, Abuzar Mehdi Khan<sup>1</sup>, Muhammad Ramzan<sup>1</sup>, Ayesha Iram<sup>1</sup>, Ayesha Bibi<sup>1</sup> and Iram Shaista<sup>1</sup>  
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**Abstract**

Arsenic (As) is a heavy metal and 20<sup>th</sup> most prevalent element in the earth's crust. Arsenic is a prominent environmental toxicant and human carcinogen that occurs naturally but at very high amounts. Once consumed, they travel through the circulatory system and cause damage in several body systems. In this study, the arsenic nanoparticles were synthesized by using sodium arsenite salt (NaAsO<sub>2</sub>), also determined the size of synthesized nanoparticles by XRD and D size of nanoparticles was 6.819 0.1 nm. 20 sexually mature mice were used divided in total 4 groups of 5 mice in each group (C, D-I, D-II and D-III). The Control group was kept without any treatment. Dose groups were treated with AsNPs: D-I 5mg/Kg, D-II 25mg/Kg and D-III 50mg/Kg. Doses were administered orally for 30 days. LD<sub>50</sub> was calculated which was 41mg/Kg. The 31st day was considered an acclimatization period and on the 32nd day, the mice were dissected. Blood was extracted in EDTA vials for biological analysis. Activity of POD and SOD were significantly (p≤0.01, p≤0.001) decreased. Values of CAT were significantly (p≤0.001) increased by D-I while significantly (p≤0.001) decreased by D-II and D-III. Concluding, arsenic nanoparticles have the potential to decrease the oxidative stress in *Mus musculus*.

**Keywords:** Arsenic Nanoparticles, *Mus musculus*, XRD, LD<sub>50</sub>,



## O-42/ICAZ-2023

**Therapeutic potential of *Nigella sativa* against Nickel Induced Skeletal and Morphometric Alterations in Developing *Mus musculus***

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**Abstract**

This study aimed to assess the teratogenic effects of nickel and the potential therapeutic benefits of *Nigella sativa* extract against nickel-induced teratogenicity in developing *Mus musculus*. Female mice were categorized into four groups: a control group receiving no treatment, a dose group receiving oral nickel chloride, a dose + antidote group receiving both oral nickel chloride and *Nigella sativa* extract, and an antidote group receiving only *Nigella sativa* extract orally. A dosage of 78mg/10ml of NiCl<sub>2</sub> was administered, along with *Nigella sativa* extract as an antidote from the 6th to the 12th day of gestation. The LD<sub>50</sub> for nickel chloride was determined to be 30mg/kg BW. On the 18th day, all fetuses were extracted and preserved in a 70% alcohol solution. Morphometric analysis involved measuring various parameters including crown-rump length, forelimb length, hindlimb length, eye circumference, tail length, and head circumference, while skeletal analysis required immersion in a 2% KOH solution for 15 days, followed by staining with alizarine red and allicin blue. Results indicated a significant difference in deformities between the dose group and the other groups without deformities, suggesting that oral exposure to nickel chloride induces teratogenic effects in mice.

**Keywords:** Nickel chloride, Teratogenic effect, Deformities caused by nickel, Therapeutic potential, *Nigella sativa*, Developing *Mus musculus*

## O-43/ICAZ-2023

**Study of Heart and Lung Toxicity Induced by Arsenic Nanoparticles in *Mus musculus***

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**Abstract**

Arsenic (As) is a heavy metal. It's the twentieth most common element in the earth's crust and a major environmental toxicant often present in land and water. After being ingested, it enters the bloodstream and is carried to various organs including the Heart and lungs causing toxicity. This research investigated the effects of arsenic nanoparticles (AsNPs) on the Heart and Lungs. For this research, 20 sexually mature mice were divided into 4 groups (C, D-I, D-II and D-III). The Control group received no treatment. Dose groups were treated with AsNPs (D-I 5mg/Kg, D-II 25mg/Kg and D-III 50mg/Kg). Doses were administered orally for 30 days. The 31<sup>st</sup> day was considered an acclimatization period. On the 32<sup>nd</sup> day, the mice were dissected. Blood samples were collected for biochemical testing. The Serum cholesterol, HDL and LDL levels were reduced significantly ( $p \leq 0.001$ ) while Triglyceride levels increased significantly ( $p \leq 0.001$ ) in dosage groups compared with the control group. Histopathological examination of cardiac and pulmonary tissues showed normal Intercalated Discs, Myocyte Nuclei, Myocardium and normal Bronchiolar Epithelium and Alveolar Structures respectively, while pulmonary tissues of D-III showed inflammation. In conclusion, AsNPs can cause harm at the blood level but are not as detrimental as arsenic itself.

**Key Word:** Arsenic Nanoparticles, Heart, Lung, Toxicity, *Mus musculus*.



## O-44/ICAZ-2023

**Effect of ZnO Nanoparticles Prepared from *Ocimum basilicum* (Basil) Leave Extract on Gut Inhabiting Bacteria of *Catla catla***

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**Abstract**

The uncontrolled and unregulated use of antibiotics causes the emergence of multidrug resistant bacteria in fish which are responsible for the significant loss in fish farming. Nanoparticles possess the enhanced antibacterial properties due to their small size, large surface and different capping agent on their surface. The nanoparticles synthesized by physical and chemical method required high temperature, pressure, toxic chemical and expensive equipment. Moreover, nanoparticles synthesized by chemical and physical method lack the biocompatibility which limit their uses in biomedical field. In the present study, ZnO NPs were synthesized by green approach by utilizing the leaf extract of *Ocimum basilicum* and zinc nitrate hexahydrate as a precursor. The different concentration of zinc nitrate hexahydrate were to optimize the ZnO NPs synthesis. The color change of reaction mixture was monitored for the confirmation of ZnO NPs formation. Further ZnO NPs formation was confirmed by the UV Visible spectroscopy. For UV visible spectroscopy, the ZnO NPs were dispersed in distilled water and their absorption was measured. The ZnO NPs showed the absorption peak at 221nm. Further ZnO NPs were characterized by using powder x ray diffraction, Fourier transform infrared spectroscopy and scanning electron microscopy. The XRD pattern of ZnO NPs showed the sharp peaks which indicated the good crystallinity of prepared ZnO NPs. The crystallite size of ZnO NPs was calculated by using the Scherrer equation and was 13nm. The FTIR of ZnO NPs showed the number of peaks which indicated the presence of different phytochemical of plant of *O. basilicum* which played role in the reduction, stabilization and capping of ZnO NPs. The SEM micrograph of ZnO NPs were taken at resolution of 100nm, 200nm and 500nm to know about morphology and size of ZnO NPs. The SEM micrograph show that ZnO NPs were almost spherical and average sizes of ZnO NPs calculated from SEM was 18nm. Moreover, slight agglomeration was observed in SEM micrograph. The antibacterial activity of ZnO NPs was evaluated against *pseudomonas spp.*, *Aeromonas spp.* and *Enterobacter Spp.* By the well diffusion method. The ZnO NPs exhibited good antibacterial activity towards the *Pseudomonas Spp* with zone of inhibition of 20mm which comparable to positive control (ampicillin). The zone of inhibition produced by ZnO NPs against *Enterobacter Spp* and *Aeromonas Spp* was 17 and 15mm respectively. It was concluded that ZnO NPs exhibited the more antibacterial against *pseudomonas spp* followed by *Enterobacter Spp* and *Aeromonas Spp*.

**Keywords:** UV Visible spectroscopy, XRD, FTIR and SEM

## O-45/ICAZ-2023

**Development of Cost-Effective Fish Feed by Partially Replacing Fishmeal with Coconut Meal for Enhancement of Overall Performance of Thaila Fingerlings**

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**Abstract**

Fishmeal's unprofitable price and diminishing supplies open the door to the quest for substitute, protein-rich plant sources. The current experiment was performed for determining the best percentage of coconut meal (CM) to use as a partial fishmeal replacement when making inexpensive fish feed and its effect on the body composition, hemato-biochemical indices, growth, mineral and nutrient digestibility of *Catla catla* fingerlings. Fish having average weight was fed twice (@4%) a day for 90 days. Six experimental diets (0, 10, 20, 30, 40 and 50%) were prepared using CM as an alternative feed ingredient by adding 1% in-digestible marker. At the end of trial period blood and whole body samples were collected for analysis and found highest growth (SGR; 1.31, weight gain% 225%), hematological parameters (PLT; 63.72, Ht; 34.82%; RBC;  $2.76 \times 10^6 \text{mm}^{-3}$ , Hb; 7.84g/100ml), carcass, nutrient



digestibility (CF; 69.14%; CP; 69% and GE; 67kcal/g) and mineral absorption at 10% replacement of fish meal. According to the findings, it is recommended to replace 10-20% of CM with fish meal when making economical and environment friendly fish feed.

**Key words:** CM based diet, *Catla catla*, Hemato-biochemical indices, mineral absorption, Proximate body composition.

### O-46/ICAZ-2023

#### Effects of Lentil Seed Meal Based Feed on Performance of Common Carp (*Cyprinus carpio*) Fingerlings

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#### Abstract

The Sustainable Development Goals of the world is to emphasize the necessity of solving the world food problem, with goal to highlighting the eradication of hunger, achieving food security, improving nutrition and ending all forms of malnutrition. Fish's nutritional value extends beyond its use as a source of energy, as fish meal is important particularly in the areas of high quality and easily assimilated animal proteins. The purpose of this experiment was to examine the effects of partially substituting lentil seed meal (LSM) for fishmeal on the growth and feed consumption of common carp. The fingerlings were fed a diet that contained lentil seed protein (10%, 20%, 30%, 40% and 50%) for 70 days. The fish feed in Test Diet III (20% LSM) obtained the highest FCR (1.26), SGR (1.61) and weight gain (19.73), Hb (7.40g/100ml), RBCs (2.37), Ht (38.62) and ADC% of GE (70 kcal/g) and CP (71.75kcal/g). Fish fed on test diet IV based on LSM showed the highest percentage of crude fat digestion (30%). The results suggest that to maximize fish development, FM should be replaced with LSM at levels of 20% and 30% in *C. carpio* diet.

**Keywords:** *Cyprinus carpio*, feed utilization, fish meal, growth performance, Hemoglobin, lentil seed.

### O-47/ICAZ-2023

#### Formulation of Peanut Meal-Based Diet with Supplementation of Lysine for Common Carp Fingerlings

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#### Abstract

Fish rely on a diet that includes high-quality protein to facilitate their normal growth. Traditionally, fish meal has been the preferred source of protein in fish diet. However, the availability of fish meal is diminishing due to its concurrent utilization in livestock feeds, leading to escalating costs, which in turn restricts its utilization in fish feed. This uncertain future of FM forced to investigate alternative protein sources such as plant-based diets which have good nutritional quality, are readily available, and are cost-effective. In the present study, six diets were prepared by using graded levels of Lysine supplemented (0%, 1%, 2%, 3%, 4%, and 5%) peanut meal (*Arachis hypogaea*) based diets to refurbish the carcass composition, mineral estimation, and immunology of common carp (*Cyprinus carpio*) fingerlings. Fifteen fingerlings with average body weight (6.32 g) were kept in each triplicated tank and fed at 4% of their wet body weight. As per given results of carcass composition, the best results of Crude Protein (19.8%), Fat (8.3%), and Carbohydrates (3.3%) and that of immunology (WBCs:  $6.37 \times 10^3 \text{mm}^{-3}$ , Lymphocytes: 21.50%) were also noticed in fish fed with 2% Lysine supplemented peanut meal (LS-PM) based diets. Mineral absorption showed maximum values of (Ca: 76%, Na: 69%, K: 72%, and Fe: 74%) at 2 and 3% inclusion levels. From the results, it was concluded that 2% of LS-PM based diets showed positive results in carcass composition, Immunology, and mineral absorption of *C. carpio* fingerlings and can be used to prepare environmentally sustainable and remunerative fish feed.

**Keywords:** Mineral estimation, Immunology, Carcass Composition, *Arachis hypogaea*, *Cyprinus carpio*,



**O-48/ICAZ-2023**

Effects of substituted Blackseed meal based diet on growth performance and nutrient digestibility of *Cyprinus carpio* Fingerlings

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**Abstract**

Because of great adaptability of black seeds in diet, it is being investigated as a prospective option for commercial aquaculture feed in Asia. To check the effects of black seed meal (BSM) on common carp (*Cyprinus carpio*) fingerlings, a study trial was performed to investigate the effects of replacing the diet of *C. carpio* from soybean meal (SBM) to BSM on growth, nutritional digestibility and haematological profile. Five isonitrogenous and isocaloric meals (BSM-0%, BSM-25%, BSM-50%, BSM-75% and BSM-100%) were used in the experiment, each of which contained varying amounts of BSM in place of SBM (0%, 25%, 50%, 75% and 100%, respectively). Fingerlings were divided into three groups and fed for 70 days with BSM based diets at 4% of their body weight. The group fed diet BSM-50% acquired highest rank with respect to growth rate (final weight 25.67g, weight gain 18.52g and SGR 1.42%), hematological parameters (RBCs  $2.83 \times 10^6 \text{mm}^{-3}$ , PLT  $68.31 \times 10^6 \text{mm}^{-3}$  and Hb 8.12g/100ml) and nutrient digestibility (crude protein 70.24, crude fat 74.54), while the gross energy (74.46) was seen higher in fingerlings fed the BSM-25% diet. This study confirmed that the utilization of 50% BSM in fish diet in replacement to SBM had beneficial impact on performance of common carp fingerlings.

Key words: Common carp (*C. carpio*), Black seed meal (BSM), Soybean meal (SBM), Growth rate, Nutrient digestibility, Blood profile.

**O-49/ICAZ-2023**

**Utilization of Soybean-Blood Meal Mixture for Improvement in Performance of Rohu (*Labeo rohita*) Fingerlings**

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**Abstract**

Fish meal provides the high-quality protein that fish need in their diet. Its limited availability and competition for usage in fish feeds have increased. This study aims to investigate the effects of substitution on growth performance, nutrient digestibility, hematological indices, carcass composition and mineral absorption of *L. rohita*. Fifteen fingerlings with average body weight were kept in each tank and fed at 4% of their wet body weight. Different levels of soybean and blood meal mixture (0%, 20%, 40%, 60%, 80% and 100%). Diet III, containing 40% replacement of FM, exhibited the highest recorded values for weight gain (23g), weight gain% (380%), SGR (1.74), FCR (1.55), RBCs (2.88), Hb (8.33) and Ht (31.54) and PLT (64.34) by 60% substitution of fish meal. Similarly, carcass composition, greatest levels of CP (19), EE (8.18) and GE (2.18) and highest absorption of minerals (Ca, Na, K, P, Cu, Zn, Mg, Fe and Mn) were noticed in fish fed with 40% replacement of FM. It was concluded that 40% replacement of soybean meal and blood meal mixture with fish meal resulted in improved overall performance. This study found that substituting fish meal by soybean-blood meal produced high-quality *L. rohita*.

**Keywords:** Soybean-blood meal, Growth performance, Nutrient digestibility, Hematology, Carcass composition and Minerals absorption, *Labeo rohita*.





**O-50/ICAZ-2023**

**Adequacy of Succedaneous Barley Meal on Carcass Composition, Immunity and Minerals Absorption in Common Carp (*Cyprinus carpio*) Fingerlings**

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**Abstract**

The global exponential growth in the human population has resulted in a decline in food availability. Feed accounts for 60 % of total expenditure in aquaculture. This study was designed to examine the optimal inclusion level of barley meal (BM), competitive plant proteins, as a fishmeal replacer in the formulation of diets, to evaluate its effects on the carcass composition, immunity, and mineral absorption in common carp. Six experimental diets using BM as an alternative protein source containing different graded levels of BM (0%, 10%, 20%, 30%, 40%, and 50%) were prepared. Three replicates were used for each treatment having fifteen fingerlings per tank. Fingerlings were fed at the rate of 4% wet weight twice a day for 70 days. The results revealed that *C. carpio* fingerlings given 20% BM, as a protein source (BM-III) had the most improved carcass composition (crude protein; 17%, crude fat; 8%, gross energy; 3kcal/g, ash; 6% and crude fiber; 2%), immunological indices (WBCs;  $7.48 \times 10^3 \text{mm}^{-3}$ ) and minerals absorption (Ca; 72.47%, Na; 67%, K; 71% and P; 73%). Results indicated that 20% replacement level of BM with the fish meal is best suited to improve carcass composition, immunity, and mineral absorption and for the production of eco-friendly feed.

**Keywords:** BM, partial replacement, carcass composition, immunity, mineral absorption, *C. carpio*.

**O-51/ICAZ-2023**

**Study of *Nigella sativa* seed meal on Improvement of Mineral Absorption and Body Composition in *Cyprinus carpio* fingerlings.**

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**Abstract**

Fish require high protein content in their diet for optimal growth, typically sourced from fish meal. However, its scarcity is high due to higher usage in livestock feeds, driving up prices and restricting its availability for fish nutrition. *Nigella sativa* (Black seed) is a medicinal plant that has been advocated due to its efficacy, availability, and affordability and can be used in aquaculture to promote fish health and resistant to infections. The current experiment was conducted to find the effects of black seed meal-based diet (BSM) on the mineral absorption, immunological status, and proximate composition of *C. carpio* fingerlings. Five experimental diets (0%, 25%, 50%, 75%, and 100%) were formulated by using BSM based diet. For the experiment, triplicate tanks were used with stock of 15 fingerlings of average body weight (7.12 g) and were fed at 4% of their live wet body weight for 10 weeks. Results showed significant improvement in immunological status, mineral absorption, and proximate composition of common carp fingerlings fed with lower levels of BSM. The highest carcass composition (Crude protein 19%, Fat 8%, Gross Energy 2.3 kcal/g, and carbohydrates 3.32%), best immunological indices (WBCs:  $5.8 \times 10^3 \text{mm}^{-3}$ , lymphocytes: 20.59%, and Eosinophile: 2.05%) and maximum mineral absorption particularly Ca (71%), Na (72%), P (71%), and K (67%) in *C. carpio* fingerlings were found in test diet III having 50% BSM based diet. Based on these results it was concluded that 50% replacement of black seed meal with fishmeal was very helpful for maximum body performance and composition of *C. carpio* fingerlings in contrast to the control and other test diets.

**Keywords:** Black Seed Meal, Common Carp, Carcass Composition, Immunological Indices.



**O-52/ICAZ-2023**

**Partial Replacement of Fish Meal with Locally Available Black Seeds (*Nigella sativa*) Meal for Rohu (*Labeo rohita*) Fingerlings**

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**Abstract**

Over a period of 90 days, the effect of a black seed meal (BSM)-based diet was assessed on overall performance *Labeo rohita* fingerlings. BSM was used to make six experimental diets having 0, 10, 20, 30, 40 & 50% and their pellets were formed. Fish were fed two times within 24-hours period, at 4% of their body weight and sample of feces were collected and preserved. The research findings demonstrated that by adding BSM to the fish diet enabled rohu fingerlings to improve significantly. Fingerlings given 20% of BSM, showed the highest growth parameters (WG%: 241%, FCR: 1.31 and SGR: 1.36), nutritional digestibility (GE, 69.51kcal/g; CP, 73%; CF, 72%), hematological parameters (Ht:35%, RBC:2.72×10<sup>6</sup>mm<sup>-3</sup>, and Hb:8.10g/100ml) and mineral absorption (Ca: 71%, K: 75%, Na: 73%, P: 73%) were noted. This improved fingerlings growth and performance by lowering water discharge, which in turn reduced water pollution.

**Keywords:** *Nigella sativa*, *Labeo rohita*, Growth performance, Hematology, Mineral absorption, Nutrient Digestibility, Crude protein, black seed meal, Fish meal, Experimental diet.

**O-53/ICAZ-2023**

**Role of Sesame Meal for Improvement of Overall Performance in Common Carp (*Cyprinus carpio*) Fingerlings**

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**Abstract**

With an ever-increasing demand for fishmeal (FM) in fish feeds, the supply chain is barely coping in keeping up with the needs. To reduce the burden and to make the feed cost effective there is a new emerging trend of partial replacement of FM with locally sourced ingredients. Current study was done to find the impact of partial replacement of FM with sesame meal (SM) on the growth performance, nutrient digestibility, and hematological indices of common carp (*Cyprinus carpio*) fingerlings. By partially replacing at inclusion levels (0%, 10%, 20%, 30%, 40%, and 50%) of FM with SM six diets were prepared. Each group of average weight (8g) was divided into three replicates and were fed their respective feeds two times a day. Current results showed maximum improvement in growth parameters (weight gain %; 265, weight gain; 21g, SGR; 1.44 and FCR; 1.25), the blood indices (RBC; 2.93 ×10<sup>6</sup>mm<sup>-3</sup>, PLT; 65.7, Hb; 8.16, Ht; 35.58%) and the nutrient digestibility (CP;77%, CF; 72%, GE; 70 kcal/g) at 20% replacement of FM making a cost effective and environment friendly feed.

**Keywords:** Hematology, FM, growth parameters, Protein Digestibility, Crude Fat, sesame meal, common carp.



O-54/ICAZ-2023

**Replacement of Fish Meal with Blood and Soybean Meal Mixture for the overall Performance of Common Carp Fingerlings**

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**Abstract**

Fish need high-quality protein in their diet for normal growth that was sourced from fish meal but it is becoming scarce because its use in livestock feeds is coupled with increase in its prices which limits its use in fish feed. In current the study, diet was prepared by using graded levels of soybean and blood meal mixture to revamp the growth performance, nutritional digestibility, carcass composition, absorption of minerals, and hematological indices of common carp (*Cyprinus carpio*). Fifteen fingerlings with average body weight were kept in each tank and fed at 4% of their wet body weight. Different levels of soybean and blood meal mixture (0%, 20%, 40%, 60%, 80%, and 100%) were included in the diets of the treatment groups (T1-T6). Maximum weight gain (gram), WG (percentage), SGR, FI and survival (%) values were observed in fingerlings fed with test feed III having 40% substitution of FM. In terms of carcass composition, the highest values of CP, EE and GE were noticed in fish fed with 40% replacement of FM. Results of hematology parameters showed maximum levels of RBCs, Hb, PLT, and Ht were found in fingerlings fed at 60% substitution of fish meal. The highest absorption of minerals (K, Na, Fe, Ca, Cu, P, Mg and Mn) was found in fish fed at 40% replacement of fish meal. The means of differences between treatments were considered significant when  $P < 0.05$ . It was concluded that 40% replacement of soybean meal and blood meal mixture with fish meal resulted in increasing growth, hematological parameters, carcass composition, and nutrient digestibility. Based on current research, soybean and blood meal mixture can be used to substitute fish meal to prepare economical and environment-friendly fish feed for *C. carpio*.

Keywords: Soybean and Blood Meal, Nutrient Digestibility, Growth Performance, Hematology, common carp (*Cyprinus carpio*), Carcass Composition

O-55/ICAZ-2023

**Effect of Lysine Supplemented Peanut Meal Based Diet on the Growth Performance of Common Carp (*Cyprinus carpio*) Fingerlings**

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**Abstract**

The use of plant-based proteins as an alternative to fishmeal is becoming increasingly popular in the aquaculture industry. However, the deficiency of essential amino acids such as lysine in plant proteins can negatively affect fish growth and health. Six diets with varying lysine levels (0%, 1%, 2%, 3%, 4%, and 5% mg/kg) were created, and each experimental diet included 1% chromic oxide ( $\text{Cr}_2\text{O}_3$ ) as a non-digestible marker. For 70 days, each diet was assigned at random to three groups of fifteen fingerlings, and feces samples were collected for analysis. The results showed that fingerlings fed a 3% lysine supplemented peanut meal-based diet exhibited the highest growth indices, such as weight gain (20g), weight gain% (317%), FCR (1.22), SGR (1.59), nutritional digestibility (crude protein; 74.19%, crude fat; 70.39%, and gross energy; 72.79 kcal/g.) and hematological parameters showed the best results at 2% lysine addition (RBC;  $2.98 \times 10^6 \text{mm}^{-3}$ , Hb; 7.99 g/100ml, PLT; 65.57, Ht; 32.43%). Further increases in lysine levels reduced the fish's growth performance and death rate. Therefore, adding 3% lysine to peanut meal-based diets enhances fish growth, nutrient utilization, and hematological parameters. This study demonstrates that lysine supplementation can improve the nutritional value of peanut meal-based diets for *Cyprinus carpio* fingerlings and has



significant implications for the aquaculture industry.

**Keywords:** Aquaculture industry, *Cyprinus carpio*, Growth performance, Hematological parameters, Lysine, Peanut meal

O-56/ICAZ-2023

**Role of Lens culinaris Seed Meal based Diet on performance of Common Carp (*Cyprinus carpio*) Fingerlings.**

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**Abstract**

The present research work was conducted to evaluate the effect of LSM based diet on body composition, mineral absorption and immunological indices in *Cyprinus carpio* fingerlings. Protein is a crucial dietary component for fish growth. Fish meal (FM) is the principal protein source in fish feeds, but higher increase in its prices, limits its use in fish feed. Therefore, plant protein sources are being considered as an alternative sources of protein. LSM can provide a substantial portion of the protein needed for the fish. Six test diets (0%, 10%, 20%, 30%, 40% and 50%) were prepared using LSM based diet. For the experiment, triplicate tanks were used with stock of 18 fingerlings of average body weight (7.14g) and were fed at 4% of their live wet body weight for 10 weeks. The results showed that the highest values of carcass composition (Crude protein; 20% and Fat; 9%) at 20% and best immunological indices (WBCs;  $6.59 \times 10^3 \text{mm}^{-3}$  and monocytes; 1.77%) were noticed in fish fed on diet 4 with 30% LSM. The highest absorption of minerals was also found in fish fed at 20% and 30% replacement of fish meal. Results of the present study showed that 20%-30% of dietary fish meal can be replaced by LSM in diets of common carp for better growth without any adverse effects on body composition and immunological status due to its economically sustainability and environment friendly status for fish in aquatic environment.

**Keywords:** Lentil Seed Meal, Carcass Composition, Immunological status, Mineral Absorption.

O-57/ICAZ-2023

**Evaluation of the toxicity induced by waterborne copper oxide nanoparticles (CuO-NPs) in Silver carp**

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**Abstract**

Metal oxide nanoparticles are widely used in various industries, but there are concerns about their impact on the environment. This study aimed to evaluate the effects of CuO-NPs on fish following acute and chronic exposure. Ecotoxicological data demonstrates that CuO-NPs have detrimental effects on aquatic life and human health. The coprecipitation method was employed to prepare the CuO-NPs, and their size of 72 nm was confirmed by the X-ray diffraction technique. Blood samples were collected for hematological assays, and the gills, liver, and muscles were dissected from Silver carp exposed to sublethal concentrations of CuO-NPs. The duration of exposure was acute (48 hours at 10mg/L) and chronic (35 days at 1mg/L). The study found that red blood cell (RBC), hemoglobin (HB), and mean corpuscular hemoglobin concentration (MCHC) levels were significantly lower than the control group during both exposures. On the other hand, the levels of white blood cells (WBCs), mean corpuscular hemoglobin (MCH), and mean corpuscular volume (MCV) increased significantly during both exposures. After both exposures, the activity of superoxide dismutase and catalase recorded significant changes. The enzymes responded differently depending on the exposure dose and duration. This research work emphasizes that hematological parameters and enzyme systems are sensitive to metal oxide nanoparticles as their levels fluctuate significantly. Therefore, they could be helpful in determining sublethal metal toxicity.

**Keywords:** copper oxide nanoparticles, hematology, oxidative stress, catalase, superoxide dismutase



O-58/ICAZ-2023

**Extraction of Bioactive Compounds from Hemp Seeds Using Recent Extraction Methods**

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**Abstract**

This literature is designed to measure the bioactive compounds in the hemp seeds by using recent extraction techniques. The hemp seed belongs to the *Cannabaceae* family, and is botanically called *Cannabis sativa*. The hemp seeds are nutritionally composed of essential amino acids, unsaturated fatty acids, vitamins, minerals and fiber. Moreover, it is also a good source of bioactive compounds such as tocopherols, carotenoids, polyphenols, anti-oxidant, hydroxycinnamoyl amides, lignanamides, flavonol glycosides, cannabidiolic acid, cyclitols, albumin, edestin, lysine, leucine, tryptophan, flavonols, flavones, flavonoid glycosides, cannflavins A and B, spiroindan, tetrahydrocannabinol, caryophyllene, myrcene, cycloartenol, beta-amyrin, and dammaradienol. Furthermore, different extraction methods are used to extract the bioactive compounds from hemp seeds including conventional and recent technologies. Moreover, the recent technologies are used to extract bioactive compounds including ultrasound assisted extraction, microwave assisted extraction and enzyme extraction. The hemp seeds are used for the prevention of many diseases such as obesity, hypertension, hyperlipidemia, diabetes, inflammation and cardiovascular diseases.

Keywords: Hemp seed, extraction technique, nutrition, bioactive compounds, diseases

O-59/ICAZ-2023

**Toxic Synergistic Effects of Lambda-Cyhalothrin and Methylcobalamin (Vit B12) on Chicken Embryo Development**

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**Abstract**

The study's objective was to assess Lambda-Cyhalothrin (LCH) and Methylcobalamin (Vitamin B12) impacts on chick embryo development. 250 fertilized eggs from *Gallus Domesticus* were divided into five groups: i) Control group, with no dosage administration. ii) Vehicle Control group (VC,) receiving a 0.1 mL 5% DMSO solution in corn oil. iii) Lambda-Cyhalothrin group (LCH), getting a 0.1 mL 5% DMSO + 0.01 mg/kg lambda-cyhalothrin. iv) Vitamin B12 group (B12) receiving 0.1 mL 0.1 mg/kg vitamin B12 solution. v) Lambda-Cyhalothrin + Vitamin B12 group (LCH+B12) receiving 0.1 mL 5% DMSO + 0.01 mg/kg lambda-cyhalothrin + 0.1 mL 0.1 mg/kg vitamin B12 solution. Treatments were administered on day zero, and embryonic development was assessed on the 14th day. The results revealed toxic effects, including embryonic cataracts, skewed neck, muscular dystrophy, and embryo death in the LCH group as compared to the control and VC groups. However, the LCH+B12 group exhibited synergistic embryonic toxicity, with some embryos exhibiting significant teratogenic signs including, while the majority experienced halted development with a foul odor, sulfur contents, and blackish discoloration. Statistical analysis also revealed significantly decreased values ( $p \leq 0.05$ ) in LCH and LCH+B12 groups as compared to Control and VC groups. These findings indicate that the combination of Vitamin B12 and LCH resulted in more adverse effects compared to the VC, LCH, and B12 groups individually. Keywords: *Gallus domesticus*, Lambda-Cyhalothrin, Vitamin B12, Teratogenic Effect

O-60/ICAZ-2023

**Use of Nanoparticles and Entomopathogenic Fungi for the Sustainable Management of Oriental Fruit Fly, *Bactrocera dorsalis* (Diptera: Tephritidae)**

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**Abstract**

Entomopathogenic fungi play important role in pest management, as evidenced by their effectiveness against various fruit flies. To achieve sustainable management of *Bactrocera dorsalis*, the study was conducted to evaluate the effect of entomopathogenic fungi with combination of nanoparticles, specifically Silver (Ag) and Zinc Oxide (ZnO). In this study, different concentrations of each EPF strain were applied along with Nanoparticles with different



concentrations. The findings revealed that at a concentration of  $1 \times 10^8$  cfu/ml, the highest percentage of mortality in *B. dorsalis* was observed with *B. bassiana* (90.47%), *M. anisopliae* (85.71%), and *Aspergillus spp.* (66.79%). Similarly, the percentage mortality due to Ag and ZnO nanoparticles was 95.56% and 86.74%, respectively. In terms of the combined effect of EPF and NPs, the highest mortality rates ranged from 97.77% (AgBB), 93.57% (AGMA), 82.22% (AGAF), 83.77% (ZnOBB), 80.89% (ZnOMA), and 70.98% (ZnOAF). These results lead to the conclusion that utilizing entomopathogenic fungi and nanoparticles for the control of *B. dorsalis* is a very effective for the sustainable management and a viable alternative to chemical insecticides.

## O-61/ICAZ-2023

**Fireflies of Pakistan: Their Ecological Significance and Conservation Implications**

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**Abstract**

Fireflies, members of the Lampyridae family, are enchanting insects known for their bioluminescent displays. In the context of Pakistan, these mesmerizing creatures hold both ecological significance and conservation implications. This abstract delves into the multifaceted world of fireflies, shedding light on their ecological roles and the urgent need for their conservation. Pakistan boasts a diverse range of firefly species distributed across its varied ecosystems, from lush forests to agricultural landscapes. Their bioluminescent flashes serve not only as captivating displays but also play pivotal roles in ecosystem functioning. Fireflies contribute to pollination, acting as vital agents in the reproduction of numerous plant species. Furthermore, their larvae are voracious predators of various insect pests, making them valuable biological controllers in agriculture. However, despite their ecological importance, firefly populations in Pakistan face threats due to habitat degradation, light pollution, pesticide use, and climate change. These challenges necessitate urgent conservation efforts to ensure the persistence of these unique insects and the services they provide. Conservation implications revolve around the protection and restoration of firefly habitats, minimizing light pollution, and adopting sustainable agricultural practices. Educating communities about the ecological importance of fireflies and their role in pest management can engender local support for their conservation. In conclusion, the fireflies of Pakistan exemplify the intricate interplay between biodiversity and ecosystem services. Recognizing their ecological significance and implementing conservation measures is not only essential for preserving these charismatic insects but also for maintaining the health and resilience of Pakistan's ecosystems. This abstract underscores the urgent need for research, awareness, and conservation initiatives to secure the future of fireflies in Pakistan's biodiversity-rich landscapes.

**Keywords:** Fireflies, Pakistan, Ecological significance, Conservation, Biodiversity

## O-62/ICAZ-2023

**Conventional And Molecular Methods for Determination of Antibiotic Residues in Dairy Cow Milk**

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**Abstract:**

Healthy productive population along with adequate nutrition are increasingly recognized as an important prerequisite for social development. Pakistan is endowed with diverse livestock genetic resources including cow as major dairy animal. Dairy sector is facing great challenge of infectious disease, among them the mastitis is primarily important. *Staphylococcus aureus* (*S.aureus*) is a contagious pathogen bacterium that is involved in the onset of bovine mastitis. It has a zoonotic implication in term of causing infection in both human and animals. The emergence of most commonly used antibiotic resistant strains of *S.aureus* is a great challenge for pharmaceutical sector, as it contribute significantly in the economic losses particularly in dairy sector due to cost of treatment. Antibiotics residues are not affected even by the thermal treatment of the milk. The current study was conducted to determine the prevalence of detection of antibiotic residues using microbial biosensor, antimicrobial susceptibility profiling and detection of



genetic determinants against tetracycline antibiotic. In the present study total of 200 cow milk samples were screened for the detection of antibiotic resistance determinants in *S. aureus*. Data analysis showed that most of the recovered *S. aureus* strains were sensitive to the tetracycline and all four genetic determinants (*tetK*, *tetL*, *tetP*, and *otrB*) are present in local isolates of tetracycline resistant *S. aureus*. These are commonly used antibiotics and these findings have prompting concern with rational use of these therapeutics.

**Key words:** Milk, Cow, Antibiotics, Isolates

#### O-63/ICAZ-2023

##### Cyto-Genotoxic Evaluation of Sub-Chronic Exposure of BPA on Bovine Lymphocytes

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##### Abstract

Bisphenol-A (BPA) is a predominately used chemical to manufacture polycarbonate plastic goods and as an epoxy resin to form protective linings. BPA can act as an environmental endocrine disruptor and can pass through the body of animals from different sources. The environmental factors include leakage from plastic tanks, water tubs, animal feed containers, pipes, soil and photodegradation. The normal body function of bovine animals can get influenced by the toxic effect of BPA. Studies show it can be lethal even in minimal amounts and can get highly toxic over time, resulting in mimicking and disturbing bodies' normal hormonal functions. This study was designed to determine the invitro sub-chronic cytotoxic and genotoxic effects of bisphenol-A on bovine lymphocytes. Blood samples were collected from the animal shed of department of theriogenology, university of veterinary and animal sciences (UVAS), Lahore. Lymphocytes were extracted by using Histopaque technique by following standard protocol. In-vitro nutritional requirements for the growth of cells were maintained by utilizing RPMI-1640 media. Cultured lymphocytes were exposed to six concentrations of BPA (10µg/ml, 20µg/ml, 30µg/ml, 50µg/ml, 70µg/ml, 100µg/ml) to evaluate the cytotoxic and genotoxic effect on bovine lymphocytes. Treated cells were incubated for 24h, 48h, and 72h. Cells were kept at 37°C temperature with 5% CO<sub>2</sub>. Here cells were exposed in a concentration and time-dependent way to achieve the results in a sub-chronic manner. Cytotoxic effects related with BPA were assessed by applying MTT assay to treated cells of each hour. Genotoxic effects were evaluated by performing comet assay and micronucleus assay. The results obtained from MTT assay revealed that BPA can increase the production of oxidative species which decreases the viability of cells. The number of cells were slightly decreased after 24h, but an increased level of reduced cell viability was found after 72h. The production of DNA lesions and micronuclei were least noted after 24h. The highest level of DNA damage and micronuclei formation was observed after 72h of exposure. Negligible results were found in 48h of exposure in all three assays. Significant results were found in cells exposed for 72h. Our study concluded that BPA could induce cytotoxic and genotoxic effects in a concentration and time-dependent manner. Even low concentrations of BPA if exposed continuously can end up damaging the DNA integrity.

**Keywords:** DNA damage, oxidative stress, endocrine disruptors

#### O-64/ICAZ-2023

##### Prevalence, Antimicrobial Profiling and Molecular Characterization of Antimicrobial Resistant Genes of Pathogenic Bacteria Detected in *Sperata sarwari* (*S. seenghala*) of the Indus Riverine System in Pakistan

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##### Abstract

*Sperata sarwari* (*S. seenghala*) is a freshwater fish of riverine systems known for its economic and ecological importance that has recently been introduced into the farming system. The current study aimed to identify antibiotic resistance (ABR) genes in two selected bacteria and their prevalence in *S. seenghala* sampled from riverine system in Pakistan. Samples were collected from different organs of 480 fish samples of *S. seenghala*. Pure culture of selected bacteria was grown on TSA media plates. DNA was isolated using a GeneJET Kit and ABR genes were identified in the selected bacteria through PCR amplification. Phylogenetic relationship among selected bacteria was compared by phylogenetic tree of 16S rRNA gene. Antimicrobial susceptibility was tested against 14 antibiotic discs. A total of 135 (28%) including 29 (6.0%) *E. tarda* and 33 (6.9%) *E. coli* isolates, were retrieved. Phylogenetic tree analysis revealed 100% similarity between *E. coli* and *E. tarda*. Maximum 5.62% occurrence of *sul3* gene was recorded in *E. tarda*,



6.46% of qnrA, 5.42% of blaTEM in *E. tarda*, and 6.25% of tetA in *E. coli*. Finally it was concluded that introduction of wastewater from different industries into rivers causes emergence of ABR genes in pathogenic bacteria which can increase risk of infection and transfer ABR genes to other bacteria.

**Keywords:** Prevalence, Antimicrobial susceptibility, Trypticase soy agar (TSA), Mueller Hinton agar (MHA), Phylogenetic tree analysis, gyrB gene

**O-65/ICAZ-2023**

**Nutritional Management for Intestinal Health and Production Performance with Novel Amino Acid Mixture to Mitigate Heat Stress in Broilers**

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**Abstract**

Keeping in view the beneficial effects of various amino acid supplementations on the broiler's intestine, the current study was conducted to analyze the histological and molecular effects of different doses of dietary threonine supplementation on the heat-stressed broiler intestine. One-day-old broiler chicks (300) were grouped into 6 groups (n =50 birds/group). Group 1 was considered a thermoneutral group and fed only a basal diet. Groups 2 to 6 were exposed to cyclic heat stress of 35°C for 8 hours with 65±5% relative humidity and fed a basal diet supplemented with 100%, 125%, 150%, 175%, and 200% of NRC-recommended dietary Threonine (7.4g/kg). VH, VW, CD, and VSA were calculated and Heat Shock Protein 70 and Mucin-2 gene expressions were analyzed by real-time PCR. 175% and 200% THR-supplemented groups resulted in a significant increase in VW, VSA, CD, and GC count. Gene expression of HSP70 and MUC-2 was significantly downregulated and upregulated respectively. This study suggests that enhanced threonine supplementation might be successful in mitigating the harmful effects of heat stress on the poultry industry by improving the broiler's intestinal integrity and by increasing mucin production which maintains a mucosal barrier for the prevention of microbial and pathogenic invasions, hence improves production.

**Keywords:** Heat stress, threonine, villus height, villus width, crypt depth, goblet cells, HSP70, MUC-2, gene expression.

**O-66/ICAZ-2023**

**Optimization of  $\alpha$ -Amylase Production by *Bacillus Tropicus* Using Agro-Industrial by Products**

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**Abstract**

$\alpha$ -amylase is an industrially important enzyme that hydrolyzes starch to yield products including glucose and maltose. Use of agro-Industrial by-products for enzyme production helps to sustain the environment. Thirty amylase producing bacteria were isolated from soil, flour and compost samples using starch agar medium. Isolate S1 giving maximum zone of hydrolysis on starch agar medium was characterized by morphological, biochemical and molecular means. 16S rRNA analysis showed that isolate gave 98% similarity with *Bacillus tropicus*. Optimization of  $\alpha$ -amylase production by isolate *Bacillus tropicus* S1 was done using solid state fermentation (SSF). Different types of agro-industrial substrates (potato peel, wheat straw, rice husk, corn cob leaf, banana peel and wheat bran) were used for  $\alpha$ -amylase production but wheat bran gave highest  $\alpha$ -amylase activity (2.25 ±0.045 U/mg) when moisten with 10 ml diluent (M7) at pH 6.5, temperature 37°C with 7.5% vegetative inoculum after 72 h of incubation.





O-67/ICAZ-2023

### Ameliorative Effect of *Trachyspermum ammi* (Ajwain) Against Hepatotoxicity and Nephrotoxicity Induced by Graphene Oxide Nano-particles in Albino Rats

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#### Abstract

Nanoparticles are being used for diverse purposes, such as in the medical, cosmetics, textile, agriculture and electronic fields. Due to their adaptability, graphene and its variants are promising material for significant biomedical applications. Graphene and nanoparticles based on it have recently gained popularity in the industrial supermarket. *Trachyspermum ammi* seeds exhibit anti-platelet, anti-inflammatory, analgesic, anti-hypertensive, antibacterial, antifungal, antioxidant, insecticidal, diuretic, and anti-lithiasis properties. In the present study graphene oxide will be used to induce hepato and nephro toxicity and for which the ameliorative effect of *T. ammi* will be evaluated. The study will be divided into two phases 1<sup>st</sup> will be the toxicity phase and 2<sup>nd</sup> the ameliorative phase. Sixty-five rats will be purchased for this reason and kept in the animal house of Government College University Faisalabad. Fifteen rats will be used for finding LC50 of Graphite nano-particles. After the confirmation of sub-lethal doses, this will be applied to the toxicity phase. In 1<sup>st</sup> phase rats will be divided into five groups 1<sup>st</sup> (control), 2<sup>nd</sup> (Normal saline-treated), T1 (low dose mg/kg), T2 (medium dose mg/kg), and T3 (high dose mg/kg) similarly in 2<sup>nd</sup> phase (ameliorative phase) rats will randomly be divided to 5 groups 1<sup>st</sup> (C), 2<sup>nd</sup> (NS), A1 (Low treatment), A2 (medium treatment) and A3 (high treatment) of Ajwain extracts. Animal mortality, kidney, and liver histology will be assessed in the beginning and at the end of 1<sup>st</sup> phase (toxicity phase) while ameliorative effects of ajwain will be assessed in 2<sup>nd</sup> phase. The data will be statistically analyzed by Minitab 17 (One-way ANOVA). This research will be helpful to define the limits of graphite and to find the protective effects of *Trachyspermum Ammi* (Ajwain).

**Keywords:** toxicity, nanoparticles, albino rats, ameliorative effect.

O-68/ICAZ-2023

### Comparative Study on Mucus Microbiota of Major Carps *Labeo rohita*, *Catla catla* and *Cirrhinus mrigala*

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#### Abstract

The consequences of aquaculture are going to expand, especially for fresh water. This trend is expected to continue with the role of fish food supply. The quality of water is very important not only for fish health but also for their density. The outermost surface of the skin is coated with mucus, which is believed to be colonized by a diverse bacterial community. The fish are constantly exposed to these microorganisms present in soil, water waste, and manure. The present study detected and analyzed the mucus micro-biota of three major carps. The project determined the bacterial composition and growth on the skin mucus of three major carps. Fish and water samples were collected from earthen ponds in sterilized polythene bags and bottles, respectively. Collected samples were cleaned with distilled water and then transferred to an ice box. These samples were put in the refrigerator at 4 °C, wrapped in aluminum foil. The skin mucous of three major carps, rohu (*Labeo rohita*), catla (*Catla catla*) and mrigala (*Cirrhinus mrigala*) were extracted and further analyzed for bacterial identification. On petri plates, bacterial colonies were grown by culturing them on Nutrient agar (NA). The majority of bacteria detected in the skin-mucosal surfaces belong to the phylum Proteobacteria. The total viable counts in the bacterial community were counted and bacteria were identified by the Gram staining technique. The maximum colonies from *Labeo rohita*, *Catla catla* and *Cirrhinus mrigala* samples were  $297 \times 10^6$  CFU,  $295 \times 10^6$  CFU and  $297 \times 10^6$  CFU respectively. Physio-chemical parameters were determined. Tukey's test was used to assess the bacterial community viable count and physico-chemical characteristics.

**Keywords:** Comparative study, mucus microbiota, *Labeo rohita*, *Catla catla*, *Cirrhinus mrigala*



## O-69/ICAZ-2023

**Antibacterial Activity of Aqueous and Methanolic Extract of *Mentha piperita* Against Pervasive Bacteria Isolated from Urinal the *Ovis Vignei***

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**Abstract**

Medicinal plant extracts have great potential against infectious agents and can be used for therapeutic purposes. The stem and leaf extract of peppermint (*Mentha piperita*) possess antibacterial activities. The extract of peppermint stem and leaf was prepared in 70% methanol to check the antibacterial activity against three gram-negative bacteria *Escherichia coli* (*E. coli*), *Salmonella typhi* (*S. typhi*) and *Pseudomonas aeruginosa* (*P. aeruginosa*) and one gram-positive bacteria *Staphylococcus aureus* (*S. aureus*). The samples of fresh fecal matter and skin swab were collected from wild sheep from the Wildlife Park Gatwala, Faisalabad. The polythene bags containing the samples with all required information were brought to the laboratory, Department of Zoology Government College University, Faisalabad. The antibacterial activity of the extracts was checked by Agar well diffusion method. Peppermint stem and leaf extracts showed good antibacterial activity against all above bacteria by Soxhlet apparatus method as compared to Conventional method. *S. aureus* showed greater inhibition zones (17mm, 16mm, 18mm) that's mean extract was more effective against this bacterium. *P. aeruginosa* and *E. coli* show inhibition zones average about 16mm and 14mm. MIC for peppermint (stem and leaf) was 0.4mg/ml against all tested bacterial strains. Keywords: Wild sheep, Peppermint, Bacteria, Soxhlet method, Conventional method

## O-70/ICAZ-2023

**Use Of Different Cost Effective Animal By-Products As Replacement Of Fishmeal In The Diets Of *Catla catla* And Their Effects On Growth Performance, Hematological Parameters, Digestibility Of Nutrients And Whole Body Composition**

Syed Makhdoom Hussain, Fatima khurram, Zeeshan Yousuf, Muhammad Amjad

Department of Zoology, Government College University, Faisalabad

**Abstract**

The enhancement of growth performance, blood parameters, body composition, nutrients digestibility and antioxidant activity is indication of successful fish production and different substitutes have been used for this purpose. This study examined the impact of substituting fishmeal (FM) with various animal by-products (ABPs) on these parameters of *Catla catla*. Consequently, 70 days experimental trial was conducted using six different diets i.e. FM as control diet (Test-I) and other five diets consisted of different animal protein sources as major ingredients. Poultry by-product meal (PBM), insect meal (IM), meat and bone meal (MBM), blood meal (BM) and feather meal (FeM) were added in diet-II, diet-III, diet-IV, diet-V and diet-VI respectively. The nutrient contents of all diets and experimental conditions were almost similar for each group. 15 fingerlings were placed in each triplicate. Recommended diets for each group were fed to fingerlings twice a day. The percent weight gain (WG%) and specific growth rate (SGR) in the fish fed with IM and PBM based diets were significantly higher than other groups ( $p < 0.05$ ). Compared to control group, the hematological parameters including red blood cells (RBCs), white blood cells (WBCs), Hemoglobin (Hb), and platelets count (PLT) were increased in IM, PBM and MBM. MBM showed almost similar ( $p > 0.05$ ) results as control. In terms of digestibility of nutrients, IM having balanced essential amino acids (AAs) showed the best digestibility of crude protein (CP:  $73.40 \pm 0.97$ ), crude fat (CF:  $68.75 \pm 1.14$ ) and gross energy (GE:  $71.24 \pm 1.04$ ) while other diets showed no discernible change ( $p > 0.05$ ). Fish fed with diet containing PBM also showed better results in comparison to control in terms of growth performance (WG: 12.89g and WG%: 200.2%) and nutrient digestibility. Fish fed with IM also showed the highest values of antioxidant activity ( $88.98 \pm 1.64$ ) which means that IM causes inhibition of oxidation in *C. catla* and prevented it from damage by free radicals. BM and FeM showed overall poor performance in term of all parameters. Overall, the results of this study concluded that dietary substitution of FM with IM and PBM can enhance different parameters in *C. catla* fingerlings.



**O-71/ICAZ-2023**

**Physiological and Biochemical Responses of Salt Stressed Wheat (*Triticum aestivum* L.) Plants to Exogenously Applied Nitric Oxide, Hydrogen Peroxide and Sodium Hydrosulfide**

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Government College University, Faisalabad

**Abstract**

A pot experiment was conducted in the Botanical Garden at Government College University; Faisalabad, Pakistan to assess the responses of two differentially salt-tolerant wheat genotypes (Galaxy-13 and FSD-2008) to exogenously applied sodium nitroprusside (NO), hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) as well as sodium hydrosulfide application as seed priming under saline stress. Seeds of two cultivars (Galaxy 13 and Fsd-2008) were soaked in NO (0.1 mM), H<sub>2</sub>O<sub>2</sub> (1 mM), and NaHS (1 mM) for 16 hours with two salt levels (0 and 150 mM). Salt stress markedly decreased the growth attributes, imbalance nutrient uptake, and yield reduction while enhancing the level of H<sub>2</sub>O<sub>2</sub>, malondialdehyde, accumulation of osmolytes and regulated antioxidative defense mechanism in both wheat cultivars. The seed priming with signaling molecules in both wheat genotypes enhanced the content of enzymatic as well as non-enzymatic antioxidants. Seed priming with signaling molecules caused a significant improvement in K<sup>+</sup>/Na<sup>+</sup> in both wheat genotypes but more improvement was in genotype Galaxy-13. In conclusion, SNP, NaHS and H<sub>2</sub>O<sub>2</sub> pre-sowing treatments induced salt tolerance with improved chlorophyll content, water relations, accumulation of osmolytes, antioxidative defense mechanism, and improved yield.

**O-72/ICAZ-2023**

**Physiochemical analysis and Prevalence of Salmonella and Shigella in Tehsil Chistian, District Bahawalnagar, Punjab, Pakistan**

Rabia Riaz, Syed Mohsin Bukhari, Touseef Riaz, Rubab Ali, Arshad Javid, Aleem Munawer, Waqas Ali  
University of Veterinary and Animal Science

**Abstract:**

Safe drinking water is one of the basic human rights and essential need for healthy life. In this study 35 water samples were collected in sterilized bottles from filtration plant in Tehsil Chistian Punjab, Pakistan. The water samples were immediately subjected to both physical chemical parameters (pH, temperature, total dissolved solid, electrical conductivity, biological oxygen demand, dissolved oxygen, odor, taste, total hardness and alkalinity) and for contamination of Salmonella and Shigella. The data of all the tested samples were indicated that pH examined from 7- 8.6, EC from 0.32-2.23 ms/cm, BOD from 1-3.4 mg/L TDS from 220-1510 ppm, DO from 5.02-7.9 mg/L, Cl from 1.00-2.80 mmol/L and T from 25-39°C. The results of these parameters were exceeded the permissible limits for drinking water set by WHO and PSQCA. High abundance of isolated bacteria such as Salmonella and Shigella were recorded in 19 water samples by Total viable count method while the mean value of total viable count was 3.413 cfu/uL. Water was unsafe for drinking purposes. Therefore, proper purification and treatment of domestic water sources should be ensured by water management committee.

**O-73/ICAZ-2023**

**Fish meal by Earthworm Meal and its Effects on Growth of *Catla catla* in Intensive Aquaculture**

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**Abstract**

Fish meal is supposed to be best animal protein source in fish and shrimp feed, therefore it is highly demandable in aquaculture industry. To replace inclusion of fish meal at various levels from earthworm meal in the feed of *Catla catla* and to examine influence of earthworm meal on growth, four experimental diets were formed from earthworm meal i.e., control (with 45% Fish meal), 25% EWM (25% earthworm meal), 35% EWM (35% earthworm meal), and 45% EWM (45% earthworm meal). *Catla catla* were observed for survival rate, weight gain, Specific



growth rate (SGR), daily feed conversion ratio (FCR) and daily feed allowance (DFA). 25% Earthworm meal was proved as optimum level for *Catla catla*, as 68.07g, followed by 35% EWM as 67.52g with a decrease in Food conversion ratio from 3.08 (control) to 2.87 and a increase in Specific growth rate, from 0.73 (control) to 0.87 %/Day. All three levels performed better than control (without EWM). At higher level of protein (control with 45% fish meal and EWM 45%), reduced rate of growth was evident in case of *Catla catla*. Based on this research trial, earthworm meal can easily be used in the diet of *Catla catla* with 100% substitution of fish meal along with some plant based proteins.

### O-74/ICAZ-2023

#### Exploring Biodiversity and Conservation in Tropical Rainforests

Javeria Hasiham

University of Mianwail

#### Abstract

In this research project, we delve into the rich and diverse ecosystems of tropical rainforests, focusing on biodiversity and conservation efforts. Our study takes us deep into these lush environments to uncover the incredible variety of flora and fauna that call these rainforests home. We explore the intricate web of life that thrives within these ecosystems, from the smallest insects to the largest mammals. Additionally, we investigate the challenges posed by deforestation, habitat destruction, and climate change to the delicate balance of these environments. Our work highlights the importance of conservation efforts in preserving these invaluable ecosystems, safeguarding countless species, and protecting the global environment

### O-75/ICAZ-2023

#### Dietary Turmeric Supplementation Improves Glycaemic Index and Curbs Inflammatory Markers in Adult Obese Male Hyperglycaemic Rats.

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#### Abstract

Diabetes mellitus is a metabolic disorder featuring a progressive decline in insulin levels causing persistent hyperglycemia. Persistent hyperglycemia impairs the hepatic ability to maintain plasma glucose homeostasis and leads to dyslipidemia ultimately causing obesity. Hyperglycemia-induced hepatic lipid formation mediates inflammation. Turmeric, scientifically known as *Curcuma Longa*, and its prominent curcuminoids are used as anti-inflammatory herbs in traditional medicine and as a food additive. In the current study, the possible anti-inflammatory role of turmeric in a streptozotocin pre-treated hyperglycaemic rat model was assessed. Streptozotocin causes beta-cell destruction and pancreatitis along with hyperglycemia. Adult obese albino Wister rats (n=24) weighing 400g  $\pm$  20 were selected and were divided into four equal groups (n=6): negative control (normal rats), positive control (pre-treated with ip inj of Streptozotocin @60mg/kg b.w), comparative control (pre-treated with ip inj of streptozotocin @60mg/kg b.w and followed by paracetamol supplementation @13mg/kg b.w), treatment group (pre-treated with ip inj of streptozotocin @60mg/kg b.w and supplemented with dry powdered turmeric mixed with CMD @3mg/kg b.w). Body weight and plasma glucose levels were monitored at regular intervals, and the animals were sacrificed after 21 days of supplementation. The blood and tissue samples were collected, plasma was separated, and tissue samples (pancreas and liver) were fixed in formalin. Blood and plasma were analyzed for CBC, insulin, ALT, AST, and CRP. Elevated blood glucose and a decline in serum insulin levels were observed in the positive control group. Turmeric supplementation induced a substantial enhancement of plasma insulin levels which prevented the rise in blood glucose levels. Turmeric supplementation also led to a reduction in WBC count and a significant decrement in the plasma CRP levels in the treatment group. Interestingly elevated levels of ALT and AST observed in the positive control group were substantially reduced in the treatment group. The reduced diameter of islets and an increase in hepatic sinusoidal space were observed in the hyperglycemic positive control group turmeric supplementation. In conclusion, turmeric supplementation exhibited promising effects on pancreatic and hepatic parameters, potentially improving glycaemic index and constraining inflammatory markers.



**O-76/ICAZ-2023**

**Metallic Zinc-Oxide Nanoparticles in the Diet of *Cirrhinus mrigala* Fingerlings: Effects on Growth, Nutrient Digestibility, Carcass Composition and Blood Indices**

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**Abstract**

Zinc-oxide (ZnO), a prevalent metal oxide, has recently been used as a feed supplement in the aquaculture industry due to its low toxicity and biocompatibility. In this study ZnO was used as a nano-form in *Cirrhinus mrigala* fingerlings to check the growth and nutrient digestibility responses, carcass and blood traits. A total of six iso-nitrogenous diets were prepared in a completely randomized design with graded levels of ZnO-NPs (0, 10, 20, 30, 40 and 50 mg/kg) in *Moringa oleifera* seed meal. 15 healthy fingerlings (N=270; 7.133±0.05 g) were kept in triplicate and fed two times a day for 70 days. The dietary exposure of ZnO-NPs resulted in following consequences. The significantly enhanced (p<0.05) growth parameters and nutrient digestibility responses were observed when fingerlings fed 30 mg/kg of ZnO-NPs. In case of carcass and blood traits, the optimum level was noted at 30 mg/kg of ZnO-NPs. In conclusion, the supplementation of various concentrations of ZnO-NPs showed markedly alleviated (p<0.05) effects on the overall health and physiology of *C. mrigala* fingerlings. Nevertheless, they produce the best possible outcomes up to a certain extent (30 mg/kg) without compromising the quality of the fish.

**O-77/ICAZ-2023**

**Effect of Biochar Supplementation In Silage Based Total Mixed Ration On The Production Performance Of Lactating Sahiwal Cows**

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University of Agriculture Faisalabad

**Abstract**

The aim of this study was to investigate the impact of biochar supplementation on dry matter intake, milk yield, milk composition, body weight and body condition scoring (BCS) of Sahiwal cows. For this purpose, a total of four Sahiwal cows in the third parity were selected. Animals were reared on a total mixed ration diet with 80:20 maize silage to concentrate ratio. Biochar was supplemented on a total mixed ration diet in 4 × 4 Latin square design. Experimental treatments were T0 (0%), T1 (0.5%), T2 (1%), and T3 (1.5%), of biochar supplementation, respectively. First 21 days of each treatment were considered as adaptation period and next 21 days were considered as data collection period. Dry matter intake and milk yield were measured on daily basis, while milk composition, body weight and body condition scoring were measured on the last day of each treatment. Digestibility of nutrients were measured on the last 3 days of each treatment. There was significant (P<0.05) impact of biochar supplementation on dry matter intake. T3 (1.5%) showed the most significant (P<0.05) effects on dry matter intake. Moreover, Milk production differed significantly between treatments and highest milk production was showed in T3 (10.9 kg). Milk production in T3 was 27.56% higher than T0. Biochar supplementation had a significant (P<0.05) effect on milk composition. T3 showed higher milk fat 4.68% and protein 4.05% percentages than T0. Moreover, the percentages of solid non-fat and total solids were significantly different and T3 showed (9.73%) and (14.97%), respectively higher than T0. Furthermore, biochar supplementation enhanced nutrient digestibility, T3 showed the highest percentages of dry matter (67%), crude protein (66.38%), crude fiber (70.15%), neutral detergent fiber (44.23%), acid detergent fiber (36.06%), and ash (56.42%). There were no significant (P>0.05) differences in body condition rating or body weight between treatments, with T3 maintaining constant values (3.43 and 327 kg, respectively). This study concluded that biochar has positive impacts on production performance of Sahiwal lactating cows. Nevertheless, further studies are needed to investigate the impacts of biochar on production performance and animal's health for more understanding of the reasons behind the positive impacts of biochar supplementations on lactating cow's performance. It is recommended to start using biochar supplementation in animals' diets with low quantities and monitor animal health and production performance.

Keywords: Biochar, Feed Intake, Milk Production, Sahiwal Cows.



**O-78/ICAZ-2023**

**Effect of Medicinal Plant *Tamarindus Indica* Extract Supplementation On Growth, Nutrient Digestibility, Body Composition And Haematological Indices Of *Cyprinus carpio* Fingerlings**

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**Abstract:**

Herbs and their derivatives can effectively boost fish growth and immunity as a cost-effective alternative to antibiotics. In the current study, an extract of the herbal plant *Tamarindus indica* was mixed with canola meal based diets to determine its effects on growth, nutrient digestibility, body composition and hematological indices of *Cyprinus carpio* fingerlings (initial weight: 6.64±0.02g). Total six isonitrogenous and isocaloric diets were formulated with varying concentrations of *T. indica* extract (TIE) viz 0%, 0.5%, 1%, 1.5%, 2% and 2.5% and fed to *C. carpio* for 70 days. The findings of study demonstrated that TIE supplementation significantly improved the growth, nutrient digestibility, body composition and hematological indices of *C. carpio* compared to control (0% TIE). However best results were seen at 1% TIE level. While 2.5% TIE level showed lowest results for all studied parameters. Hence, it is concluded that TIE supplementation improved the overall health of *C. carpio* fingerlings and 1% TIE supplementation level is recommended

**O-79/ICAZ-2023**

**Toxic Effect Of Microplastics Supplemented Sunflower Meal-Based Diet On The Growth Performance, Body Composition, Nutrient Digestibility And Hematology Of *Labeo rohita***

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**Abstract**

Microplastics (MPs) pollution has become a global environmental concern due to the difficulty of degrading them, and it may have unexpected ecological impacts. A 90-day experimental was carried out to assess the toxicity of non-biodegradable MPs supplemented sunflower meal-based (SFM) diet on growth performance, body composition and hematology of *Labeo rohita* fingerlings. Six different test diets were formulated for this research work as control group (0% MPs) and exposed group (0.5%, 1%, 1.5%, 2%, and 2.5% MPs) respectively. Fingerlings were divided into triplicates and fed 5% of their total live body weight. After the analysis, test diet-VI showed highest FCR and lowest SGR when fingerlings fed 2.5 % MPs. In terms of body composition, test diet-VI showed lowest CP and ash values and the highest moisture and fat values. The lowermost values of RBCs, PLT, PCV, Hb, and highest values of WBC, MCH, MCHC, MCV were observed when the fingerlings fed test diet-VI MPs and these were statistically significant (p<0.05) when compare to test diet-I. Growth, FCR and hematology data from test diets were subjected to one-way analysis of variance (ANOVA). This study found that non-biodegradable MPs reduced fish growth performance, whole body composition and hematology of *L. rohita* fingerlings.

**O-80/ICAZ-2023**

**Abstract Title (Impacts Of LDPE Micro-Plastics Supplemented Sunflower Meal Based Diet On Gut Histology, Body Composition And Nutrient Digestibility of *Cyprinus carpio*)**

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**Abstract**

Plastic pollution is ubiquitously distributed in all components of environment. In the fresh water ecosystems large size plastics converts into small size micro-plastics (MPs) as they confronts with harsh environmental conditions and pose danger to the aquatic fauna. The current research work was conducted to evaluate the negative effects of low density polyethylene micro-plastics (LDPE-MPs) supplemented diets on nutrient digestibility, body composition and gut histology of *Cyprinus carpio* (Common carp) under laboratory conditions. LDPE-MPs were incorporated in the



diet at the levels of 0%, 2%, 4%, 6%, 8% and 10%. Total 270 fingerlings were distributed in to 6 triplicate tanks, each tank held 15 fingerlings. Fingerlings were fed at the rate of 5% of their biomass twice a day. Data of nutrient digestibility, and body composition were subjected to one-way analysis of variance (ANOVA) while to indorse the histological lesions, grading method was employed. The best values for the nutrient digestibility, body composition and gut histology were observed in the fish fed on control diet, having 0% MPs. The nutrient digestibility and body composition of fish were badly impacted by MPs. The amount of protein and ash content reduces while the moisture and fat content rises significantly as compare to control group. The high number of histological lesions i.e. necrosis, vacuolization, hemorrhage, edema and damaged villi were observed in gut of fish while the fish that were expose to diet comprises 0% MPs showed normal histological structures.

**Keywords:** *O. niloticus*, LDPE-MPs, gut histology, carcass

### O-81/ICAZ-2023

#### **Recuperative Effects of Herbal Feed Supplement In Hypohthalmichtys Molitrix: Improves Growth, Hematology, Carcass Composition, Antioxidant Activity And Liver Histopathology Against Waterborne-Induced Heavy Metals**

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Muhammad Asrar Chaudhary

Department of Zoology, Government College University Faisalabad

#### **Abstract**

Heavy metal (HM) toxicity threatens both aquatic life and the environment. Therefore, this research assessed the recuperative effects of dietary turmeric (TU) (*Curcuma longa*) and ginger (GN) (*Zingiber officinale*) on growth performance, hematology, carcass composition, hepatic antioxidant indices and histopathological profile of silver carp (*Hypohthalmichtys molitrix*) fingerlings that were exposed to mixture of heavy metals (HM) (chromium (Cr), cadmium (cd), Zinc (Zn) and lead (Pb)). A total of 250 fish ( $7.16 \pm 0.01$ g) were randomly assigned to seven groups in triplicates. Fish in negative control group were fed with basal diet (canola meal; without HM treatment), positive control group fed with basal diet (canola meal+HM mixture), T-1 group (TU), T-2 group (GN), T-3 group (TU+HM treatment), T-4 group (GN+HM treatment), T-5 group (combination of TU & GN+ HM mixture) at 1% inclusion level. Waterborne HM mixture negatively affected the growth performance, crude protein (CP), white blood cells (WBCs) and red blood cells (WBCs), hemoglobin (Hb), hematocrit (Ht), superoxide dismutase (SOD), glutathione peroxidase (GPX) and catalase (CAT) level. On the other hand, fish groups fed with alone TU and GN supplemented diet showed significant increase in growth, hematology, CP level, antioxidant enzyme level of *H. molitrix*. Also GN, TU and their mixture supplementation along with HM exposure recuperates the above mentioned parameters. Moreover, degeneration of hepatocytes, necrosis, central vein damage was observed in HM-exposed fish and improved in T3, T4 and T5 groups. Overall, the results of this research demonstrated that feeding canola meal to *H. molitrix* with supplementation of 1% GN, TU and their combination recuperates the HM-induced negative impacts in terms of growth performance, carcass composition, antioxidant activity, hematology and histopathological alterations in liver. This study provided proof of the promising therapeutic properties of GN, TU and their combination and enhanced its possible use in carp aquaculture, as it demonstrated to improve the growth performance and antioxidant status against HM.

**Keywords:** heavy metals, curcumin, turmeric, body composition, growth performance, antioxidant enzymes



**O-82/ICAZ-2023**

**Evaluation Of Growth, Nutrient Absorption, Body Composition And Blood Indices Under Dietary Exposure Of Iron Oxide Nanoparticles In Common Carp (*Cyprinus carpio*)**

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Department of Zoology, Government College University Faisalabad

**Abstract:**

The bioavailability, small size and direct absorption in the blood, make nanoparticles (NPs) a remarkable feed additive in the aquaculture industry. Therefore, dietary iron oxide nanoparticles (Fe<sub>2</sub>O<sub>3</sub>-NPs) were used to examine their effects on growth, nutrient absorption, body composition and blood indices in *Cyprinus carpio* (Common carp) fingerlings. Healthy *C. carpio* fingerlings (n=270) were fed with six canola meal based experimental diets (D1-control, D2, D3, D4, D5, D6) supplemented with 0, 10, 20, 30, 40 and 50 mg/kg Fe<sub>2</sub>O<sub>3</sub>-NPs, respectively. 15 fingerlings (average initial weight 5.51±0.04 g/fish) were kept in triplicates for 70 days. The results indicated that maximum growth performance, apparent digestibility coefficient, body composition and hematological parameters were observed in 40 mg/kg Fe<sub>2</sub>O<sub>3</sub>-NPs supplementation. All the experimental diets were significantly improved (p<0.05) in all the above parameters than control diet. In the present research, the recommended dosage of Fe<sub>2</sub>O<sub>3</sub>-NPs as dietary supplement is 40 mg/kg for improving the growth, nutrient absorption, body composition and hematological indices in *C. carpio* fingerlings. Hence, this study demonstrates the potential of NPs to improve the health of fish.

**O-83/ICAZ-2023.**

**Aloe Vera Supplementation Improves Growth Performance and Nutrient Digestibility Of *Labeo rohita* Fingerlings Fed Canola Meal Based Diets**

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<sup>1</sup>Department of Zoology, Faculty of Life Sciences, Government College University, Faisalabad, 38000, Pakistan

**Abstract**

Aloe vera is a well-recognized herbal supplement in aquaculture feeds, known for its ability to promote growth and digestive health. This research presents the beneficial effects of supplementation of *A. vera* in the diet of *Labeo rohita* fingerlings. A total of 270 *L. rohita* fingerlings (6.50±0.03g fish<sup>-1</sup>) were randomly divided into six dietary groups and tested in triplicates and fed on diets containing equal amount of canola meal and graded levels of *A. vera* supplementation viz., 0%, 1%, 2%, 3%, 4% and 5% to assess the growth and nutrient digestibility. Feeding rates for fingerlings were 5% of their live wet weight. Results showed that fingerlings fed 3% *A. vera* supplemented diet significantly (p<0.05) increased weight gain (%) (206.14%) and feed conversion ratio (1.23). The highest apparent digestibility coefficient of nutrients i.e., crude protein (77.67%), gross energy (67.44%) and crude fat (82.20%) and optimum carcass values i.e., fat (3.95%) and crude protein (19.57%) content, were also recorded at same level of *A. vera*. It is proved that *A. vera* significantly improves the performance of *L. rohita* fingerlings, particularly at a level of 3% supplementation.

**Keywords:** Aquaculture, fish nutrition, growth, nutrient digestibility, *A. vera*.

**O-84/ICAZ-2023**

**Efficacy of Natural Diet Supplements on Overall Body Performance of *Oreochromis niloticus* and *Cyprinus carpio* against Waterborne Induced Heavy Metals Toxicity**

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**Abstract**

The aim of this study is to evaluate the effects of herbal supplementation on the growth performance, body composition, hematology, nutrient digestibility and histopathology of *Oreochromis niloticus* and *Cyprinus carpio* fingerlings fed with sunflower meal-based diets. For this purpose, six sunflower meal-based diets were prepared including one control diet (without herbal supplementation) and five other diets containing 1% of different types of herbal supplementation (turmeric, cinnamon, ginger, garlic and mixture). Fingerlings were acclimatized for two weeks in cement tanks. Stock solution of heavy metals was added in aquaria for 15 days. Then fish were taken from aquaria





to investigate different parameters. In this way, phase one of research was completed. In phase two, fishes were shifted into V-shaped tanks which are especially designed for feces collection. Then sunflower meal-based diets supplemented with different herbs were given to fishes to overcome the effects of heavy metals. In a day, feces were collected twice from triplicates tanks for chemical analysis. Fish were fed at the rate of 5% of their live wet weight. Water quality parameters such as oxygen, temperature and pH were monitored throughout the experimental period. Standard formulae were used to calculate weight gain, feed conversion ratio (FCR), body composition and mineral status in fish. Significant values of growth, hematology and nutrient digestibility were recorded in all treatment groups when compared to control diet. Herbal supplementation also repaired liver damage. Results showed that there is significant increase in growth and decrease in FCR in treatments groups. Growth rate of *O. niloticus* and *C. carpio* was effected by heavy metals. Liver of fishes were also severely affected.

**Keywords:** Herbal supplement, Growth performance, Body composition, Hematology, Nutrient digestibility, Histopathology

#### O-85/ICAZ-2023

#### Antimicrobial and Anti-Breast Cancer Activities of Methanolic Extract of *Citrullus colocynthis*

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#### Abstract

*Citrullus colocynthis* (*C. colocynthis*), called Schrad, is the Cucurbitaceae family plant. It has a wide range of nutritional and therapeutic uses. Conventionally, it treats various disorders like throat diseases, constipation, dyspepsia, anemia, splenomegaly, scrofula, bronchitis, asthma, ulcers, cancer, leucoderma, and urinary incontinence. It is stated in the literature that this plant has a wide range of pharmacotherapeutic properties, such as anti-cancer, antioxidant, astringent, antiamebiasis, hypotensive, sedative, refrigerant, anti-fungal, and antibiotic characteristics. This plant is useful as a novel drug against several cancer types. In this study, we visited various places in southern Punjab after the shade dried and crushed into coarse particles. By using the Soxhlet device, we prepared the extract. The sample was prepared at 20 mg/mL in Dimethyl sulfoxide to screen for the cytotoxic activity of *C. colocynthis* against human breast cancer cells. The cytotoxic and anti-metastatic activities of *C. colocynthis* were performed using the MTT (3-(4,5-Dimethylthiazol-2-yl)-2,5-Diphenyltetrazolium Bromide) assay, and the wound healing assay, respectively. *Citrullus colocynthis* washed with clean water and dried, avoiding direct sunlight at room temperature. The dehydrated stuff is homogenized to obtain a crumbly powder. The powder is stored in airtight brown plastic bottles. Almost 250g of powder were subjected to Soxhlet extraction with 2000 ml of 80% methanol. A rotatory evaporator was used to concentrate the powder, and a freeze dryer was used to solidify it. After that, the liquid-liquid fraction technique, the methanolic crude extract of *Citrullus colocynthis* was used with these three different solvents, i.e., n-hexane, chloroform, and methanol, to build a library of fractions. In a molecular mechanism, we were examining the expression of two important proteins, i.e., PARP and caspase-3, by Western Blotting. This plant is reported to have alkaloids, xanthenes, quinones, coumarins, terpenoids, tannins, flavonoids, fatty acids, proteins, carbohydrates, and phenolic compounds. The phytochemical analysis was also carried out on *C. colocynthis* extracts.

**Keywords:** Antimicrobial; Anticancer; Breast Cancer; *Citrullus colocynthis*; Medicinal Plants



## O-86/ICAZ-2023

**Effects of Sunflower Meal Based Diets Supplemented with Nano-Se Particles on Growth Performance, Nutrient Digestibility and Hematology of *Cirrhinus mrigala* Fingerlings**

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**Abstract**

The following investigation was carried out to determine the effects of Selenium nanoparticles (Se-NPs) on the growth rates, nutritional digestibility, and haematology of *Cirrhinus mrigala* fingerlings fed Se-NPs mixed with sunflower meal. The experiment included seven test meals with varying Se levels (0, 0.5, 1, 1.5, 2, 2.5, and 3 mg/kg) based on Se-NPs supplementation. Test meal 1mg/kg supplemented with Se-NPs resulted in the greatest weight gain and the highest feed conversion ratio (1.58). Best haematological indices (RBC's 2.84 10<sup>6</sup> mm<sup>-3</sup>, WBC's 7.79 10<sup>3</sup> mm<sup>-3</sup>, PLT 66, Hb 8.5 g/100ml, PCV 25% and MCV 190fl) and maximum nutrient absorption (CP 72%, EE 73% and GE 67%) were also observed in the case of 1mg/kg supplements of Se-NPs. Haematology results showed that these values began to increase in fish when feed was supplemented with 0.5 mg/kg Se-NPs maximum values were obtained with feed 1mg/kg of Se-NPs but when the concentration of Se-NPs is higher than 1mg/kg the values start to decline. Parameters of nutrient digestibility began to increase when the concentration of Se-NPs increased to 1mg/kg and suddenly started to decline with a further increase in Se-NPs. The results demonstrated that the diet supplemented with Se-NPs (1mg/kg) increased the growth performance, nutritional digestibility, and also enhanced the haematology of *C. mrigala* fingerlings.

## O-87/ICAZ-2023

**Supplementation of Methanolic Extract of Turmeric Improves Insulin Sensitivity In Adult Obese Hyperglycemic Albino Wister Rats.**

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**Abstract**

Diabetes mellitus is a metabolic syndrome characterized by persistent high blood glucose levels due to impaired insulin secretion. In obesity-related diabetes, peripheral tissues become resistant to insulin, increasing the body's need for insulin to meet metabolic demands. Early detection and a clear understanding of the relationship between insulin resistance, inflammation, and beta-cell failure are essential for effective treatment strategies. *Curcuma longa* (Turmeric), belonging to the Zingiberaceae family is one of the most popular herbal medicinal plants. Turmeric possesses anti-inflammatory and antioxidant properties. The current study was aimed to assess the effect of turmeric treatment in streptozotocin-induced hyperglycemic adult obese rats (stz i.p inj. @60mg/kg b.w.). A total of 24 adult male Albino Wister rats weighing 400-450 grams were divided into four equal groups (n=6). The negative control group comprised normo-glycemic rats receiving CMD diet. The positive control group was pretreated with Streptozotocin and fed a CMD diet. The comparative control group was also pretreated with Streptozotocin and further supplemented with Paracetamol @13mg/kg mixed with CMD. The treatment group was also pretreated with Streptozotocin and supplemented with methanolic extract of turmeric @250mg/kg b.w. Body weight and plasma glucose level were constantly monitored during the study. The animals from each group were sacrificed after 21 days. Blood samples were collected in EDTA tubes for plasma collection and samples were kept at -20°C until analysis. Pancreatic and liver tissues were also collected and immediately fixed in chilled 10% formalin. Complete blood count (CBC), ALT, AST, insulin, and C-reactive protein (CRP) were assessed in the serum samples. Formalin-fixed tissue samples were processed, sectioned, and stained with H&E for microscopic evaluation. The positive control group exhibited pathologically high levels of glucose, AST, ALT, and CRP and low plasma levels of insulin. The plasma levels of glucose, AST, ALT, and CRP in the treatment group were substantially low as compared to the positive control group but slightly higher than the untreated negative control group. The histological examination of formalin-fixed tissue samples of the pancreas and liver of the positive control group exhibited reduced cell number and diameter of islets of Langerhans with notable immune cell infiltration hinting towards pancreatitis as well as increased diameter of hepatic sinusoidal spaces around the central vein area in the liver. The pancreas in the treatment group shows limited infiltration of the immune cells and increased cell number and the diameter of the islets of Langerhans was observed as compared to the positive control group. The decreased diameter of sinusoidal spaces in the liver parenchyma was observed as compared to the positive control group. In summary, current study hints towards the beneficial role of



turmeric in enhancing insulin sensitivity, reducing systemic inflammation in obese adult hyperglycemic rats.

**O-88/ICAZ-2023**

**Benefits of a Rice Protein Meal Diet on histology and body composition in *Cirrhinus mrigala***

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**Abstract**

In this study, effects of rice protein meal on the body composition, liver and gut histology of *Cirrhinus mrigala* was determined. 120 Fingerlings were allotted to one control and two treatments diet (20% and 35% RPM) along with replica of each for 90 days. Fingerlings were acclimatized at laboratory conditions with control diet (32% CP) for few days prior to experiment, then randomly stocked in three tanks each with one replicate. Physical parameters of water like temperature, DO and pH was monitored by using YSI pro series multipara meter professional plus meter. DO within the range of 5-7 ppm is important for the health of the fish. The analysis of the proximate chemical composition of the body meat revealed that the 35% RPM retained the most crude protein, crude fat and ash content. On the other hand, the control treatment had highest retention of dry matter. The inclusion of 35% RPM diet resulting in a higher moisture and nutrient content in the fish meat. The different levels of rice protein meal had a pronounced effect on the gut and liver histology of *C. mrigala*. This suggested that the dietary treatment influenced the structural characteristics of these organs, which can impact the fish's overall health and digestive processes. The study concluded that a diet containing 35% rice protein meal was beneficial for the growth and body composition of *C. mrigala* and had an impact on the histology of the gut and liver. These findings are valuable for aquaculture because the use of 35% rice protein meal in the diet was more effective in promoting the growth of *C. mrigala* in an environmentally sustainable manner. Keywords: *Cirrhinus mrigala*, body composition, rice protein meal, liver and gut histology.

**O-89/ICAZ-2023**

**Digestive enzyme of *Trichogaster Fasciata* (Banded Gourami) from river Chenab, Multan, Pakistan**

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**Abstract**

The objective of the current study was to examine and characterize the digestive enzymes of wild *Trichogaster fasciata* in connection to characteristics like body condition and size. The samples were taken to the Fisheries Research Lab at the Institute of Zoology, Bahauddin Zakariya University, Multan. They were killed and further proceed to take various morphometric parameters and access gut for enzyme extraction. Analyze the three enzymes amylase, lipase, and protease after gut extraction. The Teitz & Fiereck approach was used to investigate the lipase enzyme's activity. Amylase activity in gut sample determination by the Smith and Roe method. The approach developed by Folin and Ciocalteu to examine the activity of the enzyme for protease. The following factors were taken into account when conducting the research, fish body length and weight, Fish gut length, weight, Zilher's index, the faulton condition k, relative gut length and relative gut mass. Sample used regression to assess and correlate these variables with concentration of amylase, lipase, and protease enzymes. Amylase activity was found to have the least significant. Lipase showed the medial activity. Lipase activity was shown to be more significant than Amylase but less than Protease. Protease activity was shown to be highly significant. The faulton condition factor and relative gut mass had the least significant connection.



**O-90/ICAZ-2023**

**Bioremediation of Pollutants From The Rainwater Using Biologically Engineered Biochar: A Novel Eco-Friendly Approach.**

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**Abstract**

Water is considered as an inherent reservoir upon which the survival of the biological community relies. When water resources are divided inequitably, water scarcity occurs which leads to an inadequate supply of water for agricultural and drinking purposes. Stormwater is gaining acceptance as a freshwater resource in arid areas, and it can provide the potential for beneficial reuse via aquifer recharge if effective pollutant removal is accomplished. Affordable, effective and efficient wastewater treatment technologies by leveraging currently available methodologies can make it easier for low- and middle-income countries to implement, thereby enhancing one health. Our research suggests a novel method for producing a high-performance adsorbent by cultivating bacterial biofilm in garden waste and coupling it to biochar made from sludge waste. Modification of the biochar by bacterial biofilm reduced the specific surface area while increasing the average pore size and adsorption effectiveness of some chemical and microbial contaminants in water. This paper suggests a novel method for reusing garden waste as a bio-modified biochar adsorbent and provides a promising strategy for removing contaminants from wastewater using biofilm-coupled biochar.

**O-91/ICAZ-2023**

**Investigating The Role of Azadirachta Indica As Hypocholesterolemic, Anti-Inflammatory And Liver-Protecting In The Diabetic Model Of Wistar Rats**

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**Abstract**

**Objective:** The study aimed to evaluate the potential anti-inflammatory and hypercholesteremic effects of *A. indica* leaf crude powder, as well as to investigate the hepatoprotective effects of *A. indica* in diabetes-induced Wistar rats. **Methodology:** *Azadirachta indica*, also known as Neem, is a fast-growing and sturdy tree that is commonly found in India. It is a diurnal tree species that is found in various parts of the Indian subcontinent. In addition to being a popular ornamental tree, Neem is also known for its medicinal properties and is used as a natural remedy for various ailments. A study conducted on diabetic rats found that *A. indica* in its crude form had anti-inflammatory, hypocholesterolemic, and hepatoprotective effects. Diabetes was induced via intraperitoneal injection of Alloxan at a dose of 120mg/kg body weight. After confirmation of diabetes rats were given treatment for the next 21 days. Group A (Negative control) normal rats fed a chow rodent diet (CRD), Group B (Positive control) diabetic rats fed CRD, Group- C (Treatment group-1) supplemented with a dose of *A. indica* 1.25 g/kg body weight, Group- D (Treatment group-2) supplemented with a dose of *A. indica* 2.5 g/kg body weight. **Results:** Data was analyzed statistically by one-way analysis of variance (ANOVA) Results showed that overall liver enzymes (ALT, ALT, and ALP) were non-significant ( $p \geq 0.05$ ). The overall analysis of results of lipid profile (TC, TG, HDL, LDL, VLDL) There was high significance among all the groups ( $p \leq 0.01$ ). The analysis of results of inflammatory marker C-reactive protein (CRP) also showed high significance ( $p \leq 0.01$ ) among all the groups. **Conclusion:** Conclusively, it may suggest that *A. indica* is used for the treatment as anti-diabetic, hepato-protective, hypocholesterolemic and anti-inflammatory.

**Keywords:**

*Azadirachta Indica*, hepatoprotective, diabetes, hypocholesterolemic.



O-92/ICAZ-2023

**Spatio-Temporal Abundance and Diversity of Coccinellids Predators and their Preys in Wheat Crop of District Gujrat**

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**Abstract**

Wheat crop is under severe threats of sucking pests like aphids that are often managed by chemical control, despite its hazardous impact on environment. Biological control of aphid pests is a sustainable alternative pest control strategy provided by natural enemies. Coccinellids as biocontrol organisms and bioindicators play important role being susceptible to aphid attack. In the present study, six-month survey was conducted at the large scale to estimate diversity and relative abundance of Coleopteran predators of families Coccinellidae from wheat crops of district Gujrat, Punjab, Pakistan. Sampling was carried out fortnightly from December 2022 to May 2023 in wheat crops by using hand-picking, per quadrant method, sweep netting method and Pit-fall traps. Twelve species of Coccinellid predators in wheat crop fields were identified during surveys from different sites i.e. Fatehpur, Kunjah and Jalalpur Jattan. In this study, Diversity index was calculated as ( $H' = 1.34$ ), Evenness ( $E = 0.96$ ) and Dominance ( $D = 0.14$ ) of coccinellids species and for aphid's species, the diversity index was recorded as ( $H' = 0.867$ ), Evenness ( $E = 0.22$ ) and Dominance ( $D = 1.40$ ). The most abundant species of predator was *C. septempunctata* and pest group was *S. graminum*. Maximum diversity of coccinellids species. Diversity of coccinellids species and aphids were observed maximum at the Kunjah site in March while at the Fatehpur site, lowest number of coccinellids species in May was recorded. Value of Analysis of variance (ANOVA) on relative abundance of Coccinellids species and aphids at three different sites of District Gujrat was ( $P=0.0114$ ) and ( $P=0.0015$ ) respectively which is significant at  $p>0.05$ .

O-93/ICAZ-2023

**Population Density and Diversity of Subterranean Termites of District Lahore, Pakistan**

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**Abstract**

Subterranean termites cause destruction to the wooden structures and eat cellulose based products all over the world, causing economic loss on large scale. This study is conducted to observe the presence of subterranean termites and their species in district Lahore Punjab Pakistan, from the months May to September, 2021. Manual method was used to collect the termites from herbs, weeds, shrubs, trees, plant debris, wooden logs and buildings of desert different areas of the District Lahore. The population density of termites was estimated using Simpson's diversity index equation. For further examination, the preserved (in 80 percent alcohol) termites were carried to Zoology Department, The University of Lahore, Pakistan. The number of termites was maximum in the months of July and August. Four species of termites, *Odontotermes obesus*, *Coptotermes heimi*, *Hetrotermes indicola* and *Microtermes obesi* were found in three areas of the District Lahore. The most numerous termite species was *O. obesus*. The diversity and population density of termites in places near wahga border is more than Jallo park and Safari Park. The aim of the present study is to evaluate population diversity of termites in District Lahore.

**Keywords:** Castes; Cellulose based; Diversity; Simpson's diversity index; Subterranean; Workers



## O-94/ICAZ-2023

**Dietary Supplementation of Dry Powdered Turmeric Improves Glucose Homeostasis And Reduces Systemic Inflammation In Hyperglycemic Adult Lean Wister Rats.**

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<sup>1</sup>Department of Physiology, Govt. College University Faisalabad.

**Abstract**

Diabetes mellitus (DM) is characterized by inadequate utilization as well as excessive production of glucose, resulting in elevated blood glucose levels known as hyperglycemia. Hyperglycemia causes progressive systemic low-grade inflammation resulting in the incident of obesity. Turmeric has been used for centuries in traditional medicine for its potential health benefits as a potent anti-inflammatory and antioxidant agent. The aim of the current study is to evaluate the effectiveness of turmeric supplementation during hyperglycemia in adult lean rats. A total of 24 adult lean Albino Wister rats weighing 100-150 g were selected and divided into four equal groups (n=6). Hyperglycemia was induced by a single intraperitoneal (ip) injection of streptozotocin @60mg/kg b.w. Animals were fed with CMD at 60g/day and water was ad libitum. The negative control group received only the CMD. The positive control group was pretreated with streptozotocin. The comparative control group was pretreated with streptozotocin and supplemented with paracetamol @13mg/kg b.w. The treatment group was pretreated with streptozotocin and supplemented with turmeric powder mixed with CMD @3mg/kg b.w. The blood glucose and body weight of the animals were continuously monitored for 21 days. All the animals were sacrificed after 21 days of treatment. Blood samples and tissue samples were collected. The blood samples were centrifuged, and the plasma was separated and stored at -20C until further analysis. The tissue samples were weighed and placed in a chilled 10% formalin solution. Insulin, Alanine aminotransferase (ALT), Aspartate aminotransferase (AST), and C-reactive protein (CRP) levels were analyzed in the serum by using specific assays. Formalin-fixed tissue samples were processed for histology, and 5m thick tissue sections were obtained through microtome and stained with hematoxylin for microscopic analysis. The positive control group has supraphysiological high blood glucose levels and abnormally high plasma ALT, AST, and CRP levels. Reduced plasma insulin levels were also observed in the positive control group. The treatment group exhibited reduced blood glucose levels which were close to normoglycemic values. Significantly reduced plasma ALT, AST, and CRP levels were observed in the treatment group as compared to the positive control group. Microscopic evaluation of the pancreatic and liver tissues in the positive control group revealed a reduction in the diameter and cell number in islets of Langerhans, while liver tissue exhibited an increased sinusoidal space and immune cell infiltration. The islets of Langerhans in the pancreas of the treatment group have comparatively higher islet diameter as well as increased cell number as compared to the positive control group. Sinusoidal spaces in the liver of the treatment group were much narrower as compared to the positive control group. The present study highlights the importance of dietary supplementation of dry powdered turmeric on glycemic index, hepatic functionality, and plasma inflammatory markers in hyperglycemic rats.

## O-95/ICAZ-2023

**Evaluation of Oxidative Stress Index among Cardiovascular Hypertensive Patients**

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**Abstract**

Hypertension, a global health issue, contributes to cardiovascular diseases. Research targets its pathogenesis, emphasizing oxidative stress as a pivotal factor. Therefore, present study concerned with assessing the level of oxidative stress among cardiovascular hypertensive patients. Alteration in hematological parameters, lipid profile was also assessed in blood plasma. For this study total 75 individuals involved 50 as diseased and 25 as control group. In my study the result of parameters used for assessing profile of lipid like TG, LDL and TC opposite to test value significantly enhanced while HDL decreased. The level of hematological parameter determines that hemoglobin, MCH, HCT, MCHC. MCV, MPV, platelets, RBC and lymphocytes were significantly lower and neutrophils level were higher as compared to normal value. The result of this study indicates that level of oxidative stress parameters like catalase and superoxide dismutase in hypertensive group were decreased significantly while MDA and GPX increased significantly against normotensive group having no hypertension. Also, OSI (oxidative stress index) which is the total measure of both oxidant and antioxidant were higher (1.67) as compared to control group (0.37). The result of present study demonstrates that in hypertension pathogenesis, oxidative stress is involved.



**O-96/ICAZ-2023**

**Immunomodulatory and Antioxidative Potential of Ethanolic Extract of *Gymnema Sylvestre* in a Diabetic Rat Model**

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**Abstract**

*Gymnema Sylvestre* (*G. sylvestre*) is known for its effectiveness in managing diabetes, but its potential as an antioxidant and immunomodulator has been underexplored. This study aimed to assess its immunomodulatory and antioxidative effects in a diabetic rat model. Healthy male Wistar (N-28) Alloxan (Alloxan @ 100mg/Kg b.w) was used to induce diabetes in all groups except the negative control. Rats were divided into four groups (n-7): a negative control (healthy), a positive control (diabetic without treatment), and two treatment groups receiving (*G. sylvestre* extract @ 250,500 mg/kg b.w) at different doses. After 21 days of treatment, blood analysis showed significant improvements in glucose, insulin, oxidative stress markers, liver profile, lipid profile, and histological findings in pancreatic and liver tissues in the treatment groups compared to the positive control. This suggests that *G. sylvestre* extract protected  $\beta$ -cells, potentially benefiting diabetes patients and offering cost-effective, locally available options for the pharmaceutical industry and scientific research.

**O-97/ICAZ-2023**

**Development of Edible Coatings from Natural Gums and Herbs to Enhance the Shelf Life of Fruits**

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**Abstract:**

Worldwide, rapid ripening and microbial spoilage contribute to substantial postharvest losses in fruits and vegetables. This study explores an eco-friendly approach to extend shelf life while retaining nutritional quality. We developed edible coatings from 1% chitosan and 1% arabic gum, known for their film-forming properties. These coatings were enriched with 1% aloe vera, 1% tulsi, 1% neem, and 1% mint to enhance antibacterial and antioxidant capabilities. The aim was to create a barrier against moisture and microbial threats while preserving sensory and nutritional attributes. Apples and tomatoes were immersed, dried, and compared with control solutions: a synthetic gum control (5% paraffin oil) and distilled water.

Stored at ambient temperature, coated and control apples and tomatoes underwent microbial, moisture, pH, Total Soluble Solids (TSS), and ascorbic acid assessments over 28 days. Results revealed a significant extension in the shelf life of coated apples and tomatoes compared to controls. Natural gums and herbs sustained quality, ensuring a 28-day shelf life, while controls deteriorated within 10-15 days. This study advocates for natural gum-based coatings enriched with herbs as a sustainable approach to fruit and vegetable preservation. These coatings not only delay ripening and decay but also uphold fruit quality and safety, presenting an eco-friendly alternative to conventional methods. Future research should expand this technique to diverse produce and explore large-scale production possibilities.

**O-98/ICAZ-2023**

**A Study of Toxicity Evaluation of Methotrexate (Anti-Cancer Drug) In Aqueous Medium Treated by Advanced Oxidation Process.**

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**Abstract.**

The present project highlighted the effect of radiation based treatment assisted with oxidant (H<sub>2</sub>O<sub>2</sub>) for the toxicity evaluation of anticancer methotrexate. For cytotoxicity, bioassays such as *Allium cepa*, hemolytic, brine shrimp were investigated. The Ames test was used for mutagenicity analysis. The solutions having concentrations 5, 10 and 15 ppm were irradiated with UV radiation exposure time 15, 30, 45, 60, 75 and 90 min and gamma radiation absorbed doses 0.3, 0.6, 0.9, 1.2, 2, 3 and 4 kGy in combination with H<sub>2</sub>O<sub>2</sub>. There was difference observed for aqueous solution before and after treatment with reference to cytotoxicity and mutagenicity. In *Allium cepa* test, a 47.07, 44.36 and 38.23% increase in root length (RL), root count (RC) and mitotic index (MI) was observed respectively for UV/H<sub>2</sub>O<sub>2</sub> treatment and in the case of gamma/H<sub>2</sub>O<sub>2</sub> treatment, the RL, RC and MI were increased up to 49.39, 52.63 and 52.38%, respectively. The Brine shrimp test has shown 85.95 and 91.30% decrease in toxicity using UV/H<sub>2</sub>O<sub>2</sub>



and gamma/H<sub>2</sub>O<sub>2</sub> respectively, while hemolytic test has shown 19.21 and 26.32% hemolysis using UV/H<sub>2</sub>O<sub>2</sub> and gamma/H<sub>2</sub>O<sub>2</sub>, respectively. The mutagenicity reduced up to 82.3, 86.46 and 89.59% (TA98) and 85.42, 87.5 and 90.63% (TA100) for UV/H<sub>2</sub>O<sub>2</sub> while 89.59, 90.63 and 93.75% (TA98) and 84.38, 89.59 and 92.71% (TA100) for gamma/H<sub>2</sub>O<sub>2</sub>. The UV and gamma radiation along with H<sub>2</sub>O<sub>2</sub> based AOPs are promising approaches to detoxify the wastewater which can be extended to real hospital liquid effluents effectively

O-99/ICAZ-2023

**Antimicrobial Resistance Paradigm in *Escherichia coli* isolates from Commercial Poultry: Molecular Insights**

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**Abstract**

*Escherichia coli* is a commensal organism that inhabits the gastro-intestinal tract of animals and humans having the potential to cause several infections including colibacillosis among commercial chickens, termed as avian pathogenic *E. coli* (APEC). *E. coli* strains are also responsible for several infections among humans including diarrhea, meningitis and urinary tract infections etc. A significantly increased spread of antimicrobial resistant (AMR) *E. coli* strains, among humans and animals, are considered as the global threat in the domain of public health/ one health. At present commercial poultry has emerged as a basic food industry across the world. Whereas extensive antimicrobials are used among commercial poultry as therapeutic or prophylactic agents, indirectly increasing the risk of emergence of AMR-APEC, that could also be a potential threat to the community. The exchange of AMR genes among *E. coli* isolates is mediated either vertical, horizontal gene transfer or mutations. Here, we have focused on the molecular identification of pathogenicity, virulence factors and AMR among APEC while considering the public health/ one health concept.

Keywords. Antimicrobial resistance (AMR), Avian pathogenic *Escherichia coli* (APEC), Food Animals

O-100/ICAZ-2023

**Promising Potential of *Gymnema sylvestre* for Diabetes Management: Experimental Insights**

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<sup>1</sup>Department of Physiology, Government College University, Faisalabad, Pakistan

**Abstract**

**Background;** *Gymnema sylvestre*(G.S), a popular herbal treatment for diabetes, was tested on diabetic rats to assess its anti-inflammatory, hepatoprotective, and hypocholesterolemic effects. **Objective;** The study aimed to determine its potential in managing diabetes-related complications, offering promising insights for alternative diabetes management using natural remedies. **Material and methods;** In this experiment, 40 adult male Wistar rats were divided into four groups(n-10). Diabetes was induced in all groups through intraperitoneal injection (Alloxan @ 120 mg/kg bw) except the Negative group. A Negative control (NC; standard chow maintenance diet), Positive control (PC; diabetic untreated group), and Treatment groups (T1, T2), were administered 250 @ mg/kg b.w and 500 mg/kg b.w of G.S, respectively, for 21 days. After the study, blood samples were collected, and serum was analyzed for antidiabetic anti-inflammatory, hepatoprotective, and hypocholesterolemia effects pancreatic tissue was also preserved for histological examination. Statistical analysis was carried out using one-way ANOVA by using Graph pad prism. **Result;** The findings unveiled a significant decrease in the serum glucose and random glucose level, lipid profile alongside liver enzymes, including ALT, and AST, and total oxidative stress, and significant elevation in total Antioxidant level, HDL level, and the histological analysis of beta cell density were increased in treated groups. **Conclusion;** *Gymnema sylvestre* demonstrated antidiabetic and antioxidant effects, lowering glucose levels and improving lipid profiles, showing potential for diabetes management.





O-101/ICAZ-2023

**Assessing the Efficacy of Ajwa Dates Extract in Mitigating Arsenic Toxicity in a Rat Model**

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Department of Zoology, University of Sargodha

**Abstract**

Arsenic contaminates water through, agriculture (pesticides and fertilizers), industrial processes, municipal waste disposal, and naturally occurring high levels in some groundwater. It poses health risks up to 60 million people in Pakistan. Therefore, the present study was designed to find detoxifying and health promoting properties of Ajwa dates against the harmful effects of Arsenic toxicity. Twenty male wistar rats randomly divided into four groups. Control; Arsenic Intoxicated (10ppm); Ajwa extract alone (300 mg/kg); and Arsenic plus Ajwa treated. The doses given orally daily for 14 days. Through DPPH antioxidant activity of Ajwa dates extract evaluated, it exhibited significant potential. Arsenic induced haematotoxicity, hepato-renal toxicity in rats indicated highly significant increase levels of serum glutamic pyruvic transaminase (SGPT), serum glutamic-oxaloacetic transaminase (SGOT), Alkaline Phosphate, Urea and Creatinine with a significant decrease in RBC, Hb, Total Leukocyte count (TLC), Platelet count, Lymphocytes, Total Protein, A/G ratio. These changes that related with Arsenic toxicity were significantly alleviated by Ajwa extract administration. So, the use of Ajwa is recommended to alleviate the oxidative stress caused by Arsenic. These promising findings suggest that Ajwa dates, due to their rich natural antioxidants, phenolics, vitamins, and iron content, etc. have a protective potential against arsenic poisoning.

O-102/ICAZ-2023

**Evaluation of Antidiabetic And Histoprotective Effect of Polyherbal Extract (CCNSSM) on Alloxan Induced Diabetic Female Rats**

Tahira Almas\*, Sajida Batool, Muhammad Arshad, Farzana Siddique

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**Abstract**

Diabetes is an endocrine disorder characterized by hyperglycemia because of failure to release insulin for storing blood glucose. It results into renal failure, disease of the adrenal glands, hypertrophy of the adrenal and renal cortex, and shrinking of the adrenal medulla. Many medicinal plants are used extensively to treat diabetes because they are inexpensive, readily available, and thought to have less side effects. The goal of the current investigation was to determine the nephroprotective and adrenal gland protective effects of Citrullus colocynthis (bitter apple; CC), Nigella sativa (black cumin; NS), and Silibum marianum (milk thistle; SM) on alloxan-induced diabetic female rats. Twenty-eight female albino rats were divided into four groups: a normal control group, a diabetic control group, a diabetic group treated with standard drugs and the diabetic group treated with polyherbal extract. With the exception of diabetes control, the other two diabetic groups received normal treatment for seven weeks: metformin and prepared herbal extract. Histological alterations, random blood glucose, kidney weight, adrenal gland weight, and mean body weight were noted in several groups.

Our finding indicates that polyherbal extract (CCNSSM) had a protective impact on the herbal-treated diabetic group.



**O-103/ICAZ-2023**

**Use of Citric Acid And Phytase Treated Cottonseed Meal Based Diet In *Labeo rohita* Fingerlings To Increase Growth, Nutrient Digestibility And Haematological Indices**

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<sup>3</sup>Department of Zoology, Khawaja Fareed University of Engineering and Technology, Rahim Yar Khan, Pakistan

**Abstract**

The purpose of this study was to see how citric acid (CA) and phytase (PHY) supplementation affected the growth, nutrient digestibility and haematological indices of *Labeo rohita* (L. rohita) fingerlings fed cottonseed meal (CSM) based diet. A 12-weeks experiment was conducted to check growth, nutrient digestibility and haematological indices of L. rohita fingerlings in order to test CSM as a replacer of fish meal (FM). The protein proportion of the test diet was fulfilled by substituting CSM for FM at a rate of 0, 25 and 50%. In a completely randomised design with a 3×3 factorial arrangement, 16 test diets, TD1 to TD16 were inclusion with CA (0 and 2.5 %) and PHY (0 and 750 FTU/kg). In order to estimate nutrient digestibility, chromic oxide was used as an inert marker in diets. The growth, nutrient digestibility and haematological indices in fish fed on CA and PHY supplemented diet was significantly higher as compared to all other diets. In conclusion, synergistically CA and PHY significantly ( $p < 0.05$ ) increase growth, nutrient digestibility and haematological indices of L. rohita fingerlings.

Keywords: Cottonseed, citric acid, phytase, growth, nutrient digestibility, L. rohita

**O-104/ICAZ-2023**

**Uses of *Moringa oleifera* Leaf Meal Based Diet in The Practical Feed of *Cirrhinus mrigala* Cultured in Semi-Intensive System**

Nasreen Akbar<sup>\*</sup>, Nisar Ahmad, Syed Makhdoom Hussain, Muhammad Mahmood  
Department of Zoology, University of Jhang

**Abstract:**

Total six month experiment was conducted in 12 earthen ponds to access the effects of *Moringa oleifera* leaf meal (MOLM) based diet on body mineralization and hematology of *C. mrigala* cultured in earthen ponds. In order to formulate experimental diets, MOLM was used as test ingredient. MOLM was used to replace fish meal (FM) in the diet of fish, at varying levels of 0%, 10%, 15%, 20%, 25% and 30%, respectively. There were six experimental feed prepared. Fish were placed in a cemented pond for two-weeks under laboratory conditions for acclimatization. Total 540 fishes were distributed in 12 earthen ponds and fifteen fish of each species were stocked in each pond. Fish were fed at the rate of 3% of their body mass. Water quality parameters such as oxygen, temperature and pH were monitored throughout the experimental period. Best values of body mineralization in *C. mrigala* were recorded at 10% addition of MOLM in the diet. Additionally, it was found that hematological parameters showed maximum values when fish fed with 10% inclusion of MOLM in the diet. It was concluded that MOLM has good potential to be used as a FM replacement in *C. mrigala* diet with highest effect at 10% showing best body mineralization and hematological parameters.



## O-105/ICAZ-2023

**Ameliorative Effects of Alpha Lipoic Acid, Quercetin and Ascorbic Acid against Zinc Oxide Nanoparticles Induced Hepatic Damage: In vivo**

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<sup>2</sup>Department of Chemistry, Lahore College for Women University

<sup>3</sup>Department of Zoology, Government College University, Lahore

**Abstract**

The current study envisioned to evaluate time related protective effect of quercetin, alpha lipoic acid and ascorbic acid on liver of mice against sub-acute exposure of zinc oxide (ZnO-NP) nanoparticle. Male Swiss albino mice (n=72) were randomly divided into eight groups (n=9, each group). G1 received saline solution 0.9%; G2 received quercetin (100 mg/kg b.w); G3 received alpha lipoic acid (100 mg/kg b.w); G4 received ascorbic acid (100 mg/kg b.w); G5 received ZnO-NPs (50 mg/kg b.w); G6 received ZnO-NPs with quercetin; G7 received ZnO-NPs with Alpha lipoic acid and G8 co-treated with ZnO-NPs and ascorbic acid for 21 consecutive days. Body weight, hepatosomatic index and plasma biochemical parameters (total protein, albumin, globulin, total cholesterol, triglycerides, high density lipoproteins, low density lipoprotein, aspartate aminotransferase, alanine transaminase, alkaline phosphatase & bilirubin) were estimated. ZnO showed significant increase in body weight and cause alterations in all biochemical parameters. Co-administration of quercetin (100 mg/kg b.w), alpha lipoic acid and ascorbic acid daily along with ZnONPs, significantly ameliorate the dramatic alteration in biochemical parameters and hepatocellular necrosis caused by ZnO nanoparticles. Brine shrimp larvae cytotoxicity assay of ZnO nanoparticles showed 0% mortality. Present study concluded that all three active ingredients showed hepatoprotective effects against nanoparticles induced time dependent toxicity.

**Keywords:** Alpha lipoic acid and ascorbic acid; quercetin; ZnO-NP

## O-106/ICAZ-2023

**Spatio-Temporal Abundance and Diversity of Coccinellids Predators and their Preys in Wheat Crop of District Gujrat**

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**Abstract**

Wheat crop is under severe threats of sucking pests like aphids that are often managed by chemical control, despite its hazardous impact on environment. Coccinellids as biocontrol organisms and bioindicators play important role being susceptible to aphid attack. Sampling was conducted for Six month and carried out from December 2022 to May 2023 by using hand-picking, per quadrant method, sweep netting method and Pit-fall traps. Twelve species of Coccinellid predators were identified from different sites i.e. Fatehpur, Kunjah and Jalalpur Jattan. Diversity index was calculated as (H<sup>1</sup>= 1.34), Evenness (E = 0.96) and Dominance (D = 0.14) of coccinellids species and for aphid's species, the diversity index was recorded as (H<sup>1</sup>= 0.867), Evenness (E = 0.22) and Dominance (D = 1.40). The most abundant species of predator was *C. septempunctata* and pest group was *S. graminum*. Maximum diversity of coccinellids species and aphids were observed in March at the Kunjah site while minimum in May at Fatehpur site. The (ANOVA) on relative abundance of Coccinellids species and aphids at three different sites of District Gujrat was (P=0.0114) and (P=0.0015) respectively which is significant at p<0.05. The data of this research will be useful for biological control programme by aphidophagous beetles.



### O-107/ICAZ-2023

#### **Spatiotemporal Diversity and Distribution of Amphibians (Anurans) in District Hafizabad**

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Department of Zoology, Wildlife and Fisheries, University of Agriculture, Faisalabad, Pakistan

#### **Abstract**

Anurans constitute the highest biomass among vertebrates in some ecosystems and depending on scale, may be keystone species. The analysis was conducted to estimate the Spatio temporal diversity of anurans at terrestrial and aquatic habitats. Survey from November to April (2020-2021) was conducted in selected sampling sites. For aquatic and terrestrial survey, the selected area was Khalid Sohal and Head Sagar Park and Cropland of district Hafizabad respectively. Standard sampling methods was VES, pitfall traps, hand picking and net fishing that was used for sampling. Encountered anurans was captured, identified and photographed. Buffered formalin solution was used for preservation. Evaluation of diversity, richness and evenness was done by Shannon Weiner diversity index. A total of 288 specimens were collected with 32 species from families of order Anura. All the species belonged to nine different families Conrauidae, Pipidae, Scaphiopodidae, Bufonidae, Dicroglossidae, Ranidae, Leptodactylidae, Myobatrachidae, Pyxicephalidae. The family Bufonidae was the most abundant with 13 species and 180 specimens. Pyxicephalidae, Conrauidae was the least abundant families with 1 specimen each i.e. Ali et al. (2018). April show maximum diversity of index as compared to other months. The value of diversity index of December was found least. Analysis of variance for abundance of species in accordance with time showed significant ( $p < 0.05$ ) results.

### O-108/ICAZ-2023

#### **Association Between Exposure to Environmental Tobacco Smoke and Oxidative Stress Among Population of Sargodha District**

Farah Khan<sup>1</sup>, Muhammad Arshad <sup>2</sup>, and Maryam Sana<sup>3</sup>  
Department of Zoology, University of Sargodha

#### **Abstract**

Environmental tobacco smoke (ETS) is a newly revealed public health risk factor that may leads to oxidative stress. This study examined the effects of ETS exposure on CBC, lipid profile, and plasma antioxidants (Catalase (CAT), Glutathione peroxidase (GPOx), Superoxide dismutase (SOD), Lipid peroxidation and Total antioxidant capacity (TAC)) among ETS exposed and unexposed non-smokers. 140 healthy volunteers were recruited. 60 nonsmokers without ETS exposure were designated as control group. 80 were passive smokers of which 35 were LE passive smokers (less ETS exposed) and 45 were HE passive smokers (high ETS exposed). CBC analysis showed significant increase in TLC, MCH and lymphocytes level in HE passive smokers compared to control group. LDL in HE passive smokers was significantly increased compared to LE passive smokers and control group. CAT activity was lowered in HE group than LE and control groups. There was significant decrease in SOD level in passive smokers compared to control group. MDA and GPOx levels were significantly increased in HE passive smokers than LE and control group. Mean total antioxidant capacity was significantly lowered in passive smokers compared to control group. These results suggested that exposure to ETS weakens the antioxidant defense system and leads to oxidative stress



**O-109/ICAZ-2023**

**The Efficacy of Iron Oxide Nanoparticles Supplemented Moringa Oleifera Seed Meal Based Diets On Overall Performance of Oreochromis Niloticus Fingerlings**

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Department of Zoology, University of Jhang

**Abstract:**

The current research study was conducted to evaluate the effects of Iron oxide nanoparticles (NPs) supplemented Moringa oleifera Seed Meal (MOSM) on the growth, nutrient digestibility and carcass composition of Oreochromis niloticus (Nile tilapia) fingerlings in laboratory conditions. Iron oxide NPs was incorporated in the test diets at the levels of 0, 5, 10, 15, 20 and 25 mg/kg of diet. Chromic oxide was added as inert marker in test diets. There were six experimental diets that were used during the trial. Fingerlings were divided into 6 groups (each having triplicate) and then placed in the experimental tanks for 30 days. Fingerlings were fed at the rate of 5% of their biomass twice a day (morning and evening). The effect of each treatment on the various parameters of fish was evaluated by standard protocols. Data from the different research parameters revealed that the diet containing 10mg/kg iron oxide NPs of diet affects the growth nutrient digestibility and carcass more efficiently. The FCR value for 10mg/kg of iron oxide was maximum (1.59). Total weight gain and protein content were increased in the group of fingerlings that fed on 10mg/kg NPs containing diet. The further increase in NPs in the test diets did not effects the parameters efficiently.

**O-110/ICAZ-2023**

**Lipid Profile in Coronary Artery Disease Patients in Sialkot (Clinical Study)**

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<sup>5</sup>Head of Department Zoology, Assistant Professor, University of Sialkot, Pakistan

**Abstract**

Coronary artery disease (CAD), a metabolic disorder characterized by hyperlipidemia, is main cause of death throughout world. Current study aimed to evaluate role of lipid profile of coronary artery disease in Sialkot. Hundred individuals (30-60 years) were considered for current study which were further divided into two groups i.e., control (n=50: Healthy individuals) and diseased (n=50: Coronary artery disease patients). Data was collected related to socioeconomic status, family history and blood pressure was measured. Body mass index (BMI) was calculated from height and weight. Waist circumferences were measured. Blood samples were collected and centrifuged for plasma separation which was used for the estimation of high density lipoprotein (HDL), Low density lipoprotein (LDL), Total cholesterol, Triglycerides using chemistry analyzer. Total cholesterol (221.3 ± 14.8683mg/dL), triglycerides (221.3 ± 14.8683mg/dL) and LDL (124 ± 12.28 mg/dL) showed highly significant increase while HDL indicated highly significant decrease (54.2 ± 2.53 mg/dL) in CAD subjects. This study provided clear evidence that CAD patients had lipid profile dysfunction. This study will benefit our society for lowering the risks related to coronary artery disease by targeting lipid profile.

Key Words: Coronary artery disease, HDL and LDL



**O-111/ICAZ-2023**

**Spatio-Temporal Abundance and Diversity of Ground Beetles in Wheat Agro-Ecosystem of District Pakpattan**

Afifa Murtaza Rao, Nazia Ehsan, Iqra Bibi, Tayaba Muqaddes and Muhammad Saqib\*

Department of Zoology, Wildlife and Fisheries, University of Agriculture, Faisalabad, Pakistan

**Abstract**

The wheat crop has great economic importance in Pakistan. The present study was conducted to investigate the spatio-temporal abundance and diversity of Ground beetles in wheat crops. Sampling was done from December 2022 to May 2023 for six months. The fauna was sampled these techniques like pitfall and hand-picking method i.e. Rischen et al., (2023). The collected beetles were preserved in a 10% formalin solution and identified with keys i.e. Aruggoda et al., (2010). Shannon-Wiener index (1949) t-test and ANOVA was used to analyzed the data. In this study, Diversity index was calculated as ( $H' = 1.93$ ), Evenness ( $E = 0.99$ ) and Dominance ( $D = 0.86$ ). Value of (ANOVA) on relative abundance of Carabids species at three sites of District Pakpattan was ( $P = 0.0005$ ) which is significant at  $p > 0.05$ . Total 509 specimens were captured from three sites. The collected beetles' species were belonging to 6 sub-family, 7 genus and 9 species. Out of 509 species, 194 were collected from Chak 23/sp, 179 from Tibba Pakpattan and 136 from Adda Chawant. Diversity were found maximum in April and lower in February. Predacious Carabids of wheat were "Agonum dorsale, C. inquisitor, and Pterostichus melanarius". The data of this research was used for biological control programme by Carabid beetles.

**O-112/ICAZ-2023**

**Effect of Electrode's Surface Area On Biogas Enhancement and Its Process Stability During Anaerobic Digestion Coupled with Microbial Electrolysis Cell**

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**Abstract**

Sustainable alternatives ought to be used because of the growing need for renewable energy brought on by the depletion of natural resources, population increase, and escalating consumption of fossil fuels. To directly convert biomass and safeguard the environment over the long term, waste management is essential. Methane, hydrogen, and other compounds are produced from organic waste via anaerobic digestion, whereas organic matter is converted into other chemicals using microbial electrolysis cells (MECs). MEC-AD can speed up substrate breakdown and change the anaerobic digestion (AD) microbial population by enriching exo-electrogens and methanogens, resulting in increased biogas generation. Improvements in MEC-AD for methane generation were made by increasing the surface area of electrodes in MEC. The surface area was increased by introducing more electrodes in respective digesters. By sensing electric signals that are linearly related to substrate concentrations, the MEC-AD process is tracked in real time. And increasing the surface area of electrodes during anaerobic digestion coupled with MEC enhances biogas production and the methane content of biogas. Determining the relationships between substrate breakdown, the MEC-AD system, and the microbial community. The study focused on how to enhance biogas production at controlled temperature and voltage by using MEC in conjunction with a single-stage anaerobic digester. The highest biogas yields were obtained, respectively, in the control, MEC with 2 electrodes, and MEC with 4 electrodes at OLR3 gVS/L. When the surface area of the MEC-AD system is expanded, biogas production increases, thereby enhancing biogas.



O-113/ICAZ-2023

**Plasma PD-L1 as A Biomarker In The Clinical Management Of Glioblastoma Multiforme—A Retrospective Cohort Study**

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**Abstract:**

Glioblastoma multiforme (GBM) is the most aggressive, malignant, and therapy-resistant tumor of the brain. Blockade therapy targeting the programmed cell death protein 1 (PD-1)/programmed death ligand (PD-L1) axis is currently under investigation for the clinical management of the GBM. This study has quantified the plasma levels of PD-L1 as a biomarker for the clinical management of GBM. A cohort (n = 128) of Pakistani adult glioblastoma patients together with age- and sex-matched healthy controls was used for quantification of pre-surgery levels of plasma PD-L1. PD-L1 protein and mRNA were measured by PD-L1 platinum ELISA and quantitative real-time PCR, respectively. Receiver operating characteristic (ROC) curve analysis was used to compute area under the curve (AUC) for specificity and sensitivity analyses. The Kaplan–Meier survival analysis was employed to compute overall survival. PD-L1 protein and mRNA were significantly higher in GBM compared to the healthy controls (p < 0.0001). Mean PD-L1 concentration for the GBM was found to be 48.98 ± 2.290 pg/ml compared to 27.63 ± 1.281 pg/ml for controls. Gene expression analysis showed statistically significant upregulation (p < 0.0001) of PD-L1 in blood of GBM compared to healthy controls. Plasma PD-L1 showed an AUC of 0.840 (p < 0.0001; 95% CI = 0.7716 to 0.9090) where a cutoff value higher than 46 pg/ml demonstrated 100% specificity and 57.81% sensitivity. Higher pre-surgery levels of PD-L1 were found to be associated with overall poor survival [p < 0.0001; HR (log-rank) = 0.08; 95% CI = 0.04 to 0.15]. Age, gender, and ethnic background were not found to be associated with plasma PD-L1 levels.

O-114/ICAZ-2023

**Liver Fluke Infestation in Sheep Population in District Dera Ismail Khan**

Atiq-Ur-Rehman<sup>1,2\*</sup>, Malik Badshah<sup>2</sup>, Sami Ullah Khan<sup>2</sup>

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<sup>2</sup> Department of Microbiology, Quaid-I-Azam University, Islamabad 45320, Pakistan

**Abstract**

Pakistan is agriculture based country and livestock is a key part of this industry and play a vital role for the development and growth of national economy but there are some diseases which greatly affect the health and production of animals and fascioliasis is one of them. So a comparative study was conducted on sheep of two different selected areas. A study of 100 sheep found a 70% prevalence of *F. hepatica* in Himmat and 34% in Daraban. Hematological and biochemical parameters were evaluated at 0, 7, and 28 days. Results showed a significant decrease in RBC and HB in infected groups, but no significant difference after treatment. Also there was noteworthy variation in WBC ratio in infected animals in different days as compared to control group but after treatment WBC values become normal of all infected sheep. Similarly, there is significant increase (p<0.05) in AST and ALT values at day 0 of all the infected groups but after treatment the values become in line to the control group. In conclusion, in District Dera Ismail Khan the prevalence of fascioliasis is of great concern to sheep health, productivity, economic losses in terms of meat, milk and wool production.



**O-115/ICAZ-2023**

**Bacterial Diversity in Effluents of Fabric, Chemical and Oil Industries of Faisalabad and Jhang Region**

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**Abstract**

The present study was designed to investigate the bacterial diversity in different industrial effluent samples. In the present study 45 effluent samples were collected from Crescent textile industry, Ihsan Habib fabric industry (LTD), Shakkar Gunge (sugarcane) Mill Jhang, Sitara Chemical Industry (LTD), Fawad Ghee Industry and Madina Oil Mill from Faisalabad and Jhang region. Nutrient agar media was used to isolate and colony forming units (CFUs) of bacteria. *Bacillus* spp., *E. coli*, *Staphylococcus* spp., *Shigella* spp. and *Pseudomonas* spp., were identified through different biochemical tests. Simpson diversity index, Chi square and Z test were used for data analysis. The association between ( $X^2$ ) industries and number of bacteria isolated from effluent/ml is highly significant at p-value 0.000. *Bacillus* spp., was highly abundant in comparison of other bacteria. Maximum diversity was found in Fawad Ghee Industry (0.74), Shakkar Guange Mill (0.68), Ihsan Habib Industry (0.64), Sitara Chemical Industry (0.61), Madina Oil Mill (0.58), while least diversity was observed in Crescent Textile Industry (0.48).

**O-116/ICAZ-2023**

**In-Situ and Ex-Situ Determination of Predation Potential of Syrphid Flies**

Nosheen Fatima, Muhammad Tahir, Nazia Ehsan, Aqsa Riaz, Warda Mustafa, Iqra Bibi  
University of Agriculture, Faisalabad, Department of Zoology, Willdlife & Fisheries

**Abstract**

Syrphid flies are known as biological control agents. The aim of this study was to investigate the syrphid flies' capacity for predation on different insect pests in In-situ and Ex-situ to minimize the use of insecticides used for pest control. Sampling was done from January 2023 to May 2023 mainly by hand picking and sweep netting. Samples were identified by using taxonomic key provided by Dawah et al., 2020. Firstly, the feeding behavior of predators on insect pests was observed in the field area. Then large number of syrphid flies and their predators were studied in Biocontrol Laboratory, Department of Zoology, UAF, Pakistan. Three species of family Syrphidae were reared in the laboratory by giving them appropriate environment. Variation in larval feeding efficiency was computed by using Complete Randomized Design. Among the species chosen, *Episyrphus balteatus* had the highest mean predatory efficiency 495, followed by *Melanostoma fasciatum* 490 and *Eupeodos corollae* 487. Maximum predation by *E. corollae* larvae was on *Schizaphis graminum* 525 and by *E. balteatus* larvae was on *Schizaphis graminum* 530. The highest predation by larvae of *M. fasciatum* was on *Rhopalosiphum padi* 532. Least predation was recorded by larvae of *E. corollae* 487 on all four aphids.

**O-117/ICAZ-2023**

**Effect of Different Metal Oxide Nanoparticles On Biogas Production Using A Continuous Anaerobic Digester**

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**Abstract**

Fossil fuels depletion and waste management are the most critical issues in developing countries because the fundamental infrastructure isn't in place. These factors necessitate to look for renewable energy sources such as biogas, derived from the anaerobic digestion of biomass is a renewable and sustainable energy source because of its environment friendly and energy-efficient technology. The process's drawbacks is its slow rate of biodegradation. The introduction of nanoparticles into the anaerobic digester was thought to be a viable strategy that would not only stabilize the AD process but also speed up slurry digestion, resulting in increased biogas production. The experiment was carried out to compare the different anaerobic digestion conversion efficiency with and without metal oxide NPs (such as Ni, Fe, and Co) and their effect on the biogas production in a two-stage anaerobic digestion of fruit and vegetable waste. On comparing, the CuO and NiO NPs result into 158.52 NmL and 149.71 NmL of biogas, while Fe<sub>2</sub>O<sub>3</sub> has produced the most biogas with the rate of 176.14 NmL with 35% enhancement compared to control. This improved gas can also be used as a vehicle and automobile fuel.





**O-118/ICAZ-2023**

**Evaluation Of Protective And Therapeutic Role Of Aloe Barbadensis Against Furadan-Induced Toxicity in *Labeo rohita***

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**Abstract**

This study evaluated the protective and therapeutic efficacy of *Aloe vera* against Furadan-induced toxicity in *Labeo rohita*. A total of 180 juvenile fish (average body weight  $78.85 \pm 2.5$ g, average length  $17.78 \pm 1.02$ cm) were equally divided into 9 tanks at a stocking density of 1.5g/L (20 fish/tank) and tanks were randomly divided into 3 groups T0, T1, and T2. Group T0 was labeled as a control group, fed a basal diet, and was not exposed to a pesticide. Group T1 was fed with 1% Aloe vera supplemented feed for 30 days and exposed to a sub-lethal concentration (0.12mg/L) of Furadan for 5 days, while group T2 was exposed to a sub-lethal concentration of pesticide for 5 days and then sub-divided into two groups, one shifted to Aloe vera supplemented feed for 30 days while other to the basal diet. Exposure to a pesticide showed significant alterations in hemato-immunological, biochemical, and antioxidant enzyme status, Hsp 70, and Lys C gene expression while pre- and post-feeding Aloe vera supplemented diet showed significant improvement in all the corresponding parameters. It seems that Aloe vera feed supplementation boosts the immune system and provides protection against pesticide-induced toxicity by mitigating the toxicological effects of a pesticide.

**O-119/ICAZ-2023**

**Feed Formulation from Locally Available Cheap Sources and Effect of the Growth of Tilapia (*Oreochromis mossambicus*)**

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Institute of Zoology Division, Bahauddin Zakariya University, Multan

**Abstract**

This study work was completed to check the effectiveness of local feed for fish growth. For this purpose, easily available feed ingredients were collected from the local market. 100 fingerlings of *Oreochromis mossambicus* were collected from Bahawalpur fish hatchery and these samples were kept under feeding trial in the fish laboratory of Institute of Pure and Applied Biology (Zoology Division) at Bahauddin Zakariya University, Multan. This study was prolonged for 60 days. Three feeds were prepared and fed to the 3 experimental fish groups. 15 fingerlings were analyzed for growth parameters and fish body composition. This study presented that fish growth can be increased by replacing commercial expensive feed by local easily available food sources. Non-significant ( $p > 0.05$ ) value of feed conversion ratio was obtained and feed efficiency ratio was also documented as non-significant ( $p > 0.05$ ). Highly significant ( $p < 0.001$ ) value of protein efficiency ratio and specific growth rate was achieved. Different content values of water, dry weight, ash, organic matter, fat and protein were analysed.

Keywords: Fish feed ingredients, Mortar and pestle, Digital balance, Mincing machine, Tanks, Tilapia (*Oreochromis mossambicus*).



**O-120/ICAZ-2023**

**Identification of Khv Resistance in Breed Stocks of Common Carp (*Cyprinus carpio*) Using Molecular Marker**

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**Abstract:**

Cyca-DAB1\*05 allele is known to be associated with the resistance to koi herpes virus in common carp (*Cyprinus carpio*) worldwide. Marker assisted selection for carp culturing and genetic improvement can help in saving time and facilities. The present study was designed for the molecular detection of the presence of KHV resistant genes in the broodstocks of common carp (*Cyprinus carpio*) and to nominate the selected broodstock as KHV resistant or not. Since none of the case is reported in literature till now from Pakistan about any occurrence and detection of KHVD, a total of 200 samples of common carp fingerlings were collected from farms located in eight districts of lower Punjab. The existence of Cyca-DAB1\*05 marker was analyzed by PCR with specific primers. Results were significant, favorable and showed high prevalence of resistant genes in nearly all brood stocks collected from lower Punjab with some variations in broodstocks collected from farms located in Lodhran and Bahawalpur. As variations are seen in two of the districts, this research can be extended by collecting samples across Pakistan to identify and confirm the prevalence of KHV resistant gene in the population of *Cyprinus carpio*. Key words: *Cyprinus carpio*, Resistance, Koi herpes virus, Molecular marker

**O-121/ICAZ-2023**

**Evaluation of the Potential of *Cannabis sativa* L. (Industrial Hemp) as a Substrate for Biorefinery**

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**Abstract:**

The growing human population and fossil fuel consumption are causing energy resource depletion and a health crisis, with drug resistance being a major threat. Sustainable development is crucial, with biorefineries focusing on producing renewable energy and value-added products from biomass. In this study *Cannabis sativa* (industrial hemp) was used for biorefinery purpose. The seed oil and seed cake extracts were used to generate biodiesel and check antimicrobial potential. Phytochemical screening of oil and extracts showed it has beneficial substances like flavonoids, saponins, etc. *Candida albicans*, *Aspergillus flavus*, *Aspergillus niger*, *Fusarium oxysporum*, and *Curvularia lunata*, exhibited susceptibility to extracts and oil, with N-Hexane showing highest activity. Multi-drug resistant bacterial strains (*Pseudomonas aeruginosa*, *Klebsiella pneumonia*, *Salmonella*) showed susceptibility to all extracts, with methanol being most susceptible and oil having minimal susceptibility. Chemical transesterification was used to evaluate the biodiesel production from seed oil. The biodiesel yield reached 84% after optimization under conditions: temperature 50 °C, oil: methanol ratio 1:9, catalyst 1%, RPM 600, and 90-minutes. The whole cell approach, with standard reaction conditions yielded 63% biodiesel. Hence, the study reveals that *Cannabis sativa* plant is an excellent feedstock for biorefineries.



O-122/ICAZ-2023

**Evaluation of Antimicrobial Activity of Eruca Sativa Leaves Extract and Their Zinc Oxide Nanoparticles**

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**Abstract:**

Scientific evidence of health risks associated with the continued use of synthetic chemicals has sparked a lot of interest in finding natural molecules. The natural molecules are produced by microbes, plants, and animals and served several uses, including antioxidant and antimicrobial. The genuine benefits of plant extracts on a specific human condition encourage us to screen indigenous plants that are also capable of antioxidant and antibacterial activities. Eruca sativa, sometimes referred to as "rocket salad," an edible plant native to the Mediterranean region and well-known for its therapeutic benefits. In current study the extract Eruca sativa leaves were prepared in a variety of solvents, including ethanol and water. The extracts were utilized as antimicrobials agent against *P. aeruginosa*, *K. pneumoniae*, *E. coli*, and *S. aureus*. Both the extracts provided the ability to suppress the growth of a variety of clinical isolates except *E. coli* which shows slight resistance to water extract. Furthermore, the biomass derived from Eruca sativa was then used to synthesize zinc oxide nanoparticles (ZnO-NPs). ZnO-NPs solution displayed maximum zone of inhibition against *P. aeruginosa* (25±1.66 mm) followed by *K. pneumoniae* (24±1.62 mm), *E. coli* (20±1.54 mm) and *S. aureus* (19±1.73 mm). Coating antibiotics with ZnO-NPs resulted in a considerable boost in the activity of the antibiotics against these strains. The study concluded that Eruca Sativa mediated ZnO-NPs might be considered safe and effective nano platforms against multi drug resistant species; Klebsiella pneumonia, Pseudomonas aeruginosa, Escherichia coli & Staphylococcus aureus.

O-123/ICAZ-2023

**Bacterial Production of Polyhydroxyalkanoate (PHA) Using Rice Bran And Molasses**

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**Abstract:**

Polyhydroxyalkanoates (PHA) are the most common biopolymer and are a natural alternative to synthetic plastics. Microbial PHA are polyesters found inside the cytoplasm in the form of granules. The production cost of PHA is very high, due to the use of expensive substrates. Therefore, this study focused on the use of cheap/waste carbon sources for the cost-effective production of PHA. Rice bran and sugarcane molasses were used as the carbon source for PHA production from *Bacillus subtilis*, *Bacillus cereus*, *Alcaligenes sp.* and *Pseudomonas aeruginosa*. In the case of rice bran, *P. aeruginosa* produced 93.7% PHA yield, 0.032 g/L cell dry mass (CDM), and 0.030 g/L PHA content. *Alcaligenes sp.* produced 87.1% PHA yield, 0.031 g/L CDM, and 0.027 g/L PHA content. *B. subtilis* produced a 69% PHA yield, 0.029 g/L CDM, and 0.02 g/L PHA content. *B. cereus* produced 35.5% PHA yield, 0.045 g/L CDM, and 0.016 g/L PHA content at 37 °C, pH 7. In the case of sugarcane molasses, *P. aeruginosa* produced 95% PHA yield, 0.02 g/L CDM, and 0.019 g/L PHA content. *Alcaligenes sp.* yielded 90.9% PHA, 0.011 g/L CDM, and 0.01 g/L PHA content. *B. subtilis* produced 91.6% PHA yield, 0.012 g/L CDM, 0.011 g/L PHA content; *B. cereus* produced 80% PHA yield, 0.015 g/L CDM, 0.012 g/L PHA content at 37°C, pH 7. A higher concentration of carbon sources increased the CDM and decreased the PHA yield. The maximum yield of PHA was obtained from sugarcane molasses. The incubation period of 24 – 48 hours was suitable for *B. subtilis* and *B. cereus* while 72 – 96 hours was suitable for *Alcaligenes* and *P. aeruginosa*. The extracted biopolymers were analyzed by Fourier transform infrared spectroscopy (FTIR), which identified the extracted biopolymers as poly-3-hydroxybutyrate P(3HB).



### O-124/ICAZ-2023

#### Evaluation Of Antimicrobial Potential Of Mgo Nanoparticles Against Multidrug Resistance Pathogens

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#### Abstract

The growing antimicrobial resistance is a big threat to public health. To combat this, nanoparticles (NP) have been found as an alternative to antibiotics. The current study involved the green synthesis of chitosan-based MgO NPs using leaf extract of *Trianthema portulacastrum*. Different techniques, such as UV-vis, SEM, TEM, FTIR, and XRD, were used to characterize the NPs, which were further evaluated for their antibacterial activity against *Enterococcus faecium*, *Staphylococcus aureus*, *Acinetobacter baumannii*, and *Pseudomonas aeruginosa*. The characterizations confirmed a UV-absorption peak at 290 nm, 20 nm crystallite size with approximately spherical morphology. The inhibition zones for the well diffusion assay were obtained between  $4 \pm 0.40$  mm –  $19 \pm 1.72$  mm. The maximum inhibition was obtained against *Acinetobacter baumannii*. It was also noticed that the MIC and MBC values for the Gram-positive bacterial isolates (125 µg/mL and 250 µg/mL, respectively) were higher in comparison to the Gram-negative ones (250 µg/mL and 500 µg/mL, respectively). This affirms the prospective of CH-MgO NPs as antimicrobial agents against drug-resistant pathogens.

### O-125/ICAZ-2023

#### Biogas Production Potential of Castor Bean (*Ricinus Communis L.*) Cake

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#### Abstract:

Rapid increase in the world's energy demand due to population growth and intense industrialization has resulted in the exhaustion of non-renewable fossil fuels. This depletion of fossil fuels has stimulated the search for alternative energy sources and one of the important alternatives is bioenergy. Waste management is another major issue in developing countries like Pakistan. So, utilization of waste material as a source of energy is an emerging concept. For example, utilization of biomass as a substrate for biogas production etc. In this study castor seeds were evaluated for their biogas production ability. Residues left after the solvent extraction process were utilized and their net biogas production was calculated. In the batch anaerobic digestion, maximum biogas yield was exhibited by the oil which was 0.619 NL/gVS. During the continuous anaerobic digestion process, maximum biogas yield was achieved by methyl acetate residues which was 312 Nml/ g of VS added per day. The current study signifies the use of castor seeds and its residues for the use of biogas production. Leftover residues after the solvent extraction not only provide a renewable source for biogas production but also can also be managed and utilized in a more sustainable way.

### O-126/ICAZ-2023

#### Evaluation of bitter melon (*Momordica charantia*) seed powder as a potential infertility inducer in male Nile tilapia (*Oreochromis niloticus*)

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#### Abstract

Nile tilapia (*Oreochromis niloticus*) is a pond breeder that shows prolific breeding which results in excessive recruitment of fingerlings in grow-out systems, thus lead to overcrowding and resource competition, and ultimately stunted and small-sized fish that are unable to command high market prices. Current research was conducted to investigate the effect of bitter melon (*Momordica charantia*) seed powder on (*O. niloticus*) fertility, which has previously been shown to suppress reproductive capability in mice and rats. *O. niloticus* fingerlings (10.2±2g) were distributed equally into six groups in replica of three. Fish were stocked in outdoor fibre tanks having 450 Liters of water with stocking density of 1g/l. Six experimental diets having 35% crude proteins with various doses of *M. charantia* seed powder (0, 2, 4, 6, 8 and 10g/kg diets) (representing C, S2, S4, S6, S8, and S10, respectively; C serves as the control) were prepared and fed the Tilapia fingerlings at the rate of 5% of their body weight for 90 days. The results showed that supplementing *M. charantia* seed powder had a significant ( $p < 0.05$ ) effect on reproductive



performance of *O. niloticus*. Experiment results indicated that gonadosomatic index, serum testosterone was decreased significantly ( $p < 0.05$ ) in treated groups. The order of significant decrease is as ( $C > S2 > S4 > S6 > S8 > S10$ ). Reactive oxygen species (ROS) in blood were decreased while there was a slight increase in antioxidant enzymes (SOD, POD, CAT) of testicular tissues. Histological examination of the testicular tissue revealed that in the control group, sperm were observed to have been released into the lumen of the seminiferous tubules. In contrast, the S10 group display the lowest number of sperm within the tubular lumens. Histological observations, GSI and serum testosterone concentration reveals that *M. charantia* seed is an efficient reproductive inhibitor in *O. niloticus* thus could be employed to manage overpopulation in Nile tilapia.

**O-127/ICAZ-2023**

**Development of Bee Wax and Arabic Gum Edible Fruit Coating with Cinnamon Oil to Enhance the Postharvest Shelf Life of Lemon (*Citrus limon*)**

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<sup>1</sup>Department of Zoology, Lahore College for Women University, Lahore Pakistan.

**Abstract**

The shelf life of soft fruits is extremely short and millions of tons of fruits have been wasted annually. The present study was conducted to formulate honeybee wax, arabic gum, and cinnamon essential oil edible coating to enhance the postharvest storage quality of *Citrus limon* (lemon) at ambient temperature. Edible coating formulated with five different formulations i.e. F1 = 100% beeswax (BW), F2 = 100% Arabic (AG) gum, F3 = cinnamon oil (CEO), F4 = 70 (Bee wax): 20 (Oil): 10 (Arabic gum), F5 = 60 (Bee wax): 20 (Oil): 20 (Arabic gum). Lemons were divided into six groups (five experimental and one control). A thin film of the edible coating was applied to the *C. limon* and was kept at ambient conditions. All formulations were characterized by analyzing quality parameters at different intervals: % weight loss, pH, antioxidant capacity, firmness, shrinkage, yellowing, ascorbic acid, juice content, and % decay incidence. Results showed that the coating containing BW, AG, and CEO (70: 20: 10) more effectively minimized weight loss, maintained firmness, colour, pH, % juice content, and higher DPPH radical scavenging activity in lemon fruits. Additionally, the coating contributed to the retention of essential nutrients and antioxidants, such as vitamin C, and zero deterioration found in the fruits as compared to other treatments and control. Overall, the prepared edible exhibited significant potential in enhancing the shelf life of lemon without the need for cold storage, offering a sustainable approach to postharvest preservation.

**O-128/ICAZ-2023**

**Evaluation Of Bactericidal, Antioxidant And Cytotoxic Potential Of Characterized TiO<sub>2</sub> and ZnO Nanoparticles: A Novel Comparative Study**

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**Abstract**

Present study aimed to determine the antibacterial, antioxidant and cytotoxic potential of Titanium dioxide nanoparticles (TiO<sub>2</sub> NPs) and Zinc oxide nanoparticles (ZnONPs) against gram negative bacteria (*Escherichia coli*, *Pseudomonas aeruginosa*, and *Klebsiella pneumoniae*). Nanoparticles were characterized by UV-Vis spectrophotometry, size analyzer, scanning electron microscopy (SEM), fourier transform infrared spectroscopy (FTIR) and thermogravimetric analysis (TGA). Minimum inhibitory concentration (MIC) was determined by standard agar dilution method. Different concentrations of NPs in distilled water (0.2 mg/mL, 0.4 mg/mL, 0.6 mg/mL, 0.8 mg/mL, 1.0 mg/mL, 1.2 mg/mL and 1.4 mg/mL) were used to find out the antimicrobial activity by disc diffusion method. The antioxidant activity and cytotoxicity of these NPs was also analyzed by DPPH ( $\alpha$ - $\alpha$ -diphenyl- $\beta$ -picrylhydrazyl) radical scavenging activity and brine shrimp cytotoxicity assay respectively. The MIC of TiO<sub>2</sub> NPs for *E. coli*, *P. aeruginosa* and *K. pneumoniae* was 0.04 mg/ mL, 0.08 mg/ mL and 0.07 mg/ mL respectively while the MIC of ZnONPs against the above strains was 0.01mg/ mL, 0.015 mg/mL and 0.01 mg/mL. The highest zone of inhibition was observed for *K. pneumoniae* at 20 and 25mm and against ZnONPs respectively, at 1.4 mg/mL of nanoparticles. The susceptibility of NPs against bacterial strains evaluated in order: *K. pneumoniae* > *P. aeruginosa* > *E. coli*. The antioxidant activity of nanoparticles increased by increasing the concentration of NPs while cytotoxic analysis showed non-toxic effect of ZnO NPs and TiO<sub>2</sub> had toxic effects on 1.2 and 1.4 mg/ mL concentrations.



Results revealed that ZnO NPs acts as strong antibacterial agent as compared to TiO<sub>2</sub> NPs..

**O-129/ICAZ-2023**

**Investigation Of The Blood Physiology, Histopathology, And Immune Response Of Fusarium Oxysporum Challenged Fish**

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**Abstract**

*Labeo rohita* was challenged with *Fusarium oxysporum* and the immune response was examined. The infected fish showed altered levels of total serum protein, albumin, globulin, A/G ratio, aspartate aminotransferase, alkaline aminotransferase, alkaline phosphatase activity, and cholesterol. There were noticeable histopathological changes in the kidney, liver, and gills, including fusion of the gill lamella, necrosis, edema, vacuolization, glomerulus congestion, and altered renal tubules. The cumulative HAI analysis data suggested that the order of histological deformities in infected fish was liver > gills > kidney. Tissue-specific gene expression data showed that interleukin was upregulated in infected fish gills, liver, and kidney but downregulated in blood. Expression of the tumor necrosis factor- $\alpha$  was upregulated in the blood, liver, and kidney while downregulated in the gills. Interferon- $\gamma$  was found to be upregulated in the blood, gills, and kidney, but downregulated in the liver. All the cellular and molecular findings from this study can be taken as crucial biomarkers in the advancement of diagnostic techniques to monitor the fish's health and early immune responses against pathogens.

**O-130/ICAZ-2023**

**Effect Of Nano Encapsulated And Microencapsulated Fermented Fish Feed And Fish Hydrolysate Feed On The Growth, Survival, Intestinal Morphology And Growth Gene Of Early Hatchling Of *Labeo rohita* (Rahu)**

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**Abstract**

A 35 day feeding trial in a replicate of three was conducted to evaluate the impact of nanoencapsulated and microencapsulated fermented fish feed and fish hydrolysate feed on early rearing of rohu (*Labeo rohita* (Hamilton, 1822)). Larvae 3 days after hatching (DAH) were evenly distributed into five groups; T1 was reared on nanoencapsulated hydrolysate feed, T2 was on microencapsulated hydrolysate feed, T3 was on microencapsulated fermented feed, T4 was on nanoencapsulated fermented feed a control reared by egg albumin and rice polish. All groups showed a feed-dependent survival, intestinal morphology, increase in growth and the expression of genes involved in feed intake and growth with age DAH. The T1 group showed significantly higher survival (89.33%) followed by T3 (88.67%) then by T2 (82%), The T1 group showed significantly higher weight gain, specific growth rate followed by the T3 group, followed by T4, while the highest expression of ghrelin was observed in T3 followed by T1 and then by T4. The intestinal morphology of all were good but the best development of villi and cells were found in T3, followed by T4, and then by T1. Comparing all the groups with control all the parameters in treatment groups was higher and best than the control.

**O-131/ICAZ-2023**

**Erythropoietic Gene Expression After Acute And Chronic Exposure Of Dinoteferon In Wister Rats**

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**Abstract**

The present research investigates the impact of neonicotinoid exposure, both acute and chronic, on erythropoiesis in a mammalian model. Neonicotinoids, widely used insecticides targeting insect-specific nicotinic acetylcholine receptors, have raised concerns due to their potential adverse effects on non-target organisms. This study shows the effects of neonicotinoid pesticides on the process of erythropoiesis within mammalian bone marrow. Using a controlled experimental design, the mammalian subjects were exposed to varying concentrations of neonicotinoids over defined time periods, simulating acute and chronic exposure scenarios. Erythropoiesis, the intricate process of red blood cell formation, was evaluated through bone marrow samples. Findings provide valuable insights into the impacts of neonicotinoids on erythropoiesis under different exposure regimes. The results show potential disruptions in bone marrow function due to neonicotinoid exposure. This research not only contributes to our understanding of



neonicotinoid effects beyond their primary targets but also underscores the importance of comprehensively evaluating their impact on mammalian health.

Key Words: Gene expression, Erythropeiosis, Neonicotinoids

**O-132/ICAZ-2023**

**Whitefly and Mealy Bugs' Management in Citrus Fields by Solar Light Trap**

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**Abstract**

Citrus pest management is one of the most dynamic components of citrus pre-harvest production. Citrus whiteflies and citrus mealybugs are the major insect pests of citrus orchards in district Sargodha, Pakistan. Population densities of different sucking pests of citrus and their biological control agents were studied in citrus orchards. Aim of the study was to employ non-insecticide methods to bring the pest population down to safe levels. Observations were recorded regular interval of 10 days to check the population of pests that was trapped in solar light traps. Each site had eight different plants from which the data were obtained. Each trap's insect pest catch was collected in tiny mesh bags, which were then taken into the lab for identification.

The maximum number of Citrus whiteflies was captured in the month of March that was 220 while the minimum number of Citrus whiteflies captured in the month of January that was 67. The Shannon diversity index was 0.588, evenness 0.849, richness (species number) 2, total individuals 109, and average population size 54.5 in the last week of March. The maximum number of mealybugs captured in the month of April that was 146 while the minimum number of Citrus mealybugs captured in the month of January that was 50. The Shannon diversity index was 0.637, evenness 0.918, richness (species number) 2, total individuals 105, and average population size 52.5 in the first week of April. Maximum number of pests were attracted toward the blue light as compared to white and red light.

Due to its environmental safety, energy independence, economic effectiveness, sustainability, the solar light trap was more successful than insecticides. Biological control is particularly desirable because the tactic is environmentally safe, energy self-sufficient, cost-effective, sustainable, and can be readily incorporated into integrated pest management (IPM) programs.

**O-133/ICAZ-2023**

**Effect of Datura Stramonium Phenolic Compounds On Behavior And Blood Chemistry Of Rotenone Induced Parkinsons Rat Model**

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**Abstract:**

Parkinson disease is chronic disease of the central nervous system mostly induced by chemicals spreading worldwide. Rotenone is an inducer of Parkinson's rat model an active compound of insecticides. The study was aimed to find out the toxic effect of chemicals on interlinked disfunction of body organs, and possible therapy by Datura stramonium (leaves and fruits) active compounds. Datura stramonium (leaves and fruits) extract contents were identified by Gas chromatograph mass spectrometry analysis, having phenolic compounds with rich antioxidant capacity. Model animals were divided into four groups, first group was considered as control, second group was administered with rotenone, third group with rotenone + Datura stramonium (leaves and fruits) extract and the fourth one with Datura stramonium (leaves and fruits) extract only. 28 days treatment plan was designed. Behavior analysis of study indicated that PD carriers lost basal ganglion movement, muscle strength, coordination, balance and muscle stability. Blood serology exhibit that low level of hemoglobin is associated with iron deficiency, an indicator of reduce dopaminergic activity and basic cause of PD, high level of glucose also reduces dopaminergic activity. Datura stramonium (leaves and fruits) extract treated groups have higher level of hemoglobin as compared to control and rotenone treated groups.



**O-134/ICAZ-2023**

**Unveiling the In-vivo Apitherapeutic Potential of Various Honey Types in Regenerating Pancreatic  $\beta$ -cells and Restoring Their Dysfunction**

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**Abstract**

Diabetes mellitus consists of a group of metabolic disorders relating to the metabolism of carbohydrates, which is illustrious by elevated levels of glucose in the blood circulation. This elevated blood glucose levels are caused by impaired insulin secretion or action. Researches demonstrate that the destruction of beta cells in type 1 diabetes and later stages of type 2 diabetes. Due to limited self-regenerative capacity of insulin producing beta cells, there is growing interest in exploring pharmaceutical and natural products that could play a crucial role in treating type 1 diabetes (T1D) and potentially a subset of type 2 diabetes (T2D). Our previous study emphasised the regenerative potential of beta cells supplemented with manuka honey, suggesting the potential role of its integral antioxidants in combating diabetes mellitus. In this study, we investigate various local honey varieties, including berry, acacia, and jujube honey. According to a statistical analysis of the data, jujube honey outperformed the other examined varieties in terms of reducing oxidative stress, improving insulin production, and effectively mitigating degenerative changes in pancreatic islets. Additionally, it resulted in a significant overexpression of transcription factors which is suggestive of pancreatic beta cell regeneration. According to our research, jujube honey may have medicinal value as an antioxidant and antidiabetic. It may be able to lessen some of the complications related to diabetes and encourage the regeneration of pancreatic beta cells.

**O-135/ICAZ-2023**

**Study of tio<sub>2</sub> Nanoparticles Induced Cardiotoxicity In *Oreochromis niloticus* (Nile tilapia)**

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**Abstract:**

One of the most created and often utilized artificial nanoparticles in industrial applications are titanium dioxide nanoparticles. The growth of nanotechnology applications has raised the danger of nanoscale metal exposure in humans, the environment, and aquatic life. Consequently, the quest of this exploration was to assess the cardiotoxicity of TiO<sub>2</sub> NPs in the heart of *O. niloticus*. TiO<sub>2</sub> LC<sub>50</sub> was estimated to be 17.4 mg/L. Then, for 14 days on alternate days, fish were subjected to duplicate doses of 1/10<sup>th</sup>, 1/5<sup>th</sup>, and 1/2<sup>nd</sup> of LC<sub>50</sub>. At the beginning, six fish with original weight of their bodies were measured in gm (60-70 g) were placed at random to each tank. Analysis revealed substantial changes in RBCs, WBCs, Hb, and hematocrit, among other variables. Fish were dissected after the trial, and a sample of each fish's heart was taken for histopathology. AST, ALT, catalase, glutathione, and superoxide dismutase extents were all significantly changed in the investigational group of fish than in the reference groups. The findings demonstrated that tissue damage, a change in the quantity of blood cells, and disturbances in *O. niloticus* enzymes were all brought on by the presence of extremely small amounts of TiO<sub>2</sub>NPs. These findings will encourage researchers to deal with toxicological problems brought on by nanotechnology.

**O-136/ICAZ-2023**

**Molecular Genetic Study Of Wilson Disease**

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**Abstract:**

The human body requires a small amount of copper for various functions. However, if there is any mutation in ATP7B abnormal accumulation of copper can cause damage to organs such as the liver and brain. This leads to Wilson disease, which presents with neurological, hepatic, and psychiatric abnormalities. Fortunately, Wilson disease is treatable if diagnosed early, allowing patients to live almost healthy lives. The objective of this study was to detect mutations in patients with Wilson disease. To accomplish this goal, a sample of fifteen Wilson disease patients underwent testing for general biochemical parameters and clinical characteristics. After suspecting Wilson disease through clinical and biochemical observations, patient samples were processed for genetic analysis to identify disease





causing genetic variants. This was followed by genetic screening of affected Wilson disease patients. Genetic analysis focused on the hotspot (coding regions) exons (Nos. 2, 3, 5, 8, 13, 14, and 15) for mutation analysis. This research has successfully identified mutation p.Cys271\* in patients with Wilson disease. In addition, our in-house developed ARMS-PCR assays were used to screen all Wilson disease patients for the targeted genetic variants. These molecular assays have successfully identified fifteen Wilson disease patients with a mutation (p.271\*, c.813C>A) using ARMS-PCR. In conclusion, while biochemical and clinical parameters are helpful in diagnosing symptomatic Wilson disease patients – these are usually late (i.e. after the appearance of clinical symptoms), molecular genetic analysis can detect the Wilson disease at an early stage.

**O-137/ICAZ-2023**

**Formulation of Novel Nano Vesicular Fatty Acid Structures for Enhanced Topical Delivery of Antifungal drug**

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**Abstract**

This study intended at encapsulating an antifungal Miconazole nitrate (MN) into advanced novasomes for improving its permeation into the skin and clinically modifying its therapeutic effectiveness. Novasomes containing free fatty acid (FFA) as a penetration enhancer were prepared using ethanol injection method and explore the novasomes features regarding entrapment efficiency percent (EE%), particle size (PS), polydispersity index (PDI) and zeta potential (ZP), Scanning electron microscopy (SEM), Fourier-transform infrared spectroscopy (FTIR), Thermogravimetric analysis (TGA), Differential scanning calorimetry (DSC), MIC (Minimum inhibitory concentration), Agar well diffusion method were explored. The optimized formulation MN7 including 30 mg lipid constituents and Span 60 to oleic acid in a ratio of 2:1 (w/v) exhibited an EE% = 97.45%, PS = 154 nm, PDI = 0.019 and ZP = ±14 mV. Further, MN7 showed superior inhibition of *Candida albicans* growth relative to MN suspension using resazurin reduction assay. Medicated novasomes MN7 had valuable results against *Candida albicans* with maximum zone of inhibition 23.667±0.667mm. The Minimum inhibitory concentration for MN7 was lower than that of the unloaded novasomes (12.5 and 25 mg/mL respectively). The cell viability remained above 85% showing that formulation is non-toxic and safe. Concisely, the results showed that MN7 had a high level of effectiveness in treating skin fungal infections.

Keywords: Miconazole nitrate, Novasomes, Antifungal activity

**O-138/ICAZ-2023**

**Ameliorative Potential Of Luteolin Against Polystyrene Microplastics Instigated Renal Toxicity In Rats**

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**Abstract:**

Polystyrene microplastics (PSMPs) due to their potential adverse effects, pose serious threat to the health of humans as well as other organisms. Luteolin (LUT) is a natural flavonoid which demonstrates a wide range of pharmacological activities. The present study was designed to assess the ameliorative ability of LUT against PSMPs instigated renal toxicity in albino rats. Twenty-four rats were apportioned into four equal size groups including control, PSMPs (0.01 mg/kg), PSMPs (0.01 mg/kg) + LUT (30 mg/kg) and only LUT (30 mg/kg) treated group. It was revealed that activities of catalase (CAT), superoxide dismutase (SOD), glutathione peroxidase (GPx), glutathione S-transferase (GST), glutathione reductase (GSR) & glutathione (GSH) contents were reduced while the levels of reactive oxygen species (ROS) and malondialdehyde were escalated in response to PSMPs exposure. Moreover, PSMPs administration upregulated the levels of KIM-1 and NGAL. Similarly, PSMPs treatment increased the levels of urea and creatinine while reducing the levels of creatinine clearance. Additionally, the levels of inflammatory biomarkers nuclear factor-κB (NF-κB), tumor necrosis-α (TNF-α), interleukin-6 (IL-6), interleukin 1beta (IL-1β), & cyclo-oxygenase-2 (COX-2) activity were escalated due to PSMPs exposure. Besides, administration of PSMPs elevated the levels of Bax and caspase-3 while downregulating the levels of Bcl-2. Furthermore, PSMPs exposure disrupted the normal architecture of renal tissues. Nevertheless, LUT supplementation revoked abovementioned impairments via regulating antioxidant, inflammatory and apoptotic biomarkers.



**Keywords:** Luteolin, Polystyrene microplastics, Apoptosis, Renal damages, Inflammation

**O-139/ICAZ-2023**

**Exploring Bioactive Compounds from Medicinal Plant Species to Treat Male Infertility: An *In Silico* Study**

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**Abstract**

Male infertility is a major global health problem in which a sexually active partner is unable to attain pregnancy within a year without the use of contraception. Due to various anomalies, the male factor has become more significant in infertility cases in recent decades, accounting for almost half of all instances. The current study was aimed to present the benefits of products derived from several species of medicinal plants and to show why these products should be used in innovative ways to treat male infertility. High performance liquid chromatography was employed to reveal phenolics from the methanol extract of leaves and stems of selected plant species (i.e., *Withania somnifera*, *Tribulus terrestris*, *Cinnamomum verum*, *Muira puapa*). Molecular docking using PyRx software was employed to reveal binding interactions between phytochemicals and receptor proteins involved in male infertility. BIOVIA Discovery studio was used to understand plausible functional and binding relationships between male infertility-causing proteins and phytochemicals reported from chosen plant species. The online bioinformatics tool Swiss ADME was used to examine the drug-like qualities of phytochemicals with the strongest binding interactions and the best docking score. The interactions between the phytochemicals and the receptor proteins showed that the selected phytochemicals from these plants could be used in the treatment of male infertility in future.

**O-140/ICAZ-2023**

**Pharmacological and Toxicological Evaluation of Methyl 4-Hydroxy -2H-1,2-Benzothiazine -3-Carboxylate 1,1-Dioxide against Haloperidol Induced Parkinson like Symptoms in animal model: In-Vitro and In-Vivo Studies**

Liaqat Hussain

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**Abstract**

In Parkinson's disease (PD), degradation of dopaminergic neurons in substantia nigra causes striatal deficiency of dopamine, which results in tremors, bradykinesia with instability in posture, rigidity and shuffled gait. Prevalence of PD increases with age as from 65 to 85 years. In an attempt to devise targeted safe therapy, nanoparticles of methyl 4-hydroxy -2H-1,2-benzothiazine -3-carboxylate 1,1- dioxide (MBD) (MBDN), were prepared and their acute toxicity and safety was evaluated. Thirty-six healthy albino mice were randomly divided into six groups (n=6): normal control, diseased control, standard (levodopa/carbidopa (100/25 mg/kg) and the remaining three groups were administered 1.25, 2.5 and 5 mg/kg MBDN during 21 days study. Except control, all mice, were injected haloperidol (1mg/ kg i.p.) 1-hour prior to treatment to induce PD. Acute toxicity test showed, no effect of MBDN on lipid profile, brain, renal and liver function and histoarchitecture of kidney, liver and heart, except decreased (P < 0.05) platelet count. Behavioral studies showed significant improvement (p < 0.001) in motor function and reduction of oxidation status in a MBDN in a dose dependent manner. Thus, the study findings revealed significance of MBDN as a selective MAO-B inhibitor for the improvement of Parkinson's symptoms in animal model.

**O-141/ICAZ-2023**

**Assessment of the anti-fertility potential of castor bean seed powder (*Ricinus communis*) on Nile Tilapia (*Oreochromis niloticus*)**

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**Abstract:**

This study was aimed to investigate the potential antifertility effects of castor bean seed (CBS) on the fingerlings of Nile Tilapia (*Oreochromis niloticus*). After acclimatization, a 60 days feeding trial was conducted on the fingerlings of the average body weight 7.5±1.5 grams. The fish were divided into four random groups and each



group had triplicates. T0 served as a control group while the rest were treatment groups (T1, T2 and T3). 5, 10 and 15 grams/kg feed of CBS powder was the dose administered to T1, T2 and T3 respectively. Histological studies revealed that the gonads were drastically destroyed, affecting the sperm and egg count. Among the treated groups, T3 (15 grams/kg feed of CBS) showed a significant decrease ( $p < 0.01$ ) in sperm and egg count. Along with the antifertility, CBS powder had also a pronounced effect on growth performance. The final body weights of treated groups were higher (with T3 the highest) than the control group (T0) which suggested that the energy for the reproduction was being used for growth.

**O-142/ICAZ-2023**

### **Screening Of Trace And Essential Elements In The Serum Of Gastrointestinal Cancer Patients As Compared To Controls**

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#### **Abstract**

Gastrointestinal cancer has inflicted huge threats to the health of mankind. Metal pollution has been introduced as a possible contributor to increasing the risk of gastrointestinal cancer development. The present study was aimed to analyze Cd, Zn, Fe, Cr, Ni, Hg, Pb and Se in the serum of gastrointestinal cancer patients and healthy subjects employing nitric/perchloric acid based wet digestion followed by quantification with atomic absorption spectrophotometry. The average Cd and Cr exhibited significantly higher levels ( $p < 0.05$ ) in the serum of gastrointestinal cancer patients than healthy donors, however, mean Hg, Se and Zn were considerably higher in the controls. Dissimilarity in the trace metal distribution was also revealed with nutritional habits, and smoking habits of both donor groups. The correlation study and multivariate statistical analyses exhibited some significantly divergent associations and apportionment of the metals in the cancer patients and controls. Noticeably, variations in the elemental levels were also measured for different types (colorectal, gastric and oesophagus) of gastrointestinal cancer patients. Overall, comparative variations of the metal concentrations in serum of the gastrointestinal cancer patients were significantly different than the healthy donors; consequently, determination of toxic trace metals status may be indicative of pathological disorders, such as gastrointestinal cancer system.

Keywords: Gastrointestinal cancer, Metals, Healthy subjects, Serum, AAS

**O-143/ICAZ-2023**

### **Prevalence and Diversity of Haemoparasites of Lizards in District Dir KPK Pakistan**

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Quaid-i-Azam University Islamabad

#### **Abstract**

Reptiles are cold-blooded animals having 11,733 species worldwide and 195 species in Pakistan. Among the reptiles lizards are most diversified and widely distributed group having 7,176 species worldwide and 103 species and subspecies in Pakistan. A total number of 49 lizards were collected from four sampling sites i.e. Biyar (n=18), Chera Galai (n=15), Munda (n=12) and Sheringal (n=4) from March to September 2022 in district Dir (upper and lower) Khyber Pakhtunkhwa, Pakistan. The lizards were captured by means of glue traps. Blood samples were collected from coccygeal vein, forming a thin blood smear and stained with giemsa and were screened for the presence of haemoparasites. Over all prevalence of haemoparasites 24.5% (n=12/49) were detected in lizards of 4 species comprised of two major groups: Apicomplexa (Schellackia and hepatozoan) and bacterial organism (Rickettsia). The prevalence of parasite varied among the four different sampling sites with the highest prevalence observed in Biyar 18.4% (n=9/49) while a 2.04% (n=1/49) prevalence was observed in the remaining three sampling sites Chera Galai, Munda and Sheringal. We also found an increasing trend in the prevalence of haemoparasites along the elevational gradient. Family Agamidae had the highest prevalence, with 22.5% (n=11/49) lizards. For lizard species *Laudakia tuberculata* was the most parasitized host with 50% (n=9/18) positive individuals.



**O-144/ICAZ-2023**

**Effect of Probiotics on Growth Enhancement and Disease Resistance in Freshwater Fish**

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**Abstract**

Probiotics are widely used in aquaculture to promote the growth and health of fish, particularly in terms of their ability to defend against pathogenic agents. The present study was designed to evaluate the impact of *Lactobacillus rhamnosus* (*L. rhamnosus*) probiotic on the growth performance and disease resistance of *Oreochromis niloticus* (*O. niloticus*) fingerlings. The results of this study revealed that fish treated with *L. rhamnosus* displayed enhanced growth rates. Significant variations in the composition of macromolecules, including amino acids, fatty acids and carbohydrates, between the treated and control groups were observed. Elevated levels of thyroid hormones were observed in the probiotic-treated groups. Challenged assay was performed with probiotics in which fish was intramuscularly challenged with *Aeromonas hydrophila* (*A. hydrophila*). Fish were divided into four distinct groups: the control, probiotic-treated, infected and infected + probiotic-treated groups. Significant variations in hematological parameters were noted among the control and treated groups. Marked histopathological changes in gills, liver and kidney were recorded in pathogen challenged group in comparison to control and probiotic treated groups. Furthermore, the survival rate of the fish was higher in the probiotic-treated group. The findings of this study provide evidence that probiotic supplementation serves to enhance the growth and the immunity of *O. niloticus*. Therefore, it is recommended that *L. rhamnosus* show great potential as dietary additives for boosting fish growth and strengthening their defense mechanisms against microbial diseases.

Key words: Growth Performance, Probiotics, Disease Resistance, *Aeromonas hydrophila*, *Lactobacillus rhamnosus*

**O-145/ICAZ-2023**

**Association of CDKAL1 Gene Polymorphism (rs10946398) with Gestational Diabetes Mellitus In The Pakistani Population**

Aleesha Asghar, Sabika Firasat, Kiran Afshan, Shagufta Naz

**Abstract:**

Background CDK5 regulatory subunit associated protein 1 like 1 (CDKAL1) encodes a tRNA modifying enzyme involved in the proper protein translation and regulation of insulin production encoded by the CDKL gene. Sequence variations in the CDKAL1 gene lead to the misreading of the Lys codon in proinsulin, resulting in decreased glucose-stimulated proinsulin production. Various polymorphic sequence variants of the CDKAL1 gene such as rs7754840, rs7756992, rs9465871, and rs10946398 are reported to be associated with type 2 diabetes mellitus and gestational diabetes mellitus (GDM) incidence. One of these single nucleotide polymorphisms i.e., rs10946398 has been reported to impact the risk of GDM and its outcomes in pregnant women of different ethnicities i.e., Egypt, Chinese, Korean, Indian, Arab, and Malaysian. Numerous findings have shown that rs10946398 overturns the regulation of CDKAL1 expression, resulting in decreased insulin production and elevated risk of GDM. However, there is no data regarding rs10946398 genotype association with GDM incidence in our population. Methodology In this study, 47 GDM patients and 40 age-matched controls were genotyped for rs10946398 CDKAL1 variant using Tetra primer Amplification Refractory Mutation System Polymerase Chain Reaction (Tetra ARMS-PCR). 2 Results Analysis of the results showed the significant association of the C allele of CDKAL1 SNP rs10946398 ( $\chi = 0.02$  p = 0.001) with the risk of GDM development. Conclusively, the results support the role of SNP i.e., rs10946398 of CDKAL1 gene in GDM development in Pakistani female patients. However, future large-scale studies are needed to functionally authenticate the role of variant genotypes in the disease pathogenesis and progression.



**O-146/ICAZ-2023**

**Utilization of Anaerobic digestion for Organic Waste Management and Energy Generation**

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Quaid-i-Azam University, Islamabad, Pakistan.

**Abstract:**

Due to increasing global population and an ever-increasing demand for food yield, resulting in production of huge amount of waste (agricultural, industrial, municipal and animal). These wastes have detrimental effect on the environment and public health. Various waste management and processing technologies have been developed recently including recycling, incineration, pyrolysis, gasification, composting, landfilling and anaerobic digestion that transform waste generated from various sources into renewable bioenergy and curtail the untoward effect of waste that pollute the environment and deteriorate public health. The anaerobic digestion due to advancement of technology has the potential to produce enhanced biogas and energy production and to reduce the untoward effect of various wastes. The valuable products of the process are biogas and biofertilizer and the biogas can be converted into heat and energy. As the waste of various sources is key challenging for the environment and public health, it is necessary to minimize its detrimental effect. In conclusion, it is highly recommended, that anaerobic digestion should be used as alternative for waste management and generation of sustainable energy.

**O-147/ICAZ-2023**

**Null models for understand intertidal decapods communities in North Patagonian beach (Pelluquin, 41°S, Chile).**

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**Abstract**

The intertidal decapods in continental Chile are characterized by its species sharing with Peruvian coast along practically all coast, being coexisting species that has not studied with details its interspecific interactions. The aim of the present study is applying null models for understand if the intertidal decapod community is random or not-random. The results revealed that species associations were random, due probably to many species repeated in samples, and the niche sharing results revealed that species reported do not share niche, and in consequence there is not interspecific competition. The obtained results partially agree with other similar observations for Chilean coast, and it would be explained due the oceanographic conditions.

Keywords: intertidal decapods, null models, northern Patagonia, rocky shore.

**O-148/ICAZ-2023**

**Effects Of Moringa oleifera Leaf Meal On Overall Performance Of *Cirrhinus mrigala* Fingerlings Cultured In Earthen Ponds**

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**Abstract**

The goal of this research was to evaluate the effects of Moringa oleifera leaf meal (MOLM) on the overall performance of *Cirrhinus mrigala* fingerlings reared in six earthen ponds. Fishmeal (FM) was substituted with MOLM at various levels in the diet: 0%, 10%, 15%, 20%, 25%, and 30%. Throughout the study, one control diet and five experimental diets were used. For fifteen days, fingerlings were acclimated to laboratory settings in an experimental tank. There were 15 fingerlings put into each of the six earthen ponds, for total of 90 fingerlings. When compared to other experimental and control groups, analyses revealed that fish given a diet based on 10% MOLM had the highest



growth performance. Fingerlings fed a diet that substituted 10% of FM with MOLM showed the greatest results for body composition, hematology, and body mineralization. The current study found that performance of fingerlings enhanced when

10% of FM in the diet substituted with MOLM.

O-149/ICAZ-2023

**Computational Study Of Structural Properties Of Irgacure 2959 For Its Potential To Act As Drug For Alzheimer's Disease**

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**Abstract:**

The potential energy surface scan of the Irgacure-2959 molecule was performed and most stable molecular structure of the molecule was predicted. FT-IR and FT-Raman spectra of the molecule were recorded. The calculated and observed wavenumbers were assigned. The UV-Vis spectrum of the molecule shows the possible electronic transitions of the molecule. The frontier molecular orbitals analysis indicates chemical reactivity and bioactivity of the molecule. The molecular electrostatic potential surface reveals the electrophilic and nucleophilic reactive sites of the molecule. The heat capacity, entropy and enthalpy values of the molecule were calculated in the temperature range from 50 to 500 K. The natural bond orbital analysis authenticates the stability of the molecule. Moreover, the molecular docking analysis reveals that the title molecule can act as a potent inhibitor against the acetylcholinesterase enzyme. Hence, the present investigation paves the way for developing effective drugs in the treatment of Alzheimer's disease.

O-150/ICAZ-2023

**Fish Feed Formulation by Replacement of Fishmeal: Implications for Sustainable Aquaculture**

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**Abstract:**

Aquaculture is the fastest developing industry that is becoming increasingly vital across the globe in order to feed the world's starving population. Nowadays, the total production of aquatic animals in aquaculture has reached about 87.5 million tons. More than 70% production of this industry relies on the external feed. The primary feed ingredient in aquaculture is fish meal (FM), which has a balanced nutritional profile, great palatability, and a high concentration of growth-promoting substances. It has become expensive as a result of its high demand and static supply, which limits the expansion of this industry. Therefore, there is an urge to locate FM substitutes that are both broadly available and cost effective. This review highlights the use of plant protein sources in the feed industry, due to their various advantages such as sustainability, availability, cost effectiveness etc. Some of the alternatives such as soy bean meal, Moringa oleifera leaf meal, Moringa oleifera seed meal, canola meal, sunflower meal, and cottonseed meal, have been used extensively to replace FM, since they are more environment friendly, conveniently available, cost effective and sustainable than FM. Although, some anti-nutritional factors (phytate, tannins, saponins, trypsin inhibitors, gossypol) limit their usage in aquaculture. The first consideration for formulation of feed is the quality of the feed ingredients. Therefore, feed additives (antioxidants, antibacterial agents, pigments, enzymes, organic acids and hormones) are substances that are added to the fish feed, to not only fulfill the nutritional demands but also enhance the health, quality and composition of fish. This study also focuses on the addition of different supplements, i.e., enzymes, probiotics, organic acids, nanoparticles and biochar, to fish diets in order to address the limitations of plant by-products. By collating knowledge, it implies that further research work will be needed to ascertain the impacts of these alternatives for cost-effective and eco-friendly aqua-feeds.

Keywords: Plant by-products, replacement, feed formulation, cost effective, environment friendly



O-151 ICAZ/2023

**Understanding the Nexus Between Anesthetic Drugs and Infection: A Holistic Review"**

Manzoor Ullah

Abasyn University Peshawar

**Abstract:**

This comprehensive review delves into the intricate relationship between anesthetic drugs and the potential risks of infection. Anesthesia is a cornerstone of medical interventions, yet concerns have emerged regarding its impact on immune function and infection susceptibility. The review navigates through various classes of anesthetics, elucidating their immunomodulatory effects and exploring the implications for patient safety. Beginning with a discussion on the fundamental immunological mechanisms influenced by anesthetic agents, the review examines the diverse classes of anesthetics, including inhalational agents, intravenous induction agents, and neuromuscular blocking agents. Special attention is given to drug-induced immunosuppression and its consequences for infection risks. The review critically analyzes epidemiological data, clinical studies, and case reports to discern patterns in infections associated with specific anesthetic agents and procedures. Beyond direct effects on the immune system, the broader context of perioperative practices, such as aseptic techniques and sterilization protocols, is explored to identify strategies for optimizing patient safety. Considering contemporary challenges posed by emerging infectious diseases, the review discusses the adaptability of current protocols to evolving epidemiological landscapes. It aims to foster a nuanced understanding of the complex interplay between anesthetic drugs and infection risks, informing clinical practices and stimulating further research for enhanced patient care in the realm of anesthesia.

O-152/ICAZ-2023

***In-Vivo* Antibacterial Potential of Sol-Gel Synthesized Honey Mediated Zirconia Oxide Nanoparticles**

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**Abstract:**

Antibiotic resistance in microorganisms is a catastrophic threat to the human health all around the world. Staphylococcus aureus is renowned for its methicillin-resistant strains (MRSA) which is a global cause of hospital-associated (HA) and community-associated (CA) infections. Zirconia based nanomaterials have biomedical and biological properties i-e in drug delivery, antioxidant, anti-cancerous, and anti-microbial. The present study aims to synthesize Zirconia Oxide (ZrO<sub>2</sub>) nanoparticles by honey mediated sol-gel method. The structural characterization of nanoparticles (nps), surface morphology, crystalline structure was observed by FTIR, SEM and XRD respectively. In Vitro antibacterial activity of Zirconia nanoparticles was checked by using Clindamycin (CLI) as positive control. In Vitro activity against MRSA gave a synergistic effect. Bacterial mice (BALB/C) model was developed to investigate the antimicrobial activity of ZrO<sub>2</sub>. Histology of infected tissues was done by H&E staining. This model would be applicable for the evaluation of novel antimicrobial treatments of ZrO<sub>2</sub> nps against superficial infections caused by S. aureus (MRSA).

Keywords: Antibacterial, Zirconia NPs, Nanotechnology, Infectious disease, hemocompatible

O-153/ICAZ-2023

**Antimicrobial, Ant Diabetic and Free Radical Scavenging of *Capsicum annum* Green Synthesized Selenium Nanoparticles**

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**Abstract**

Selenium nanoparticle have gained more attention in biomedical field due to their biocompatibility, biodegradability and low toxicity. Generally, selenium nanoparticle has a high level of absorption in regular supplementation comparative to selenium. In the present study, Green synthesized method would be used to prepare selenium nanoparticles using Capsicum annum leaf extract. The structural characterization, crystalline



material structure and surface morphology of Se NPs would be done by FTIR, XRD, and SEM. Selenium nanoparticle would be subjected to antimicrobial activity against Gram positive cell culture to check the inhibition of bacterial growth. The  $\alpha$ -amylase and  $\alpha$ -glucosidase inhibitory assays would be used to check antidiabetic effect of selenium nanoparticles. DPPH assay would be used to indicate the antioxidant activity of selenium nanoparticles. Green synthesized Selenium nanoparticles would possess strong antimicrobial, antioxidant, and antidiabetic effect.

Keywords: Bioavailability, Selenium nanoparticles, Characterization, Drug delivery, Antioxidant, Antidiabetic, Antimicrobial activities.

#### O-154/ICAZ-2023

### Efficacy of Citric Acid Supplemented Canola Meal Based Diet on Proximate Composition and Growth Parameters of *Cirrhinus mrigala* Fingerling

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#### Abstract

Fishmeal being a limited and costly feed ingredient is continuously substituted with locally available plant protein sources. However, the occurrence of anti-nutritional factors in plant meal suppresses its potential to be fully replaced. Therefore, in this study, we aimed to check the synergistic effects of dietary additives such as citric acid on growth performance in *Cirrhinus mrigala* fingerlings. Canola meal was used as a test ingredient to replace fishmeal at graded levels such as; 0%, 1%, 2%, 3%, 4% and 5%. These six diets were further supplemented by varying levels of citric acid to formulate total six test diets named as T1, T2, T3, T4, T5, T6. Each treatment contained three replicates having 15 fingerlings in each tank; following 3×3 factorial arrangement. Chromic oxide (1%) was also added in these diets as an inert marker. Maximum weight gain% of *C. mrigala* (212%) and the best values of FCR (1.18), respectively, were recorded when fish fed on diet T4 (canola meal replacement level supplemented with 3% citric acid) compared to fish fed control diet T1 (without citric acid supplementation). Similarly, body composition values such as protein (17%), Ash (2.44%), and moisture (74%) were also noted for same diet. Improved values of body composition was also recorded when fish were fed on diet T4. In conclusion, canola meal replacement by fishmeal supplemented with citric acid at the levels of 3%, respectively proved beneficial in maximizing the growth performance and body composition *C. mrigala*.

Keywords: Fishmeal, canola meal, growth, body composition.

#### O-155/ICAZ-2023

### Spatio-Temporal Abundance and Diversity of Ground Beetles in Wheat Agro-Ecosystem of District Pakpattan

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#### Abstract:

The wheat crop has great economic importance in Pakistan. The present study was conducted to investigate the spatio-temporal abundance and diversity of Ground beetles in wheat crops. Sampling was done from December 2022 to May 2023 for six months. The fauna was sampled these techniques like pitfall and hand-picking method i.e. Rischen et al., (2023). The collected beetles were preserved in a 10% formalin solution and identified with keys i.e. Aruggoda et al., (2010). Shannon-Wiener index (1949) t-test and ANOVA was used to analyzed the data. In this study, Diversity index was calculated as ( $H' = 1.93$ ), Evenness ( $E = 0.99$ ) and Dominance ( $D = 0.86$ ). Value of (ANOVA) on relative abundance of Carabids species at three sites of District Pakpattan was ( $P = 0.0005$ ) which is significant at  $p > 0.05$ . Total 509 specimens were captured from three sites. The collected beetles' species were belonging to 6 sub-family, 7 genus and 9 species. Out of 509 species, 194 were collected from Chak 23/sp, 179 from Tibba Pakpattan and 136 from Adda Chawant. Diversity were found maximum in April and lower in February. Predacious Carabids of wheat were "Agonum dorsale, *C. inquisitor*, and *Pterostichus melanarius*". The data of this research was used for biological control programme by Carabid beetles.





O-156/ICAZ-2023

**Efficacy Of Different Types Of Biochar On Growth Performance And Body Composition Of *C. carpio* Fingerlings**

Muhammad Amjad<sup>1\*</sup>, Syed Makhdoom Hussain<sup>1</sup>, Zeeshan Yousaf<sup>1</sup>, Muhammad Faisal<sup>1</sup>

<sup>1</sup>Department of Zoology, Faculty of Life Sciences, Government College University, Faisalabad, 38000, Pakistan

**Abstract:**

The study was aimed to find out how different types of biochar supplemented sunflower meal diets influence the growth and body composition of *C. carpio* fingerlings. Seven different diets were tested in the experiment. A sunflower meal-based diet was supplemented with 2% of various types of biochar (cotton stick, wheat straw, corn cob, house waste, grass waste, and green waste biochar). The control diet was without biochar. As a non-digestible marker, chromic oxide was added to the diets. Each day, at the 5 % of their live wet weight, fingerlings were fed. The maximum weight gain (272.37%), lowest FCR (1.23), highest SGR (1.88) were recorded in corn cob biochar supplemented sunflower meal based diet test diet. In case of body composition, corn cob biochar supplemented sunflower meal based diet indicated significant ( $p < 0.05$ ) improvements in crude protein (17.87%) and crude fat (6.27%). From these results, it was concluded that 2% corn cob biochar supplementation in sunflower meal based diet is optimum for improving growth performance and body composition of *C. carpio* fingerlings.

O-157/ICAZ-2023

**Parkinson's Disease Induced Rat Model Histopathological Study of the Toxicity of *Datura stramonium* L. Leaf Extract and Rotenone on Vital Organs**

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Women univeristy Multan

**Abstract:**

Both conventional and modern medical systems have long recognized plants and herbs as very effective and dependable medicines. *D. stramonium* L. is one of these healing plants. A flowering plant that is primarily found in the wild, *Datura* is a great source of tropane alkaloids including atropine and scopolamine, which have anticholinergic properties. The Solanaceae family plant, *Datura stramonium* L. grows wild and is extensively dispersed and accessible. One of the recognizable traditional herbal remedies is *Datura stramonium* L. Atropine, hyoscamine, and scopolamine are only a few of the poisonous tropane alkaloids that are present in it. Several bodily organ systems may be compromised by *Datura stramonium* L. It is crucial that people, particularly among youth are before utilizing a plant, be knowledgeable of its toxicity and any possible negative effects. In recent years, a review of Rotenone's chemistry, biotransformation, pharmacology, toxicity, and carcinogenicity had done. It was necessary to carry out more research on the biotransformation pathways of rotenone and other rotenoids. Rotenone has been widely utilized to create a rat Parkinson's disorder framework but the disease's systemic impact on neuron other than dopaminergic sites or non-neuronal tissues are still poorly understood. We talked about histopathological alterations in the heart, liver, kidney, and lung tissues because *Datura stramonium* L. and rotenone are poisonous. Here, we conduct an experiment using the Wister albino male rat model. The two lethal herbs Rotenone and *Datura* were employed. The Rats were injected by *Datura* leaves and powdered Rotenone, which was used as fertilizer. Rats were injected with various doses. These two poisons had a highly negative effect on the rat organs, and also observed change in behavior through different experiments and the last experiment showed quite distinct outcomes. Both poisons were administered to the same rat, their combined effects as well as their individual effects were discussed.



O-158/ICAZ-2023

**Length-Length, Length-Weight Relationship And Condition Factor Of Wild Catla catla Collected During Spring Season From Satluj River Burewala, Pakistan**

Muhammad Mudassar Raza, Muhammad Naem

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**Abstract:**

Embarking on a scientific odyssey, the present study meticulously unravels the intricate connections between length and weight, as well as the interplay among various morphological parameters, in Catla catla, a freshwater fish species inhabiting the Satluj River in Pakistan. Through a rigorous examination of 71 specimens, meticulously procured between October 2022 and November 2023, a comprehensive understanding of the growth dynamics and overall health of this economically vital species emerges. Delving into the realm of length-weight relationships, a compelling positive allometric growth pattern unfolds, characterized by a regression coefficient (b) of 3.1017. This revelation implies that as the overall length of the fish augments, the relative size of its body components also amplifies, demonstrating a harmonious growth trajectory. Venturing further into the labyrinth of length-length relationships, robust and statistically significant correlations ( $P < 0.001$ ) among the examined length parameters emerge, painting a vivid tapestry of interconnectedness. This intricate interplay of morphological features underscores the holistic integration of various body components, contributing to the overall structural integrity and functional efficacy of Catla catla. Extending its reach to encompass the intricate dance of morphological parameters, the investigation unveils the associations between total length, wet body weight, condition factor, and other noteworthy morphological features. The Fulton condition factor (K), meticulously computed for each specimen, illuminates the overall health and well-being of the fish population, providing valuable insights for informed management practices. The findings gleaned from this meticulous endeavor offer significant contributions to the burgeoning knowledge base regarding the length-length and length-weight relationships in Catla catla. The acquired wisdom holds profound implications for fisheries management practices, stock assessment methodologies, and a comprehensive understanding of growth dynamics in this commercially valuable species. To further elucidate the intricacies of growth patterns and physiological adaptations in Catla catla, future research endeavors should delve into potential variations in these relationships across diverse populations and environmental conditions. Such investigations would undoubtedly deepen our understanding of the remarkable adaptability of this resilient species, paving the way for informed conservation and management strategies.

O-159/ICAZ-2023

**Comparative Microbiota of Farm Raised and Marketed *Labeo rohita***

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Fisheries Microbiology and Immunology Lab, Faisalabad.

Department of Zoology, University of Education, Lahore (Faisalabad) Campus

**Abstract:**

Microbiota analysis was used to assess a comparative study on the microbiota of farm-raised and marketed *Labeo rohita*. This study provided information regarding food contamination by various microorganisms as a pathogenic agent which inhibits their significance and played a critical control point farm programs raised and marketed fish to prevent useful and unhealthy foods from reaching to public. Fish is considered one of the vital white meat protein sources because it has imperative protein ingredients in the form of unsaturated fatty acids not only to cure heart ailments but also to play a significant role in other health hazards. But fish can be spoiled quickly due to the absence of modern preservative techniques because it can have a lot of microorganisms that cause serious threats to human health. Due to these facts, consumers have become more serious and conscious about these products. Fish and water samples were collected from earthen ponds, in sterilized polythene bags and bottles respectively. Collected samples were cleaned with distilled water and then transferred to an ice box. These samples were put in a refrigerator at 4°C, and wrapped in aluminum foil. Samples of bacteria from fish skin, meat, and organs were collected. For samples, 5 dilutions were formed. On petri plates, bacterial colonies are cultured by using culturing media. Tryptic soya agar (TSA), Nutrient agar (NA), Eosin methylene blue (EMB), and MacConkey agar were used to study the total viable counts in the bacterial community. Water samples from ponds were used to study the physio-chemical



parameters (pH, Temperature, Dissolved Oxygen, Total ammonia, Carbon dioxide, Total alkalinity, and Total hardness). Analysis of bacterial community viable count and physio-chemical parameters were measured by Tuckey's test.

### O-160/ICAZ-2023

#### The association of Dietary Phytochemical Index (DPI) And Dietary Inflammatory Index (DII) with Weight status of Overweight Reproductive Age Females

Maryeum Naveed<sup>1</sup>, Huma Umbreen<sup>1\*</sup>

<sup>1</sup>Department of Nutritional Sciences, Government College University Faisalabad

#### Abstract:

Numerous chronic diseases, such as diabetes, heart disease, cancer, and inflammatory disorders are mostly caused by being overweight or obese. A complex illness, obesity is influenced by a person's surroundings, dietary patterns, lifestyle, and genetics. The scores for the dietary phytochemical index are derived from studies examining how dietary phytochemical components affect body mass index and weight status. The main goal of the current study is to determine how women of reproductive age (15–35 years old) weight status relate to the dietary phytochemical index (DPI) and dietary inflammatory index (DII). Data for this cross-sectional study was gathered from many Faisalabad city universities. There were 307 volunteers recruited in this cross-sectional study. The three-day, 24-hour recall approach was applied to the dietary evaluation. Body mass index had a significant negative correlation with dietary phytochemical index ( $r = -.65, p < .001$ ). Body mass index had a significant positive correlation with dietary inflammatory index ( $r = .69, p < .001$ ). Based on the results of this study, we can say that those with a higher DII score and lower DPI score are more likely to suffer from overweight in Pakistan

### O-161/ICAZ-2023

#### Potential Protective Role of Lycopene and Vitamin E against Thiachloprid Induced Neurotoxicity in *Labeo rohita*

Ayesha shamsher

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#### Abstract

Pesticides have beneficial effects on crops but they have adverse effects on other non-target organisms due to their persistence in the soil. Neonicotinoid insecticide thiacloprid is one of the most commonly used synthetic insecticides worldwide. Thiacloprid is classified as a category 2 carcinogen and have high risk to humans and aquatic organisms and has altered the expression of apoptotic and immune related genes has caused DNA damage and induced hepatotoxic, nephrotoxic, neurotoxic, carcinogenic and teratogenic effects in fishes. It has caused depressive like behavior by reducing motor activity and increasing inductive freezing behavior in fishes. Lycopene and Vitamin E enhance immunity and have anti-inflammatory, hepatoprotective and neuroprotective effects in fish. The current study aim was to check the lycopene and vitamin E detoxifying quality against the toxicity of thiacloprid in fish. Different behavioral changes were observed in fish exposed to different concentrations of thiacloprid. The severity of these behavioral changes increased with higher thiacloprid concentrations. The fish were divided into three groups for further study. The first group served as a control, the second group was exposed to a sublethal concentration of thiacloprid (11.8mg/L) while being fed a commercial diet, and the third group was exposed to the same sublethal dose of thiacloprid and fed a diet supplemented with lycopene and vitamin E as an antioxidant. After 30 days of sublethal thiacloprid exposure, the fish were dissected to assess histopathological changes and enzyme assays were conducted to determine the acetylcholinesterase and butyrylcholinesterase activities in various organs, including the gills, liver, brain, kidney, heart, and muscles. The study revealed that thiacloprid caused histopathological changes in fish's kidney, liver, heart, brain, gills and muscles. Esterase activity of Butyrylcholinesterase (BuChE) activity inhibition %age > Acetylcholinesterase (AChE) activity inhibition %age observed in this study.

Keywords: Thiacloprid, Neonicotinoids, nAChRs, AChE, BuChE, Neurotoxicity.



O-162/ICAZ-2023

**Antibiotic Resistance and its Gene Profile in *Escherichia coli* Isolated from Diseased Farm-Raised Carps in Punjab, Pakistan**

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**Abstract**

Antibiotic resistance has become alarming to public health. The present study aimed to investigate the multi-drug resistance (MDR) of *Escherichia coli* (*E. coli*) in farm-raised fish. A total of 216 diseased fish samples from different fish farms were screened for *E. coli*. Molecular confirmation was done with Polymerase chain reaction (PCR) using *UspA* gene. All the positive *E. coli* isolates were subjected to eight different antibiotics. Antimicrobial sensitivity was performed via the Kirby Bauer disk diffusion method. Antibiotic resistance genes; *blaSHV*, *TEM*, *CTX-M*, *tet(A)*, *tet(B)*, *erm(A)*, *erm(B)*, *erm(C)*, *vga(A)*, *str(A)*, *str(B)*, *aadA1* and *aac(3)-I* was examined. A total of 79 (36.57%) *E. coli* was confirmed through PCR. Antibacterial susceptibility test showed 86.1% of isolates were highly resistant towards oxytetracycline and 22.7% of isolates were sensitive against azithromycin, respectively. Results for all antimicrobial agents were highly significant  $p < 0.01$ , except streptomycin. Phenotypic multi-drug resistant (MDR) was documented against 8 different antibiotics. About 7.59% of isolates stood resistant against to eight different antibiotics. The higher prevalence for *CTX-M* was 86.07%, *tetA* 91.13%, and *ermB* 69.62% while for *strA* 75.94% was recorded. While *blaSHV*, *ermA*, and *vga(A)* genes were not detected. All isolates were recorded for genotypic MDR. About 10.12% of isolates were sustained for ten different antibiotic resistance genes. The results for antibiotic susceptibility and resistance genes pattern in the present study has provided a valuable check and balance in term of unhygienic practices and the misuse of antimicrobial agents.

Keywords: Fish, *E. coli*, Antibacterial susceptibility, Antibiotic resistance genes

O-163/ICAZ-2023

**Molecular Characterization And Antimicrobial Resistance Among Diarrheogenic And Non-Diarrheogenic *Escherichia coli* From Healthy And Diseased Freshwater Farmed Fish**

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**Abstract:**

The aim of this study is to understand molecular characterization and antimicrobial resistance of diarrheogenic and nondiarrheogenic *E. coli* from healthy and diseased farm fish from Cypriniformes order. A total of 516 healthy and diseased farmed fish samples belong to Cypriniformes order were collected from various regions of Punjab and screened for *E. coli*. Biochemical tests and PCR confirmation were conducted using the 16S RrNA and *UspA* genes. DEC was examined through PCR using different virulence genes. All isolates were tested for various antibiotics using the disk diffusion method. The phenotypic and genotypic resistances of Extended-spectrum  $\beta$ -lactamases (ESBLs) were investigated. A Chi-square test was performed to compare the prevalence of *E. coli*, virulence genes, and ESBLs genes with a significance level of  $P \leq 0.05$ . Out of the total fish samples, 16.66% and 36.57% of *E. coli* strains were confirmed through biochemical tests and PCR, respectively. The DEC pathotypes were recorded in 30% and 62.02% of isolates from healthy and diseased fish, respectively. A higher rate of 19.37% of EAEC pathogroup was observed in both healthy and diseased fish, while the EIEC pathogroup was only observed in diseased fish at a rate of 10.07%. The significance ( $P \leq 0.05$ ) was observed among the virulence genes. The highest resistance rates among diarrheogenic and non-diarrheogenic strains were observed with tetracycline, amoxicillin, and ceftazidime. A higher prevalence of *CTX-M* (56.81%) and *TEM* (43.18%) was recorded in DEC pathotypes, while *blaSHV* was not detected. The high prevalence of DEC *E. coli*, and the production of ESBLs, indicate unhygienic practices and the misuse of antibiotics in fish farms.



**Keywords:** Carps, E. coli, Virulence genes, Extended-spectrum Beta-lactamases

**O-164/ICAZ-2023**

**Metabolic Engineering of *B. licheniformis* for Enhanced Hydroxytyrosol Production**

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Laboratory of Biocatalysis and Enzyme Engineering, Environmental Science, Hubei University, Wuhan, China

**Abstract:**

Hydroxytyrosol (HT) is a polyphenol found in olives, renowned for its antioxidant and anti-inflammatory properties. However, its large-scale application has been constrained by the high production costs and environmental pollution associated with traditional plant extraction and chemical synthesis methods. Microbial production presents a promising alternative, yet it still faces challenges such as enzyme expression imbalances and unknown rate-limiting steps leading to suboptimal yields. In this research, we focused on establishing and optimizing the hydroxytyrosol production pathway in *Bacillus licheniformis*. This strain exhibits robustness, making it suitable for large-scale aromatic alcohol production. Through the DBTL engineering cycle, we successfully engaged in protein engineering of keto acid decarboxylase, optimized metabolic pathways, and overcame limiting factors, significantly improving microbial efficiency. Subsequently, we further refined the scale-up cultivation process to increase hydroxytyrosol production, ultimately achieving a yield of up to 9475 mg/L, the highest level reported in the current literature. Harnessing the power of synthetic biology, we aim to achieve a more cost-effective and sustainable method for hydroxytyrosol production, unlocking its potential applications in areas such as cardiovascular drugs, cosmetics, functional foods, and dietary supplements, allowing it to flourish like a seed.

**O-165/ICAZ-2023**

**Evaluation of Wheat Straw and Physical Form of Total Mixed Ration (TMR) on Feeding and Resting Behavior of Sheep and Goats**

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National Agricultural Research Centre, Islamabad

**Abstract:**

An experiment of 12 weeks was carried out to analyze intake levels, frequency, chewing activities and resting behavior of bucks and rams. Thirty-two bucks of weight  $24 \pm 6$  kg and thirty-two Lohi rams of weight  $24 \pm 6$  kg were fed ad libitum four complete diets conventional low fiber (CLF), conventional high fiber (CHF), pelleted low fiber (PLF) and pelleted high fiber (PHF) in a  $4 \times 2$  factorial design. Fiber/concentrate ratio in these diets was low (15/85) or high (25/75). Behavioral activities were recorded with video camera. Each animal was observed for 24-hour after every 10-days. Total daily intake was significantly higher ( $P < 0.05$ ) of rams (+ 450 g DM/day). Intake rate was also significantly higher ( $P < 0.05$ ) on pelleted diet (+350 g DM/day). Intake rate during meal were 6.57, 5.44, 11.34 and 8.65 g/min respectively, on CLF, CHF, PLF and PHF ( $P < 0.05$ ). Resting behavior also depended upon the type of diet (less than 1121 min/day on conventional and more than 1291 min/day on pelleted ( $P < 0.05$ )). Lying time was also more in bucks 622 min/day than rams 587 min/day ( $P < 0.05$ ). The experiment revealed distinct feeding patterns and preferences in bucks and rams, influenced by diet type.



O-165/ICAZ-2023

**Palliative Role Of Peonidin 3-O-Glucoside Against Doxorubicin Prompted Liver Damages In Rats: A Biochemical, Inflammatory, Apoptotic And Histopathological Analysis**

Muhammad Faisal Hayat<sup>1</sup>, Muhammad Umar Ijaz<sup>1,\*</sup>,

<sup>1</sup>Department of Zoology, Wildlife and Fisheries, University of Agriculture, Faisalabad, Pakistan

**Abstract:**

Doxorubicin (DOX) is a chemotherapeutic drug which demonstrated various sorts of deleterious effects that counteracted its intended benefits. Peonidin 3-O-glucoside (PND) is a plant-based flavonoid which exhibited different biological as well as pharmacological potential. The current investigation was conducted to evaluate the therapeutic potential of PND against DOX induced liver damage in albino rats. Twenty-four rats were divided into 4 groups such as control, DOX (3mg/kg) treated, DOX (3mg/kg) + PND (40mg/kg) exposed and only PND (40mg/kg) supplemented group. It was revealed that DOX exposure significantly reduced the activities of catalase (CAT), superoxide dismutase (SOD), glutathione peroxidase (GPx), glutathione S-transferase (GST), glutathione reductase (GSR) & glutathione (GSH) contents while escalating the levels of reactive oxygen species (ROS) and malondialdehyde (MDA). Furthermore, administration of DOX elevated the levels of alanine transaminase (ALT), aspartate transaminase (AST) & alkaline phosphatase (ALP). Besides, the levels of nuclear factor-  $\kappa$ B (NF- $\kappa$ B), tumor necrosis-  $\alpha$  (TNF-  $\alpha$ ), interleukin-6 (IL-6), interleukin 1beta (IL-1 $\beta$ ), & cyclo-oxygenase-2 (COX-2) activity were increased in response to DOX treatment. Moreover, DOX administration instigated various histopathological impairments in hepatic tissues. However, supplementation of PND substantially restored aforementioned irregularities owing to its antioxidant, anti-inflammatory as well as hepatoprotective potential.

**Keywords:** Oxidative stress, Inflammation, Hepatic damage, Doxorubicin, Peonidin

O-166/ICAZ-2023

**Exploring Genetic Variants and Clinical Manifestations in GSD Ia Patients: A Pakistani Perspective**

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**Abstract:**

Glycogen storage disease type Ia (GSD Ia) is a rare autosomal recessive disorder resulting from defects in the glucose-6-phosphatase complex (G6PC) caused by variants in the *G6PC* gene. This study aims to provide a comprehensive clinical and genetic characterization of GSD Ia cases within the Pakistani population, presenting diverse clinical profiles encompassing symptoms such as hypoglycemia, hepatomegaly, lactic acidosis, hyperuricemia, seizures, epistaxis, hypertriglyceridemia, and short stature. Patients were recruited from the Pakistan Institute of Medical Sciences (PIMS) and Children's Hospital Lahore (CHL) with informed consent, after approval from the Bioethics Committee at Quaid-i-Azam University. Molecular analysis was conducted by screening all coding exons and intron-exon boundaries of the *G6PC* gene using the Sanger sequencing method on 20 participating patients. Through DNA sequencing and the utilization of pathogenicity prediction tools (PROVEAN, MutationTaster, Polyphen 2, HOPE, Varsome, CADD, DANN, SIFT, and HSF), our investigation identified 21 variants, including 8 novel disease-causing variants in the *G6PC* gene: G6PC (NM\_000151.4):c.71A>C (p.Gln24Pro), c.109G>C(p.Ala37Pro), c.133G>C(p.Val45Leu), c.49\_50insT, c.205G>A(p.Asp69Asn), c.244C>A(p.Gln82Lys), c.322A>C(p.Thr108Pro), and c.322A>C(p.Cys284Tyr). Among the 13 identified polymorphisms, 3 were observed in a heterozygous condition, while 10 were found in a homozygous state. This research reveals the clinical presentation of GSD Ia in the Pakistani population, revealing previously unreported disease-causing genetic variations in the *G6PC* gene. The broad spectrum of symptoms observed in this cohort underscores the complexity of GSD Ia. These findings contribute significantly to our understanding of GSD Ia in the Pakistani context, providing crucial insights for diagnosis, management, and genetic counseling for affected individuals and their families.

**Keywords:** Glycogen storage disease, mutation, Pakistani population, *G6PC*, GSD1a



## O-167/ICAZ-2023

**Investigating Wilson Disease Mutations in the Copper Binding Domain of *ATP7B***Tayyaba Shan<sup>1</sup>, Sabika Firasat<sup>1\*</sup>, Bushra Gul<sup>1,2</sup>, Kiran Afshan<sup>1</sup><sup>1</sup> Department of Zoology, Quaid i Azam University, Islamabad, Pakistan<sup>2</sup> Department of Biosciences, University of Wah, Wahcantt**Abstract:**

Wilson's disease (WD), an autosomal recessive disorder resulting from *ATP7B* gene mutations, presents clinical heterogeneity with neuropsychiatric and hepatic manifestations across diverse age groups, posing diagnostic challenges. This study aims to genetically and clinically characterize WD cases in the Pakistani population. Clinical data collection and investigation of *ATP7B* exons using PCR-based Sanger sequencing were conducted. Pathogenicity predictions for identified variants utilized PROVEAN, MutationTaster2, and HSF software. Clinical heterogeneity, including reduced serum ceruloplasmin, signs of chronic liver damage, and elevated 24-hour urinary copper excretion, was observed. The mean age of onset was 11.3 years, with Kayser-Fleischer rings present in 75% of cases. Approximately 82.5% of patients belonged to inbred families, and those with neurological disorders were predominantly above 12 years of age. Ten variants in the analyzed *ATP7B* gene region were identified, including a reported variation (p. L227Yfs\*35), 4 putative novel synonymous variants, and 5 reported polymorphisms. This study contributes to a reliable understanding of clinical presentations and genotype-phenotype correlations, shedding light on *ATP7B* function and structure. The findings offer insights for disease prognosis and family counseling. The study enhances our understanding of Wilson's disease in the Pakistani population, showcasing the clinical spectrum and identifying sequence variants in the screened region of *ATP7B*.

**Keywords:** Wilson disease, *ATP7B*, genetic heterogeneity, Pakistan.

## O-168/ICAZ-2023

**Analysis of *FTO* Gene Risk Variant in Metabolic Syndrome Patients**Zainab Akhtar<sup>1</sup>, Ghazala Kaukab Raja<sup>2\*</sup>, Sabika Firasat<sup>1</sup><sup>1</sup> Department of Zoology, Quaid i Azam University, Islamabad, Pakistan<sup>2</sup> University Institute of Biochemistry & Biotechnology, Pir Mehr Ali Shah Arid Agriculture University Rawalpindi, Pakistan**Abstract:**

Metabolic syndrome (MetS) is a group of disorders like hyperinsulinemia, dyslipidemia, obesity and hypertension. A number of genes including *FTO* are reported for association with MetS or its components. The present study was designed for genotyping *FTO* gene Single Nucleotide Polymorphism (SNP) in MetS patients and controls. Data was collected from Pakistan Institute of Medical Sciences (PIMS), Islamabad and study was approved by Ethics Committee for the use of human subjects of PMAS Arid Agriculture University Rawalpindi. A total of 400 participants, 200 cases and 200 controls were recruited with written informed consent form. After DNA extraction, all subjects were genotyped for *FTO* gene risk variant (rs9939609) using allele specific Polymerase Chain Reaction. The findings of the present study showed that MetS subjects had significantly high frequency of rs9939609 risk allele (A) frequency as compared to controls (OR 4.11, 95% CI 2.30-7.34 and P < 0.0001). The risk allele is strongly associated with MetS and body mass index. The present study concluded that rs9939609 *FTO* gene SNP is a risk marker for obesity leading to MetS development in Pakistani populations.

**Keywords:** Metabolic syndrome, *FTO*, rs9939609

## O-169/ICAZ-2023

**Effects of 17  $\alpha$ -Methyltestosterone and *Cyprinus carpio* testes as Reproductive Inhibitors on Sex Control and Growth of *Oreochromis niloticus***

Rafia Jamal, Farkhanda Asad, Shahbaz Ali, Shehar Bano, Aiman Nadeem, Navaira Batool, Noshaba Anwar, Shahzad Nasir

Department of Zoology, Government College University, Faisalabad

**Abstract**

An experimental study was conducted to determine the efficacy of 17  $\alpha$ -methyltestosterone and *Cyprinus carpio* testes powder on growth performance and sex reversal rate of *Oreochromis niloticus*. Fries of tilapia 2-3 days old (560) was bought from Punjab fish hatchery Satyana Road Faisalabad. The trial was conducted at Fisheries lab Department of Zoology, Government College University Faisalabad. In phase-I (treatment phase) one control and four



treatment diets (MT1: 60mg/kg, MT2: 70mg/kg and CCT1:70%, CCT2: 80%) was fed to experimental groups (each with one replicate) for the period of 30 days. In phase-II (rearing phase) control diet (32% CP) was given to all groups for further 90 days at the rate of 4% live body weight once a day and survival rate was monitored on daily basis. Physicochemical parameters of water like pH, dissolved oxygen and temperature were monitored by using YSI pro series multi parameter professional plus meter. MT2 and MT1 treatments had significantly higher male percentage (85% and 75%, respectively), followed by CCT2 treatment (70%). The control and MT treated groups had the highest GSI values, while the testes treated groups had the lowest. Maximum weight was noticed in followed by CCT1 which was (5.27±0.04abc). Protein efficiency ratio (PER) and specific growth rate (SGR) did not significantly differ among all treatments. Condition factor (CF) was significantly higher in MT1. This study suggests that natural sources are not only more cost-effective but also environmentally friendly and readily available; they are a good choice over synthetic alternatives.

**Keywords:** *Oreochromis niloticus*, 17 $\alpha$ -methyl testosterone, testes powder, rearing phase and sex inhibition

#### O-170/ICAZ-2023

### Comparative effect of *Carica Papaya* and 17 $\alpha$ -Methyltestosterone on Growth and Reproductive Performance of *Cyprinus carpio*

Navaira Batool, Farkhanda Asad, Rafia Jamal, Shehar Bano, Aiman Nadeem, Shahbaz Ali Noshaba Anwar, Shahzad Nasir

Department of Zoology, Government College University, Faisalabad

#### Abstract

The study investigated the potential of *Carica papaya* seeds and 17 $\alpha$ - Methyltestosterone on growth and sex ratio in *Cyprinus carpio* (common carp). The experiment lasted for 90 days, with two different concentrations of papaya seed (6g and 7g) and 17 $\alpha$ -methyltestosterone (60mg and 70mg) administered separately. The purpose of this study was to observe how these treatments affected growth characteristics and reproductive performance in common carp. The findings illustrated that growth metrics such as weight gain, protein efficiency ratio and specific growth rate showed highest value in T3 group (PSM 6g) than other treatments. Papaya-treated groups revealed the lowest values for HIS and GSI while highest value was found in MT-treated groups. Both papaya seed meal and 17 $\alpha$ -methyltestosterone significantly induced masculinization in the common carp population. The 7g papaya seed treatment displayed a more pronounced masculine effect (90%) than MT. Importantly, the treatments had no negative effects on common carp growth. Overall, the study highlights the potentials of *Carica papaya* seed meal as sex reversal agent for inducing masculinization in *Cyprinus carpio*. This research suggests that papaya seeds could be a cost-effective and non-toxic source of bioactive compounds for sex reversal agents in fish farming, offering a potentially sustainable method for controlling the sex ratio in aquaculture operations.

**Keywords:** *Cyprinus carpio*, *Carica papaya* seeds, 17 $\alpha$ -methyltestosterone, natural inhibitors, sex reversal, reproductive performance, growth, body composition

#### O-171/ICAZ-2023

### Assessment of Rice Protein Meal on Growth and Digestive Enzymatic Activity of *Oreochromis niloticus*

Aiman Nadeem, Farkhanda Asad, Rida Nadeem, Rafia Jamal, Noshaba Anwar, Navaira Batool, Shehar Bano, Shahzad Nasir and Shahbaz Ali

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#### Abstract

The experimental investigated the effects of rice protein meal (RPM) on various aspects of *Oreochromis niloticus* fingerlings. This study involved three dietary groups, a control diet and two treatments with different levels of rice protein meal (20% RPM and 35% RPM). This trial was designed at Fisheries Lab, Department of Zoology, Government College University Faisalabad for 90 days. Prior to experiment, 120 fingerlings were acclimatized for one week, then randomly stocked in three tanks each with one replicate (20 fingerlings/tank). Feed was offered at the rate of 4% live wet body weight twice a day. DO was maintained at 5-7 ppm by using air pumps through capillary system. Results exposed a significant growth rate (P<0.05) in the RPM2 where concluding weight was 6.55±0.06a with initial weight of 2.54±0.04m and weight increased was reported as 4.03±0.029a. Higher inclusion of RPM in the





diet had positive affect on the growth. RPM2 group (35% RPM) exhibited the highest levels of liver and gastrointestinal protease enzyme activity. This indicated that the inclusion of RPM2 influenced the activity of digestive enzymes, which contributed to improved growth. In contrast to protease enzyme activity, the control group had the highest levels of liver and gastrointestinal amylase enzyme activity. This suggested that the control diet was more effective in promoting amylase activity, which is important for the digestion of carbohydrates. The conclusion of the study is that the use of 35% RPM in the diet was more effective in promoting the growth of *O. niloticus* in an environmentally sustainable manner. The study highlighted that this diet is cost-effective, environmentally friendly and widely available, making it a promising option for aquaculture.

**Keywords:** *Oreochromis niloticus*, growth performance, amylase enzyme activity, protease enzyme activity and rice protein meal.

**O-172/ICAZ-2023**

**Masculinization of *Cyprinus Carpio* using 17  $\alpha$ - Methyltestosterone and *Moringa Oleifera* Seeds Powder**

Shehar Bano, Farkhanda Asad, Rafia Jamal, Navaira Batool, Aiman Nadeem, Noshaba Anwar, Shahzad Nasir and Shahbaz Ali

Department of Zoology, Government College University, Faisalabad

**Abstract**

One experimental trial was conducted to evaluate the efficiency of 17-alpha-methyltestosterone and moringa seeds powder on the sex reversal and proximate body composition of *Cyprinus carpio* (Common carp). 200 common carp hatchlings (2–3 days old) were acclimatized for few days and then randomly placed in five tanks, each with one replicate (20 fry/ aquarium). The *Cyprinus carpio* was fed on four treatment diets: MS1 12g/kg, MS2 16g/kg, MT1 60mg/kg, MT2 70mg/kg, and one control (without hormone). For 30 days, treatment diets (32% CP) were administered at a rate of 4% live body weight twice per day. All groups received the control diet after 30 days. Diets based on moringa considerably reduce the GSI and HSI in treated fish. MT1 and MT2 produced 76% and 90% male population respectively. The percentage of sterility noted in MS1 and MS2 was 73% and 93%. The chances of sterility increase along with the level of moringa seeds powder in diets. Results revealed that *Moringa oleifera* caused sterility in *Cyprinus carpio*. Body composition analysis showed highest gross energy, moisture and crude protein values in MS treated groups and highest dry matter and NFE in control group. Since plant resources are less expensive, biodegradable, and easily accessible than artificial ones, they are preferable to artificial ones for limiting *Cyprinus carpio* unchecked proliferation.

**Keywords:** *Cyprinus carpio*, moringa seeds powder, 17- $\alpha$ -methyltestosterone, sex reversal and proximate body composition

**O-173/ICAZ-2023**

**Diversity of Insect Fauna in Correlation to Abiotic Factors on Wheat Crop in Agro Ecosystem of Faisalabad**

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**Abstract**

Wheat (*Triticum aestivum*) is the major staple food of Pakistan. Many insect pests are attacking the wheat crop. In the present study the overall population of insect pest's species i.e. Aphids, Midges, Grasshopper, Wasps, Cricket, along with natural enemies such as Spiders, Coccinellids, and Chrysoperla were surveyed from field Inspected specimens and correlated with abiotic factors and their diversity on the wheat crop was studied. The biggest insect population was found in March, according to the statistics. Aphids (148.08), Spiders (3.65), Midges (149), Crickets, Wasps (22), Grasshoppers (3.5), Chrysoperla (7.75), and Coccinellids (4.39) in relation to maximum and minimum temperatures (24.5 °C, 13.9 °C), rainfall 135mm, and relative humidity in the morning and afternoon (85 percent, 62.4 percent). Insect population was lowest in January, with Spider (0.45), Aphids (3.44), Midges (7.69), Coccinellids (0.33), Grasshoppers (0), Wasps (0), Chrysoperla (0.75) in all traps (pitfall, sweep net, and aspirator) in relation to maximum and minimum temperature (17.3 °C and 5.5 °C), rainfall 50.8mm, and relative humidity in the morning and afternoon (88.3 percent & 60.3 percent). The results revealed that insect diversity of Midges, Aphids, Crickets,



Chrysoperla, and Wasps showed a positive but non-significant correlation with temperature while Coccinellids, Spiders, and Grasshoppers had a negative and non-significant effect. Whereas, relative humidity showed a significant as well as a positive correlation with Midges, Aphids, Grasshopper, and Wasps while rainfall showed a negative & non-significant correlation with all insects.

**Key words:** Abiotic factor, Dynamics, Insect traps and Wheat insect fauna

O-174/ICAZ-2023

#### Evaluation of botanical extracts and insecticides against *Schizaphis graminum* on wheat under field conditions

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#### Abstract

The wheat aphid is a highly damaging pest that infests wheat crops. It inflicts harm by extracting cell sap, introducing toxins into the plant, depleting photo assimilates, and transmitting damaging plant viruses. The aim of this study was to assess the effectiveness of botanical extracts and synthetic insecticides in controlling the wheat aphid. The data on the aphid population was collected at four different time intervals: 24, 48, 72, and 168 hours following the application of botanical extracts and insecticides. The highest levels of mortality seen at certain time intervals were 85.06% and 79.29% for Neem and Eucalyptus leaf extract after 168 hours, followed by 72.29% and 71.69% after 72 hours, 63.35% and 62.45% after 48 hours, and 48.91% and 48.68% after 24 hours, respectively. The Neem leaf extract demonstrated superior efficacy compared to the Eucalyptus leaf extract, and a notable distinction between the treated and control plots was observed. The mortality rates for Carbosulfan and Imidacloprid were 76.80% and 75.62% respectively after 48 hours. After 72 hours, the mortality rates increased to 84.40% and 84.08% for Carbosulfan and Imidacloprid respectively. After 168 hours, the mortality rates further increased to 91.35% and 90.53% for Carbosulfan and Imidacloprid respectively. Finally, after 168 hours, the mortality rates reached 95.39% for Carbosulfan and 93.85% for Imidacloprid. Both Carbosulfan and Imidacloprid effectively decreased the aphid population compared to the control group. However, there was no significant difference found between the plots treated with Carbosulfan and Imidacloprid. According to the findings, botanicals offer cost-effective and environmentally friendly options for controlling wheat aphids. It is recommended that these botanicals be included as part of an integrated management strategy.

**Keywords:** *Eucalyptus* leaf extract, Neem leaf extract, Carbosulfan, *Schizaphis graminum*

O-175/ICAZ-2023

#### Investigation of Insecticide Effectiveness And Resistance In *Bemisia tabaci* (Gennadius, 1889) Populations Under Laboratory Conditions

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#### Abstract:

Insecticide resistance progression is mainly dependent on chemical control techniques used for the management of whitefly, *Bemisia tabaci* (Genn.). This study aimed to investigate the progression of insecticide resistance in *B. tabaci* populations and evaluate the effectiveness of five distinct insecticides over a three-year period (2019 to 2022). The insecticides studied included pyriproxyfen, acetamiprid, chlorfenapyr, imidacloprid, and diafenthiuron, each representing different chemical classes and modes of action. To assess effectiveness, *B. tabaci* were exposed to each insecticide for varying durations (24, 48, and 72 hours). Resistance levels were quantified based on mortality rates and relevant parameters. Results demonstrated differential responses among the tested insecticides. Pyriproxyfen exhibited consistently low resistance values across all exposure durations, indicating its efficacy in controlling *B. tabaci* populations. Acetamiprid displayed gradual resistance escalation with increasing exposure times, though it remained effective, albeit slightly less so than pyriproxyfen. Chlorfenapyr and imidacloprid showed higher resistance levels compared to acetamiprid, indicating reduced effectiveness in managing *B. tabaci* populations. However, the precise resistance patterns and effectiveness metrics for these two insecticides were not explicitly



elaborated upon in the provided summary. This observation underscores the substantial resistance developed against diafenthiuron and its limited effectiveness in whitefly control. In conclusion, the findings of this study highlight pyriproxyfen's superior efficacy as an insecticide against *B. tabaci* populations. On the other hand, diafenthiuron exhibited heightened resistance and diminished effectiveness. This research sheds light on the dynamics of insecticide resistance and offers insights for refining pest management strategies for *B. tabaci* populations.

**Keywords:** Whitefly, Insecticide Resistance, Cotton, Chemical control, Insecticides

#### O-176/ICAZ-2023

### In Vitro And In Vivo Antibacterial Activity Of *Asphodelous tenuifolius* Against Methicillin Resistant *Staphylococcus aureus* For Treatment Of Superficial Skin Infections

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#### Abstract:

*Staphylococcus aureus*, a Gram-positive, coagulase-positive pathogen belonging to the family Staphylococcaceae, is a spherical bacterium of approximately 1µm in diameter. A strain of *S.aureus* which has developed resistance against beta-lactam containing compounds like methicillin is Methicillin-resistant *Staphylococcus aureus* (MRSA). It is the leading cause of bacteremia, endocarditis, skin and soft tissue infections, bone and joint infections and hospital-acquired infections. Synthetic medicines do not only treat disease but also exert drastic effects on the health of individuals. There is need for the development of alternative bioactive compounds against MRSA for the treatment of skin infections. For this reason, *Camellia sinensis* is used. *Camellia sinensis* originated in China, belongs to the family Theaceae. It is a flowering plant whose buds, leaves and stems are used to make tea. Green tea contains epigallocatechin gallate (EGCG), epicatechin gallate, catechin, epicatechin, gallic acid, epigallocatechin. *Camellia sinensis* was identified, collected, dried and grinded. Their Methanolic extract was produced through Soxhlet extraction method. Qualitative phytochemical screening was done by phytochemical assays to assess bioactive compounds in green tea. Antimicrobial activity was measured through well diffusion method while DPPH scavenging assay was performed to determine antioxidant potential. MTT assay was established to check the cytotoxic effect of green tea extract. The screening revealed that green tea possesses alkaloids, flavonoids, steroids, tanins and saponins. It has potential antioxidant with IC<sub>50</sub> value of 3.731 µg/ml. Green tea extracts exhibited significant free radical scavenging activity with IC<sub>50</sub> 45.78 µg/ml. It has potential antimicrobial activity against MRSA with inhibition zone ranging from 17.43±0.40 to 23.48 ±0.46 at concentration of 100mg/ml to 500mg/ml and MIC value of 375. For In-vivo activity, Albino mice were taken and acclimatized for a week. Green tea herbal ointment was prepared in three different concentrations of 100mg/ml, 300mg/ml and 500mg/ml to check the concentration best for curing infection. MRSA aliquot was prepared in normal saline solution with OD of 0.8-1 CFU. Mice were divided in six groups of no treatment group, no MRSA group, and clindamycin treated group, 100mg/ml, 300mg/ml and 500mg/ml concentration ointment groups. On day one the wound was caused to all the mice of all groups and all groups were infected except no MRSA group. On day one, after 24-hours the mice were checked if they have developed infection, pus was considered as the standard for the development of infection. Day one was also considered as first treatment day, wound size was measured and pictures were taken. Mice were treated every day, pictures were taken and the wound contraction was measured every third day for nine days. On day three infection got worse in no treatment group, no healing occurred in no MRSA group, wound started contracting in clindamycin, 300mg/ml and 500 mg/ml ointment groups while there was no significant reduction in wound size of 100mg/ml ointment treated groups. On day six the wound in no treatment group did not start healing, there was significant contraction in wound of clindamycin, 300 mg/ml and 500mg/ml ointment treated groups. The wound in 100mg/ml group was also healing but the rate was very slow in comparison to all other healing groups. Day nine was the final day of treatment, the wound of 500 mg/ml ointment treated group was almost healed, clindamycin treated group healed at a higher rate than 100mg/ml ointment treated group but healed at a lower rate than 300 mg/ml ointment treated group. The overall results suggest that green tea has the potential to heal wounds and treat skin infections caused by MRSA. So, there is need to commercialize herbal ointments instead of synthetic drugs for wound healing, treatment of skin infections, abscess and inflammations. Herbal ointments are beneficial and cost effective.

**Keywords:** *Staphylococcus aureus*, Methicillin-resistant *Staphylococcus aureus* (MRSA), *Camellia sinensis*, Skin



infections, Wound healing

O-177/ICAZ -2023

### Therapeutic Potential of Kolaviron Against Furan-Mediated Apoptosis, Inflammation, And Oxidative Stress In The Kidneys Of Male Albino Rats

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#### Abstract:

Furan, a pervasive environmental and food contaminant, may cause liver damage and cancer, but its effects on the kidney are not yet fully understood. Kolaviron (KV) is a combination of flavonoids extracted from *Garcinia kola* seeds that possesses many anti-cancer, anti-genotoxicity, and anti-hepatotoxic properties. Therefore, this study was designed to evaluate the therapeutic efficacy of kolaviron on furan induced renal toxicity in rats. 24 male albino rats were distributed into four groups: control, furan (10mgkg<sup>-1</sup>), furan+KV (10mgkg<sup>-1</sup>+100mgkg<sup>-1</sup>) and KV (100mgkg<sup>-1</sup>) administered groups. The findings of this study revealed that furan exposure decreased the activities of antioxidant enzymes i.e., catalase (CAT), glutathione reductase (GSR), superoxide dismutase (SOD), glutathione S-transferase (GST), and glutathione (GSH), while escalated the levels ROS and MDA. Furan administration resulted in a significant upsurge in urea, creatinine, KIM-1, and NGAL, whereas reduced the level of creatinine clearance. Moreover, furan treatment noticeably upsurged the levels of inflammatory markers, including tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ), interleukin-6 (IL-6), interleukin-1 $\beta$  (IL-1 $\beta$ ), nuclear factor kappa-B (NF- $\kappa$ B), and cyclooxygenase-2 (COX-2) activity. Furan intoxication diminished the level of the anti-apoptotic protein (Bcl-2) while increasing the levels of apoptotic markers (Bax, caspase-3 and caspase-9). Furthermore, furan treatment also caused considerable histological damage in kidneys of rats. However, KV co-treatment significantly alleviated furan induced kidney damage in rats. In conclusion, KV has the potential to significantly mitigate furan-induced nephrotoxicity because of its antioxidant, anti-inflammatory, and anti-apoptotic properties.

**Keywords:** Furan, Kidney damage, Nephrotoxicity, Inflammation, Oxidative stress

O-178 /ICAZ -2023

### Hepatoprotective Effects of Malvidin Against Polyethylene Microplastics Induced Hepatic Damage In Male Albino Rats By Modulating Biochemical And Histological Profile

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#### Abstract:

Polyethylene microplastics (PE-MPs) are the ubiquitous environmental contaminants that possess the ability to trigger deterioration in various organs, including liver. Malvidin (MLD) is a natural flavonoid, which exhibits putative antioxidant and free-radical scavenging activities. This research was planned to assess the hepatoprotective potential of MLD against PE-MPs-prompted hepatic damage in male albino rats. 48 rats were segregated into four groups viz. Control, PE-MPs-treated group (1.5 mgkg<sup>-1</sup>), PE-MPs + MLD-treated group (1.5 mgkg<sup>-1</sup> + 20 mgkg<sup>-1</sup>) and MLD-treated group (20 mgkg<sup>-1</sup>). PE-MPS treatment induced liver toxicity as indicated by the significant elevation in the serum levels of alanine aminotransferase (ALT) alkaline phosphatase (ALP), and aspartate aminotransferase (AST). Additionally, PE-MPS exposure disrupted the biochemical profile by decreasing the activities of antioxidant enzymes i.e., catalase (CAT), superoxide dismutase (SOD), glutathione peroxidase (GPx), glutathione (GSH), glutathione reductase (GSR) and glutathione S-transferase (GST), while raised the levels of ROS and MDA. Furthermore, inflammatory markers level such as nuclear factor kappa B (NF- $\kappa$ B), tumor necrosis factor alpha (TNF- $\alpha$ ), interleukin-1 beta (IL-1 $\beta$ ), interleukin-6 (IL-6) as well as Cyclooxygenase-2 (COX-2) activity were also increased. Besides the level of pro-apoptotic markers i.e., Bax, Caspase-3 and Caspase-9 were raised, while the level of anti-apoptotic protein, Bcl-2 was reduced following the PE-MPS intoxication. In PE-MPS-treated rats, Histopathological observation indicated substantial hepatic tissue damage. However, co-treatment with MLD remarkably reversed all the aforementioned hepatic damages.

**Keywords:** Polyethylene microplastics, Malvidin, Liver damage, Inflammation, Apoptosis



O-179 / ICAZ -2023

### Sciadopitysin Attenuates Paraquat Induced Cardiac Toxicity in Rats Via Regulating Oxidative Stress, Inflammation and Apoptosis

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#### Abstract:

Paraquat (PQ) is an effective herbicide, however due to its potent toxic effects it also causes cardiomyopathy and cardiac arrest. Sciadopitysin (SCD) is a biflavonoid isolated from *Ginkgo biloba* leaves that shows antioxidant, anti-inflammatory and anti-apoptotic potentials. Therefore, the current investigation was conducted to assess the protective impact of SCD on PQ-induced cardiac toxicity in rats. 24 male albino rats were separated into 4 equal groups i.e., control, PQ-treated, PQ + SCD co-treated and SCD supplemented group. After 30 days of treatment, it was observed that PQ significantly reduced the activities of antioxidant enzymes such as superoxide dismutase (SOD), catalase (CAT), glutathione reductase (GSH), glutathione peroxidase (GPx), glutathione disulfide reductase (GSR) and glutathione S-transferase (GST), whereas levels of reactive oxygen species (ROS) and malondialdehyde (MDA) were escalated. Furthermore, administration of PQ significantly escalated the levels of lactate dehydrogenase (LDH) and creatinine phosphokinase (CPK). Furthermore, there was an increased in the levels of the inflammatory markers i.e., tumor necrosis factor alpha (TNF- $\alpha$ ), nuclear factor-kappa B (NF- $\kappa$ B), interleukin-6 (IL-6), interleukin-1 beta (IL-1 $\beta$ ) and cyclooxygenase-2 (COX-2). The administration of PQ substantially upregulated the gene expression of apoptotic markers (Caspase-3 and Bax), while downregulated the gene expression of anti-apoptotic markers (Bcl-2). However, SCD supplementation significantly ameliorated the all the PQ induced damages due to its anti-apoptotic, antioxidant, and anti-inflammatory properties.

**Keywords:** Paraquat, Antioxidant, Heart damage, Inflammation, Apoptosis, Sciadopitysin

O-180 / ICAZ -2023

### Assessment of Antimicrobial, Antioxidant and Antihepatic Cancer (HepG2 cells) Potential of Solanum nigrum extract

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#### Abstract:

*Solanum nigrum* has immense therapeutic potential including wound-healing, anti-poison, hepatoprotective, anti-seizure, antiproliferative and phytoremediatory properties. The aim of this study was to investigate the antimicrobial, antioxidant and anti-cancerous potential of the plant. To fulfill its aims, *S. nigrum* was collected and grinded after air drying in shade. Grinded whole plant was subjected to Soxhlet extraction and concentrated by Rotary Evaporator, lyophilized and stored for further screening. The result of the qualitative phytochemical analysis confirmed the presence of alkaloids, flavonoids, saponins, steroids and tannins. Antimicrobial activity was investigated through agar well diffusion method. Minimum Inhibitory Concentration (MIC) values were evaluated through Broth Micro Serial Dilution Method. The antioxidant activity was determined through DPPH and ABTS Assays. MTT Assay was performed to check antiproliferative potential of *S. nigrum* against hepatic cancer (HepG2 cells). In our study, the trend of inhibition zone (mm) of *S. nigrum* against bacterial strains was *Pasteurella multocida* (21mm) > *Aeromonas hydrophila* (19.3mm) > *Bacillus cereus* (19mm) > *Salmonella enterica* (18.3mm) > *Pseudomonas aeruginosa* (18mm) > *Staphylococcus aureus* (16mm) > *Escherichia coli* (15mm) at 500mg/mL. Among selected bacterial strains *Pasteurella multocida* was most susceptible with inhibition zone of 21.33 $\pm$ 1.53mm with MIC value  $\leq$  187.5 $\mu$ g/mL. For fungal strains *Fusarium avenaceum* (30mm) > *Aspergillus niger* (25mm) > *Candida albicans* (13mm) > *Fusarium brachygybbosum* (0mm). Highest antifungal activity of *S. nigrum* was exhibited against *Fusarium avenaceum* with zone of inhibition 30.67 $\pm$ 2.52mm at 500mg/mL; MIC value  $\leq$  187.5 $\mu$ g/mL. IC50 of *S. nigrum* in DPPH and ABTS assay was 131.798 $\mu$ g/mL and 138.7 $\mu$ g/mL respectively. IC50 of *S. nigrum* against HepG2 cell line was found to be 79.62 $\mu$ g/mL. Thus, *S. nigrum* can be employed in the formulation of antimicrobial, antioxidant and anti-cancer drugs.

**Keywords:** *Solanum nigrum*, Antimicrobial, Antioxidant, Anticancer



O-181/ICAZ-2023

**Dose-Dependent Effects of Polystyrene Nanoplastics Induced Neurotoxicity in Rats**

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**Abstract:**

Polystyrene nanoplastics (PS-NPs) are environmental that have been identified in significant concentrations in the environment and impose potential damages to human health. Therefore, the current study was performed to assess the neurotoxic effects of polystyrene nanoplastics on brain of male albino rats. In this study, 35 rats were segregated into 5 groups (n=7/group) viz. control group, PS-NPs (10 mg/kg), PS-NPs (20 mg/kg), PS-NPs (50 mg/kg), and PS-NPs (100 mg/kg). After 30 days, rats were dissected. PS-NPs exposure reduced the activities of antioxidant enzymes, CAT, GPx, SOD and GSR, while the levels of ROS and MDA were increased in PS-NPs-intoxicated rats. Moreover, the exposure to PS-NPs induced a significant increase in the levels of inflammatory markers such as NF- $\kappa$ B, TNF- $\alpha$ , IL-1 $\beta$ , IL-6 and COX-2 activity. For the comparison of different groups, statistical analysis was conducted using one-way ANOVA followed by Tukey's test.

**Keywords:** Polystyrene nanoplastics, Brain damage, Inflammation, Oxidative stress

O-182/ICAZ-2023

**Protective Effects of Isorhamnetin On Methotrexate Induced Liver Damage**

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**Abstract:**

Methotrexate (MTX) is an antineoplastic agent, which is used to cure multiple types of cancers. However, it has numerous side effects on multiple organs, especially on the liver. Isorhamnetin, flavone is present in the fruits of *Hippophae rhamnoides* as well as in the leaves of *Ginkgo biloba*. Isorhamnetin has anti-inflammatory, anti-tumor and anti-oxidant properties. The current investigation was designed to estimate the curative potential of isorhamnetin on MTX-instigated liver toxicity. 24 male albino rats were used which were separated into 4 groups, 6 rats in each group. Group 1 was used as the control group. Group 2 was administered with MTX (20 mg/kg), 3<sup>rd</sup> group was co-administered with MTX + isorhamnetin (20 mg/kg + 10 mg/kg) and the 4<sup>th</sup> group was supplemented with isorhamnetin (10 mg/kg). The experiment was executed for 30 days. The intoxication of MTX reduced the activities of anti-oxidant enzymes (CAT, GPx, SOD and GSR), whereas the levels of ROS and MDA were increased. Moreover, the levels of inflammatory markers and apoptotic markers increased. The level of anti-apoptotic marker was decreased following the MTX exposure. However, the supplementation of isorhamnetin attenuated all the damages induced by MTX due to its anti-oxidant, anti-inflammatory and anti-apoptotic properties.

**Keywords:** Methotrexate, Isorhamnetin, Hepatic damage, Inflammation, Oxidative stress

O-183/ICAZ - 2023

**A Comprehensive Review of Nutraceuticals: Therapy Support and Formulation Challenges**

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**Abstract**

Nutraceuticals are a combination of nutrition and pharmaceuticals, and they contain biologically active components that contribute to optimal health and well-being. Nutraceuticals have gained recognition due to their nutritional benefits, therapeutic effects, and safety profile. They play an essential role in various healthcare services, including disease prevention and health promotion. This review article discusses the interactions between drugs and nutraceuticals, as well as patents related to nutraceuticals in agricultural applications and disease treatment. Nutraceuticals are also used as supportive therapy for the prevention and treatment of various diseases, including cancer chemotherapy and radiotherapy side effects. Nanotechnology is used to develop novel Nano formulations of nutraceuticals, which are micronized dietary products and supplements with improved health benefits. Finally, the



article presents the latest clinical studies on nutraceuticals that demonstrate the therapeutic effects of nutraceuticals' bioactive molecules on various diseases.

**Keywords:** cardiovascular diseases, interactions, nutrition, prevention, therapeutics.

**O-184/ICAZ-2023**

**Study of Haematological Indices in Diabetic Mice Treated with Seed Extracts of Kalonji (*Nigella sativa*) and Chicory (*Cichorium intybus*)**

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**Abstract**

The aim of this study was to check the haematological indices in diabetic mice treated with aqueous extracts of *Nigella sativa* and *Cichorium intybus* seed. The mice were intraperitoneally injected by alloxan monohydrate (150mgkg<sup>-1</sup>) to induce diabetes. After induction, the mice were divided into two main groups: control group and treatment group. Control group included positive control group treated with standard drug metformin and negative control group was treated with kasni and black seed extracts. Three different doses of extracts 300mgkg<sup>-1</sup>, 400mgkg<sup>-1</sup> and 500mgkg<sup>-1</sup> were tested on diabetic mice. The animals were treated for four weeks on daily basis. After one month, the blood samples were obtained by direct heart puncturing. The blood samples were stored in EDTA tubes and were sent to laboratory to determine haematological parameters. The blood samples were analyzed for complete blood count and HbA1c. The results revealed that the dose of 400 mgkg<sup>-1</sup> seed extract showed better results than other doses on blood parameters. Significant difference  $p < 0.001$  was found in MCHC, MCV, HCT, WBCs and HbA1c. The results of this study showed that mixed seed extracts of kasni and chicory possess anti-diabetic activity and improved the levels of glucose.

**Key words:** *Cichorium intybus*, Hematological indices, HbA1c

**O-185/ICAZ-2023**

**Development And Efficacy Of *Aeromonas Hydrophila* Vaccine Against *Aeromonas veronii* In Labeo Rohita**

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**Abstract**

The vulnerability to epidemic has been increased by increasing adoption of aquaculture approaches. In this study, the efficacy of *A. hydrophila* vaccine against *A. veronii* was evaluated by adjuvant Aloe vera and garlic extract in combination with formalin killed *A. hydrophila* bacterin in immunization of rahu (*Labeo rohita*). Fish fingerling, juvenile and adult (120 in each age group) were divided into three experimental groups and their replicates. Control group was injected on days 1 and 14 with normal saline, group (AV) was injected with Aerovac 2 (Aloe vera based vaccine) by 109 CFU/ml and group (GV) with Aerovac 1 (garlic extract based vaccine) by 109 CFU/ml. Booster dose was given after 14 days of immunization. Blood samples were collected on days 14, 28 and 42. Hematoimmunological parameters including white blood cell (WBC), red blood cell (RBCs) count, hemoglobin (HB) hematocrit (HCT), serum lysozyme activity were measured, and antibody titer were higher in fingerlings with Aerovac 2 at day 28 after the immunization. Serum lysozyme activity assay was higher in GV group as compared to AV group. At the end of experiment, all groups were challenged with live *A. veronii* and relative percentage survival (RPS) and histopathology of kidney and liver were compared among groups. There was zero mortality in all fish of AV and showed higher immunity against the *A. veronii*. Adult of GV group showed 20% mortality while fingerling and juvenile had no mortality. The results of pathogen infection test indicated that vaccines were equally effective for *A. veronii* as for the *A. hydrophila*. According to the results, administration of herbal adjuvants and same genus vaccine can be affectively used for other specie members.

**Key words:** *A. hydrophila*, adjuvant, Aloe vera, garlic extract, *A. veronii*



O-186/ICAZ-2023

**Screening of Exon 2 of ARL6 Gene in consanguineous Bardet-Biedl syndrome affected families, from Khyber Pakhtunkhwa**  
 Sumbal Wazir  
 Quaid –i-Azam University Islamabad

**Abstract:**

Laurence and Moon originally recognized the ciliopathy known as Bardet-Biedl syndrome (BBS) in 1866. The main signs of BBS are rod/cone dystrophy, polydactyly, obesity, gene defects, kidney abnormalities, and learning difficulties. Common BBS secondary symptoms include developmental delay, dental problems, heart defects, speech difficulties, syndactyly or brachydactyly, poor coordination, olfactory anomalies, and diabetes mellitus. The symptoms of BBS appear in relation to age. The prevalence of BBS varies in isolated, inbred, and consanguineous communities, where it is estimated to affect 1 in 150 000 persons worldwide. About 26 genes are implicated in the condition. Initial gene finding investigations for BBS syndrome showed autosomal recessive mode of inheritance. The most frequently altered genes in Pakistan and India are BBS10 and BBS3/ARL6. The purpose of the current studies was to study clinical characteristics of BBS cases and to identify the molecular causes of familial cases of Bardet-Biedl syndrome. Ophthalmologists identified Retinitis Pigmentosa (RP) in all the participating families, and following thorough interviewing, BBS families were selected. Blood samples and clinical records were collected. For molecular genetic analysis, DNA was isolated. For analyzing mutations, exon 2 of the ARL6 gene was amplified using primers. The amplified products were sent for Sanger's sequencing. Sequence analysis did not show any polymorphism or mutation in ARL6 gene of BBS identified families. The findings of this study also indicated that consanguinity is a factor in our population's high incidence that are recessively inherited, including BBS. Due to this, all participating families were provided with genetic counseling. To find a molecular genetic basis of disease, the remaining exons of ARL6 and other genes should be screened.

O-187/ICAZ-2023

**Hepatoprotective, Nephroprotective and Antioxidant Potential of a Newly Synthesized Schiff Base 2', 3'-Dihydroxybenzylidene (DHB) in Paracetamol Intoxicated Rats**

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**Abstract**

Paracetamol is extensively used as an analgesic and antipyretic drug, but at a high dose levels, it leads to severe side effects causing hepatotoxicity and nephrotoxicity. The lack of safeties and efficiencies of the existing medications necessitates the need to investigate new hepatoprotective and nephroprotective drugs. Studying the medicinal potential of a few freshly synthesized Schiff bases 2', 3'-dihydroxybenzylidene (DHB) was the goal of the present study against paracetamol induced hepatotoxicity in rats. In the present study, both in-vivo and in-vitro analysis were conducted. The synthetic compound was tested against DPPH, and it was found that the DHB possess strong anti-oxidant activity against diphenyl-1-picrylhydrazyl (DPPH) in comparison with ascorbic acid. Further, male albino rats (n = 20) were categorized into 5 groups each of 4 rats as, group 1; normal control group administrated with 2ml/kg of normal saline, negative control administrated with 650mg/kg of paracetamol, positive control administrated with 200mg/kg of DHB, experimental control administrated with 200mg/kg of DHB and 650mg/kg of paracetamol, experimental standard group administrated with 200mg/kg of VIT C and 650mg/kg of paracetamol for 14 days consecutively. On day 15<sup>th</sup>, the rats were anesthetized, and blood was collected from heart puncture for different hematological and serological tests. The rats were then dissected for liver and kidney analysis and preserved in formalin and were finally used for histopathology. Liver enzymes (ALT, ALP and SBR), value of cholesterol and RFTs substantially decreased in experimental group compared to toxic group. The healing in liver and kidney tissue slides analyzed with magnification of 100X and 400X were also seen in experimental group compared to toxic group. The HB, MCH, MCHC and RBC significantly increased while the TLC, PLT and Neutrophil significantly decreased in the experimental group. No significant decrease was seen in the diabetes of rats. From the results, it is concluded that DHB is a hepatoprotective and nephroprotective, anti-oxidant and anti-inflammatory compound against paracetamol induced toxicity in rats. DHB is a poor anti-diabetic compound however further work is recommended to evaluate the anti-diabetic potential of DHB in model rats.





O-188/ICAZ-2023

**Efficacy of Plant Extracts in Combined with Various Pesticides Mixture on Third Instar Larvae of *Trilocha Varians***

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**Abstract**

*Ficus benjamina* is often known as weeping fig, planted in tropical and subtropical areas and the leaf eating caterpillar. *Trilocha varians* is its major pest since 2019. This study evaluates two botanicals *Azadirachta indica* and *Euclyptus globulus*, alone and in combination with pesticides against this pest. The results showed that larval mortality was maximum when combined application of botanical and pesticide was given. Among tested botanicals, *A. indica* showed more toxicity than *E. globulus*. Combined applications of *A. indica* with pesticide gave 10.01, 16.63 and 21.22% mortality after 24, 48, and 72 hr of post treatment, respectively; while 6.45, 10.75 and 15.84% mortality was recorded after 24, 48 and 72 hr of combine application of *E. globulus* with pesticide. In all these evaluations, mortality increased with the time.

**Key words:** *Trilocha varians*, Pakistan, *Ficus benjamina*, *Azadirachta indica*, *Eucalyptus globulus*, mortality, dose, lambda-cyhalothrin

O-189/ICAZ-2023

**From Farm to Table: Investigating Methicillin-Resistant Staphylococcus Aureus (MRSA) in Milk Samples**

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**Abstract**

Using a satisfied random sampling strategy, the microbiological safety of raw milk samples from several dairy farms in D.I. Khan—Paharpur, Prova, Laar, and Bannu was evaluated. The current investigation has revealed that milk samples include an alarming number of isolates of *Staphylococcus aureus* that are resistant to antibiotics. This is a serious problem for dairy cattle farmers as well as veterinary and medical professionals. This study aims to separate and characterize *Staphylococcus aureus* from milk samples collected from buffaloes and cows. We also want to determine the methicillin-resistant *Staphylococcus aureus* (MRSA) prevalence at the dairy farm in D.I. Khan. We performed a physiochemical analysis on the milk samples. Fifty samples from dairy cows and buffaloes were subjected to antibiogram testing, bacterial isolation and identification, and both. Five of these samples tested positive for coagulase and showed resistance to methicillin, although they were also sensitive to certain other antibiotics. All isolates (100%) showed resistance to methicillin drugs, according to the antibiotic resistance profile derived from the *S. aureus* antibiotic resistance test results. Antibiotic use tends to rise in reaction to an increase in the prevalence of sickness in cattle, which may lead to higher amounts of antibiotic residue in milk and a higher risk of antibiotic-resistant bacteria. Therefore, the practice of dairy farming requires the application of prudent and precise methods when it comes to the use of antibiotics.

Keywords: Milk samples, antibiotic resistance, *Staphylococcus aureus*.



O-190/ICAZ-2023

**Isolation, Identification and Antibiotic Resistance of Aeromonas Species from Tap Water of Faisalabad, Pakistan**

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Fisheries Microbiology and Immunology Lab, Faisalabad.

Department of Zoology, University of Education, Lahore (Faisalabad) Campus

**Abstract:**

Aeromonas are potentially pathogenic microbes usually associated with fatal diseases such as cholera, vomiting gastrointestinal disorders in humans, brain hemorrhage ulcers in fishes, etc. The basic aim was to study the characterization of Aeromonas and antibiotic resistance of Aeromonas. To achieve these objectives conventional method was used. For this purpose, 50 tap water samples were gathered from different areas of Faisalabad, Punjab, Pakistan. These samples were enriched in peptone water (liquid media) along with 24-hour incubation at 37°C. After this, samples were inoculated on Aeromonas isolation agar with incubation for 24 hours at 37°C. The next task was to identify bacteria. This was done first by gram staining and then through biochemical tests according to standard procedure. Results showed that 50% water of Faisalabad was positive for Aeromonas and from 25 positive samples *A. hydrophila* 19 (76%), *A. sobria* 5(20%), *A. salmonicida* 16(64%) and *A. caviae* 8(32%) were identified. The positive isolates were checked for the resistance of antibiotics through a method of disk diffusion and results indicated that Levofloxacin (5µg) being maximum sensitive was 72% to Aeromonas spp., Streptomycin (10µg) was 60% and Ceftazidime (30µg) showed most resistance is 15% sensitive. After identifying the Aeromonas, sub-culturing of Aeromonas was done by using tryptophan soy agar (TSA). In the end, these samples were preserved by using PBS (phosphate buffer solution) and glycerin and were stored in the Microbiology Laboratory, Department of Zoology, Fisheries and Wildlife, UAF. This study found the current status of antibiotic resistance of Aeromonas species and the susceptible antibiotic this will help us in the development of effective control and prevention strategies to minimize antibiotic resistance in aquaculture.

O-191/ICAZ-2023

**Effect of Chia Seed Oil on Gut Microbiota and Growth Performance of *Labeo rohita* and *Cirrhinus mrigala***

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**Abstract:**

Gut microbiota analysis was used to investigate the impact of Chia seed oil on the gut microbiota composition and growth performance of two fish species, *Labeo rohita* and *Cirrhinus mrigala*. Fish is an essential part of human food source and man's most significant source of high-quality animal protein contents. Due to the high demand for fish from aquaculture, several studies have focused on the gut microbiota of fish, as its important role in the biological purpose of an entire organism and checking the growth performance. Interest has been rising towards the use of chia seed oil to raise fish harvest, it is primarily an element of omega-three fatty acids, but it also comprises many other nutrients that are essential for human nutrition. Protein, magnesium, phosphorus, and vital fatty acids are all included in this nutritional food. The sample was collected from fish farms at the University of Agriculture Faisalabad. The trial was organized into three groups: two experimental groups with 3 and 4% dietetic chia seed oil for both *L. rohita* and *C. mrigala* and a control group for two months. Quantitative results were obtained from treatments by using one-way analyses of variance (ANOVA). The following physio-chemical parameters were measured: the pH level, the temperature, oxygen dissolved in the water, total alkaline content, salinity levels, and water's absolute hardness. Following that, it was found that the experimental group's gut had more species of gram-positive microbes than the control group's gut. By the conclusion of the trial, fish samples were taken and analyzed. By using chia seed oil as feed, the gut microbiota of fish enhances and shows antagonistic activity against pathogenic bacteria in aquaculture.



O-190/ICAZ-2023

**Lysine and Tryptophan priming could Modulate Secondary Metabolism of *Momordica charantia* L. with Better Nutraceutical Potential**

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**Abstract:**

In the era of populated globe combating with the demand of food and medicines. There is a dire need to make our food armed with nutraceutical compounds curtailing dependence upon medicines, multivitamins, and antibiotics. For enhanced endogenous production of medicinally known phenolics a precursor of phenylpropanoid pathway (tryptophan) and precursor of trypto-phan (lysine) was aimed to assess for their efficacy. In this study, lysine (Lys) and tryptophan (Trp) priming (0 and 1mM for 12 hours) was compared for manipulation of *Momordica charantia* L. (*M. charantia*) metabolism. A field experiment was designed (RCBD) using a single variety, five replications, and three priming agents (control, Trp, Lys). Harvests were planned at three growth stages (seedling, vegetative stage, and mature yield). Leaves were evaluated for primary metabolites, enzymatic and non-enzymatic antioxidants, phenolic profile (HPLC), and antibacterial activity (MIC) against *Staphylococcus aureus* and *Pseudomonas aeruginosa*. Fruit was compared for weight, nutritive value, and medicinal phenolic (HPLC- profile). Trp treatment was with better germination characters, but fruit weight was similarly increased by both priming agents. Trp and Lys varied for modulation of Phenylpropanoid pathway (PePP) depicted by differential patten of phenolic profiles. Overall, Trp and Lys priming with better photosynthetic pigments, fruit weight, antioxidant levels, and medicinally known phenolics improved the nutraceutical status of *M. charantia* hence, can be recommended as safe strategy fortifying daily diet

O-193/ICAZ-2023

**Relative Abundance of Beetle Fauna Among Oat Fields.**

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**Abstract:**

Oat is containing high nutrition power for livestock as a gluten-free diet to enhance the nutritional values of the diets, particularly for vitamins and minerals, as well as increasing antioxidant levels. The order Coleoptera is an invasive Eurasian pest of cereals including wheat, oats and barley and expanded its geographical range significantly. So the present research work was been designed to check the relative abundance of beetle fauna among oat fields of University of Agriculture, district Faisalabad Pakistan. It was been concluded from the overall study that owing to similar nature, except few cases, oat field was recorded with similar communities. All the populations were existing homogenously and approximately experience same number of classification representatives. Total 234 specimens were recorded during the whole research study. Maximum relative abundance from oat fields was recording for *Coccinella septempunctata* 53.85% (n ≥ 126) and 25.64% (n ≥ 60), respectively. In case of genera, relative abundance was recorded almost for *Coccinella* and Family Coccinellidae was recorded in similar context. Finally, it was concluded that detailed understanding of taxa contribution and distribution in any habitat can provide insight view for conservation efforts. Therefore, keeping in view their importance, biological role of beetles, awareness about them must be created among the farming community and agriculture practices may kindly be made keep in view their vulnerability.



O-194/ICAZ-2023

**Effect of Canola and Sunflower Oil Supplemented Feed on Growth and Digestive Enzyme Activity of GMT (*Oreochromis niloticus*)**

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**Abstract:**

The prevailing experiment was designed to evaluate the effect of different vegetable oils such as sunflower oil and canola oil being supplemented in feed on the growth and gut enzyme activity of genetically male tilapia (GMT). Nile tilapia (*Oreochromis niloticus*) is omnivorous and is the most significant species in the tilapias because of its quick growth and disease tolerance competencies and can be cultured easily in semi-intensive culture. For 120 days, fish, in T1, were given 2% canola oil-supplemented feed and in T2, 2% sunflower oil was mixed with the fish feed, and control was given only commercial feed. Formulated feed and samples of fish were analyzed for crude protein, dry matter, crude lipids, gross energy, and ash following the protocols of the Association of Official Analytical Chemists. Three different digestive enzymes such as amylase, lipase, and protease were studied. The unit for measurement was units/ml of an enzyme. *O. niloticus* growth measurements showed that in the present feeding experiment, specific growth rate (SGR), weight gain (WG), and feed conversion ratio (FCR) of fish feed T1 were dramatically greater than that of fish feed in control. It is concluded that 2% canola oil-supplemented feed showed better growth performance, body composition of tilapia, and activity of digestive enzymes in GMT than 2% sunflower oil-supplemented feed.

O-195/ICAZ-2023

**Zoonotic Dynamics: Marburg Hemorrhagic Fever's Transition from Wildlife to Human Transmission and Its Public Health Implications**

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**Abstract:**

Marburg virus (MARV) is an emerging pathogen of Family Filoviridae containing the deadliest pathogens of public health concern. MARV is a member of the family Filoviridae, genus Marburgvirus and order Mononegavirales. The Marburgvirus genus contains two lineages, i.e., Lake Victoria Virus and Ravn Virus. The genome of Marburg marburgvirus is negative sense single-stranded RNA that is linear and non-segmented. MARV is pleomorphic, including rod shape, circle, U, six digits, or more commonly filamentous. In 1967, the first outbreak of MHF was reported in Frankfurt, Marburg (Germany) and Serbia with 31 patients. Animals, especially bats are the natural reservoirs of MARV (Swanepoel et al. 2007). Egyptian fruit bat (*Rousettus aegyptiacus*) is the most frequent reservoir host of MARV. The main source of virus shedding is saliva, urine, and excrement of the bat. The intermediate hosts, including animals hunted for bush meat and NHPs, are the primary vectors. In bats, it is hypothesized that biting, sexual interactions, and hematophagous arthropods are the possible routes of MARV transmission. MARV is mostly transmitted by bats to humans and NHPs through faeces, saliva, and partially consumed MARV-contaminated fruit. MARV transmission occurs directly from human to human through contact via broken skin in various ways. Aerosols are the route of MARV transmission from human to human and NHP-to-NHP. The clinical findings in a MARV-infected patient might change depending on different factors, such as the virulence of the strain, the immune status of the host, and medical maintenance. A virus typically enters the body through damaged skin or syringe needles and damages many types of cells and organs, leading to MHF. A common treatment strategy is using remedies for pain management because of the absence of documented treatment. Effective controlling of MARV is difficult because no proper treatment and vaccine (licensed) is available. Although MARV originates in Africa, its outbreaks with high



CFR and complex transmission cycles indicate that it can affect the whole continent. In conclusion, the main focus is on the future perspectives after exploring various management approaches to find a research gap so that a proper study should be conducted to limit the chances of MVD from becoming an epidemic.

O-196/ICAZ-2023

**Supplementation of Cholesterol-Loaded Cyclodextrin (CLC) in Thawing Medium Improves the Goat Sperm Longevity**

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<sup>3</sup>Department of Reproduction and Artificial Insemination, Faculty of Veterinary Medicine, Adnan Menderes University, Aydin, Turkiye

**Abstract:**

The present study investigates the impact of CLC supplementation on the longevity of thawed goat sperm. Semen was collected from mature bucks, diluted, and cryopreserved using a freezing TCG-based extender (15% egg yolk, 300 mM Tris, 28 mM glucose, 95 mM citric acid, 5% glycerol) following a standard protocol. After thawing, the semen samples were pooled and centrifuged to remove glycerol and egg yolk. The pellet was suspended in TCG solution, and initial sperm quality parameters were observed. Subsequently, the samples were divided into four equal parts and treated with different CLC concentrations (0, 0.75, 1.5 and 3mg CLC /120 × 10<sup>6</sup> sperm). The samples were incubated at 37°C for 4 hours, and motility through CASA, viability by propidium iodide staining, and acrosome using FITC-PNA staining procedures were observed at 1, 2, and 4 hours of incubation. The results indicate that the 3 mg CLC group exhibited significantly ( $p > 0.05$ ) higher progressive total motility and sperm kinetics parameters (VCL, VSL, VAP, LIN, STR, and BCF) compared to the other groups. A higher percentage of viable and a lower percentage of acrosome-reacted sperm ( $p > 0.05$ ) were observed in the 1.5 mg and 3 mg CLC treated groups compared to the 0.75 mg CLC or untreated groups at each hour. In conclusion, the treatment with 3 mg CLC is beneficial for maintaining the post-thaw sperm quality of goats for a longer duration.

Keywords: CLC, goat sperm, motility, viability, acrosome reaction

O-197/ICAZ-2023

**Serological Studies in Diabetic Mice Treated with Mixed Extract of Chicory (*Cichorium intybus*) And Kalonji (*Nigella sativa*) Seeds**

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**Abstract:**

**This study aims to evaluate the efficacy of mixed aqueous extract of black seed and kasni** in albino diabetic mice (male). The diabetes was induced in mice using alloxan monohydrate at the dose of 150mg/kg/day. The diabetic mice were divided into two groups. Group 1 (control group) was divided into subgroups. Negative control groups were treated with chicory and black seed extracts, while positive control group was treated with metformin (Glucophage). Group 2 (treatment group) was subdivided into four subgroups. Aqueous extract of mixed *Nigella sativa* and *Cichorium intybus* seeds was applied at the doses of 300mg/kg/day, 400mg/kg/day and 500mg/kg/day. On completion of trial of 28 days, final body weight and glucose level was measured and then the mice were anesthetized to collect blood. The blood was collected by direct heart puncturing. For serological studies ALT, AST, ALP, Bilirubin, Albumin, A/G ratio, creatinine and urea were measured. The results showed that the dose of 400mg/kg of aqueous extract of mixed seeds was effective to normalize the value of ALT, AST, ALP and creatinine and the results were in-line with normal control group. No effect on urea level was found in any treatment group.

Key words: *Nigella sativa*, Chicory, ALT, AST.



O-198/ICAZ-2023

Syed Muhammad

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**Abstracts:**

Sharks have long been demonized in popular media and perception for so-called "attacks" which have also tainted their general image as creatures of purpose. This article, originally published in WWF-Pakistan's *Natura Magazine* (2018), Volume 42, Issue 2, pg 30-33, aims to demystify some common perceptions about "shark attacks," explain the ecological role of these beings, threats to conservation, and the role of common perception in driving conservation efforts to safeguard these species.

O-199/ICAZ-2023

**Heteroplatc Transition Metal (II) Complexes with Bidentate Schiff base Ligands: Design, Synthesis, Structural Elucidation and Antimicrobial Activity**

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**Abstract:**

A new series of Zn(II), Cd(II) and Hg(II) heteroplatc complexes were successfully synthesized from Schiff base ligands (HL1 and HL2); which obtained from reaction of benzaldehyde with ethylenediamine and by the reaction of salicylaldehyde with o-toluidine respectively. Spectroscopic characterization of ligands and the newly synthesized complexes (1-3) was done by using (FT-IR, UV-Visible and <sup>1</sup>H-NMR) and elemental analysis. The elemental analysis data suggested the stoichiometry of complexes to be 1:1 [M:L] ratio. The proton of –OH group present in the ligands disappear in the complexes (1-3) showed that ligand is bidentate in nature bonded with metal (II) atoms via nitrogen (HC=N) and oxygen atom. The appearance of  $\nu(M-O)$  and  $\nu(M-N)$  band indicates the coordination of M(II) occur through this site thus 4-coordinated geometry of complexes is proposed. Molar conductance measurements confirmed the non-electrolyte nature of Schiff base ligand and complexes. Antibacterial activities of the synthesized Schiff base and its metal complexes showed that these complexes have significant biological activity against bacterial and fungal strains

O-200/ICAZ-2023

**Protective Effects of Sciadopitysin On Paraquat Induced Brain Damage In Male Albino Rats**

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**Abstract:**

Paraquat (PQ) is an economical, non-selective and effective weed killer that is used worldwide for controlling weeds, but it is extremely toxic to animals and humans. PQ exposure has been demonstrated to induce neurotoxicity. Sciadopitysin (SDN) is a naturally occurring flavonoid that is obtained from several plants and shows multiple therapeutic properties. Therefore, the present study was designed to assess the alleviative effects of SDN against PQ induced brain damage in rats. Twenty-four male albino rats were divided into four groups of rats. The first group was a control group. The second group was orally administered with paraquat. The third group was co-treated with paraquat and sciadopitysin. The fourth group was supplemented with sciadopitysin only. The experiment was conducted for thirty days. The results showed that the exposure to PQ decreased the activities of antioxidant enzymes (CAT, SOD, GSH, GSR, GPx and GST), whereas increased the levels of malondialdehyde (MDA) and reactive oxygen species (ROS) in the brain tissues of rats. Moreover, PQ intoxication increased the levels of inflammatory markers (TNF- $\alpha$ , NF- $\kappa$ B, IL-1 $\beta$ , IL-6 and COX-2). Furthermore, PQ exposure also induced histopathological damage in the brain of rats. However, the supplementation of SDN recovered all the PQ induced brain damages due to its antioxidant, anti-inflammatory and neuroprotective potentials.

**Keywords:** Paraquat, Sciadopitysin, Brain damage, Inflammation, Oxidative Stress



O-201/ICAZ-2023

**Exploring Insects as Sustainable Alternatives to Conventional Proteins Sources in Animal Nutrition**

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Muhammad Asfand Yar Asghar<sup>3</sup>, Tariq Nadeem<sup>4</sup>, Muhammad Salman<sup>5</sup>, Muhammad Bakhsh<sup>1</sup>

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**Abstract**

The increasing demand for natural resources to provide food and feed has led to increased global initiatives to improve production sustainability and efficiency. Insects are currently gaining greater attention as a significant and sustainable source of raw materials for animal feed, particularly in the domains of fish, poultry, and swine. The black soldier fly (*Hermetia illucens*), the yellow mealworm (*Tenebrio molitor*), and the common house fly (*Musca domestica*) are the most promising species. Despite anticipating quick progress, insects must be fully employed in the animal feed sector primarily due to technical, cost-effective, and legal barriers. Furthermore, there needs to be more studies as the perspectives of consumers and stakeholders about its utilization. Insects can fulfil the dietary needs of animals, promoting optimal growth and well-being. Insect meals can be regarded as feed-functional ingredients. Peptides and amino acids obtained from hydrolyzed proteins can be utilized in animal feeds to replace traditional protein feedstuffs. This allows for providing nutrients, bioactive substances, and feed additives to animals. By analyzing the potential impact on livestock and aquaculture industries, this study contributes valuable insights to the ongoing discourse on reshaping the future of animal protein sources for a more sustainable and resilient global food system.

Keywords: Insects, Feed, Fly, Nutrients, Protein

O-202/ICAZ-2023

**Hepatic and Renal Toxicity Evaluation Caused by Lead Acetate in Albino Mice**

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**Abstracts:**

Lead (Pb) is one of the most dangerous environmental poison, and cause health problems. The present study was designed to evaluate the negative impacts of PbAc on biochemical parameters hepato-renal function, stress markers level after orally exposure of albino mice to different concentration of PbAc salt in laboratory conditions for 28 days. For this purpose, albino mice average weight 35grams of male sex purchased and acclimatized for 2 weeks and then randomly grouping into four groups (each five mice). Different concentrations were prepared in distilled H<sub>2</sub>O as 3mg/kg BW, 5mg/kg BW, 7mg/kg BW. Control group (G1) was treated with distilled H<sub>2</sub>O and experimental groups G2, G3, G4 were treated with 3 mg/kg, 5mg/kg, 7mg/kg BW respectively, on alternate days for 28days. Lead acetate was given to treated group orally with feeding gavage. After acclimatization, initial body weight of all groups were done and final weight at the end of experiment. After the completion of trial liver and kidney blood samples were collected in EDTA coated tubes for further analysis. After dissection liver and kidney were removed carefully and used for further analysis. The weight of liver and kidney was found highest in group 2 as compared to control group. The contents of urea and creatinine were significantly higher in treated group as compared to control. Similarly, level of ALT, AST was high in treated groups. Group 4 showed highest values of MDA. While the level of catalase and GSH was lowest in group 4. Histological examination of liver showed significant alterations in treated groups as compared control group. It is concluded that lead acetate has toxic effect in living animals.



O-203/ICAZ-2023

**Identification of a GDAP1 Splice Site Variant in a Pakistani Family with Hereditary Neuropathy using Whole-Exome Sequencing**

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**Abstract**

The hereditary neuropathies (HNs) are inherited diseases affecting the peripheral nervous system, show clinical and genetic diversity. Over 100 causative genes are identified. GDAP1 gene is linked to autosomal dominant and recessive HNs, especially early onset autosomal recessive Charcot-Marie-Tooth disease, a prevalent form of HNs. This study explores clinical and genetic aspects in a consanguineous Pakistani family with hereditary motor neuropathy (HMN). The proband presented with gradually progressing weakness in the lower limbs, diagnosed with HMN through basic clinical neurological assessment and NCV testing. Other family members with HMN exhibited typical features of distal limb muscle weakness and atrophy without sensory involvement. Whole exome sequencing and Sanger sequencing revealed a splice site biallelic GDAP1 variant (NM\_018972.4 c.310+8del, p.), identified as the likely cause of HMN in the family. In-silico analysis indicates the GDAP1 variant may cause complete exon 3 skipping or intron 2 retention, affecting pre-mRNA splicing and causing disease. This study expands our understanding of GDAP1's role in hereditary neuropathy, specifically hereditary motor neuropathy (HMN).

O-204/ICAZ-2023

**The Study Of Different Plant Extracts As Bio-Pesticides Against Wheat Aphid (*Sitobion avenae*) In Punjab.**

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**Abstract:**

This experiment was conducted to assess the various bio-pesticides against the wheat aphid. The experiment was trailed at the Faculty of Agriculture sciences University of the Punjab, Pakistan. The wheat variety Galaxi was cultivated as crop in field. All the different plant extracts where used which were, neem leaves extract, Aloe vera, lemon peel extracts, moringa leaves extract and Tobacco leaves extract were used against the wheat aphid. The Randomized Complete Block Designs (RCBD) was used in field with three replications. After apply the plant extracts the aphid populations were noted after 24 h, 48 h, 72 h, 168 h and 240 h. Concentrations of 23 % each treatment were used. Data recorded after 240 h the statistical analysis results showed that highest pest control where noted at the neem leaves extracts its mortality was 85 percent. Lemon extracts also showed the good results with the effective control of 72 % mortality, 60 % mortality where noted at tobacco treatment. Same as lowest aphid controls were noted at the aloe vera leaves extract that was 52 % mortality. This study showed the effective control on wheat aphid by using the locally botanical plants which is safe for human health and same as our environment.

O-205/ICAZ-2023

**Exploring the Protective Effects of Fat-Hen's Methanolic Extract on Carbon Tetrachloride Induced Hepatic Injury in Rats**

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**Abstract:**

One of the most important organs in the human body, the liver is responsible for several physiological functions, including toxin elimination. The liver's relationship to these chemicals puts it at great risk of damage. Several chemicals like carbon tetrachloride and drugs as acetaminophen have been reported as hepatotoxins. Liver therapy and liver transplantation play key role to handle liver health, but such traditional treatment mechanisms have long diagnostic processes due to multiple tests and biopsies, furthermore immunological disturbances and organ shortage for liver transplantation are hurdles to cure liver toxicity. Although a few hepatoprotective drugs are clinically





available with associated limitations, therefore, there is a dire need for the discovery of new safer and effective hepatoprotective drugs. Major objective of this study was to explore the protective effect of the methanolic extract of *Chenopodium album* against carbon tetrachloride induced hepatotoxicity in rats. *Chenopodium album* has locally been used for multiple medicinal purposes. Methanolic extract of *Chenopodium album* (whole plant) was prepared with Soxhlet extractor and rotatory evaporator. Antioxidant activity of *Chenopodium album* was determined by DPPH free radical scavenging assay. Thirty Wistar (albino) rats (150–200 g) were divided into six groups for the evaluation of hepatoprotective potential of different concentrations of *Chenopodium album* against carbon tetrachloride (1:1 CCl<sub>4</sub>: Olive oil) under the controlled laboratory conditions. Group-I rats were administered with olive oil (Normal control), Group-II with CCl<sub>4</sub> only, Group-III with Silymarin (positive control), Group-IV with *Chenopodium album* (100 mg/kg), Group-V with *Chenopodium album* (200 mg/kg) and Group-VI rats with *Chenopodium album* (300 mg/kg) for the period of 28 days. Serum was taken to determine the levels of alanine transaminase, aspartate transaminase, alkaline phosphatase, cholesterol, triglyceride, creatinine and urea in the blood. Formalin stored tissues were examined for histopathological analysis. DPPH assay showed that *Chenopodium album* has the potential for reduction of oxidative stress. *Chenopodium album* minimized the levels of ALT ( $70 \pm 8.68$  U/L,  $68.75 \pm 8.38$  U/L &  $73.5 \pm 10.28$  U/L), AST ( $219.5 \pm 19.16$  U/L,  $140.75 \pm 13.35$  U/L &  $221.25 \pm 13.33$  U/L) and ALP ( $289.5 \pm 28.21$  U/L,  $258 \pm 11.12$  U/L &  $248.25 \pm 4.03$  U/L) at different concentrations (100 mg/kg, 200 mg/kg, 300 mg/kg respectively). *In vivo* study of *Chenopodium album* methanolic extract demonstrates the potential for protection of liver and after pre-clinical studies the plant can be used as a safe alternative of commercially available hepatoprotective medicines.

**Keywords:** Hepatoprotective, Toxicity, Natural products, Carbon tetrachloride, *Chenopodium album*

O-206/ICAZ-2023

### Islet of Langerhans in Rodents and Primate Pancreas: Anatomical and Biochemical Differences

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#### Abstract

Diabetes mellitus is a global problem and affects a significant number of people. Pakistan has been ranked as the number one country in the 2023 global diabetes index with around 26% of the population suffering from diabetes. Research efforts from national institutes and public sector universities are trying to cope with the growing number of patients and devising a national plan for diabetes prevention and recovery. Rodent models (rat, mouse) are currently considered the gold standard in the field of diabetes research because of their excellent use as diabetic/hyperglycemic models. Rodent/murine models offer cost-effective, easily managed, and biologically sound animal models to study diabetic conditions with supraphysiological levels of glucose. Non-human primates (NHPs) offer a more relevant model for humans in terms of disease pathobiology but because of their high maintenance and management costs, they are seldom opted for biological research in the public sector. Interestingly, strictly speaking about the diabetic animal models, a substantial amount of differences exist at the cytoarchitectural levels as well as subsequent metabolic signatures between rodent and primate islets of Langerhans. The current presentation will discuss in detail the specific anatomical and metabolic differences that exist between rodent and primate animal models which are highly relevant to humans in terms of the basic pathology of diabetes and the possible misinterpretation that might arise because of the fundamental difference between these two species.

O-207/ICAZ-2023

### Studies On Agronomic Impact of Banana Peel Derived Biochar in Combination With Organic Fertilizer

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#### Abstract

To meet the need of growing population, chemical fertilizers used excessively that deteriorate one-health and decline crop nutritional values. To overcome this problem, organic farming approaches are being utilized. Owing to its miraculous properties, Biochar can fulfill nutritional requirements of plants without causing threats to the environment. Moreover, it can improve soil fertility and acts as a slow-release fertilizer. This study aims to investigate the impact of banana peel derived biochar on plant growth parameters, soil physio-chemical properties and on soil



microbial population. Biomass is generated at 450°C by robust, simple, and appropriate pyrolysis method, characterized by proximate analysis. Surface functional groups, crystalline nature, thermal degradability of biochar determined by FTIR (Fourier-transform infrared spectroscopy), XRD (X-ray diffraction) and TGA (thermogravimetric analysis) respectively. Pot culture experiment was conducted with different combinations (S+S<sub>R</sub>), (S+F+S<sub>RF</sub>), (S+F+2%), (S+4%), (S+F+4%), (S+F+6%), (S+BP). Results illustrated the impact of biochar on soil physio-chemical properties (pH, EC, bulk density), plant growth parameters (length, shoot, root biomass, chlorophyll content) as well as on soil microbial population. A total of 2% of biochar with organic fertilizer significantly increased plant growth as compared to all other combinations. However, in the case of microbial population the application of 4% of biochar indicated significant results. Majority of isolated strains were gram positive while, some of the isolated bacterial strains from rhizosphere of wheat plant confirmed positive for Siderophore production, ammonia production and phosphate solubilization. These findings suggest that conversion of banana peel waste into productive, fruitful product biochar is regarded as best alternative to utilize waste and to improve soil fertility.

Keywords: Biochar, Organic fertilizer, Soil fertility, pyrolysis

O-208/ICAZ-2023

**Potential Use of Biochar as A Dietary Supplement In Aquaculture: Assessing The Growth, Nutrient Absorption, Carcass Composition, Hematology And Mineral Status In *Labeo rohita* Fingerlings**

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**Abstract**

Biochar, an organic carbonaceous matter, is a unique feed additive that is now being used in aquaculture industry to formulate a cost-effective and eco-friendly diet. This experiment was conducted over course of 90 days to determine the most effective form of biochar, produced from various sources, for supplementation in *Moringa oleifera* seed meal (MOSM-basal diet). These sources were: farmyard manure biochar (FMB), parthenium biochar (PB), vegetable waste biochar (VWB), poultry waste biochar (PWB) and corncob waste biochar (CWB), added in 2 g/kg concentration to determine the growth indices, nutrient absorption, carcass composition, hematology and mineral status of *Labeo rohita* fingerlings. The research design consisted of six test diets with 3 replications of each. Total of 270 fingerlings (6.30±0.020 g) were fed with 5% body weight and 15 of them were kept in a separate tank. The results indicated that PWB was most effective in improving weight gain (285.58±4.54%) and feed conversion ratio (1.060±0.040) compared to control diet and other test diets. The same type of biochar (PWB) produced the best results for nutrient digestibility and carcass composition. In terms of hematology and mineral status, PWB showed the best results. In conclusion, it was found that PWB significantly enhanced ( $P<0.05$ ) *L. rohita* fingerling's growth, carcass composition, nutrient digestibility, hematology and mineral composition whereas PB negatively affected all parameters.

O-209/ICAZ-2023

**Protective Effects of Sciadopitysin Against Paraquat-Induced Pulmonary Toxicity in Rats**

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**Abstract:**

Paraquat (PQ) is a quaternary nitrogen herbicide that is extremely harmful to both animals as well as humans, and numerous incidences of severe poisoning and fatalities have been documented in several decades. Acute respiratory distress syndrome (ARDS), lung fibrosis and acute lung injury (ALI) are the main clinical indications of the respiratory system in the severe case of PQ in lung toxicity. Sciadopitysin is a biflavonoid that shows antioxidant, anti-inflammatory, anti-cancer, and anti-apoptotic properties. Therefore, the current research was performed to evaluate the curative potential of sciadopitysin on paraquat-induced lung damage in rats. 20 male albino rats were separated into 4 groups. The first group served as a control group. The second group was provided with an oral dose of PQ. The third group was co-administrated with PQ and sciadopitysin. The fourth group was treated orally with sciadopitysin. PQ exposure reduced the activities of antioxidant enzyme i.e., catalase (CAT), superoxide dismutase (SOD), glutathione peroxidase (GPx), glutathione (GSH), glutathione reductase GSR and glutathione S-transferases (GST), whereas increased the levels of inflammatory markers and lungs specific markers, (eosinophil,



neutrophil, macrophage, BALF). However, sciadopitysin supplementation recovered all the damages induced by PQ.  
**Keywords:** Paraquat, Herbicide, Lungs toxicity, Antioxidants, Sciadopitysin, Biflavonoid

O-210/ICAZ-2023

**Impact Assessment of Orally Administered  
Polystyrene Nanoplastics On Heart Of Male Albino Rats**

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**Abstract:**

Polystyrene nanoplastics (PS-NPs) are potential environmental pollutants. Due to its smaller diameter these can cross biological membranes easily, enter the tissues, gather in organs and subsequently induce physiological damage. PS-NPs can accumulate in multiple organs i.e., liver, kidneys, heart and intestine thus leads to severe health issues in living organisms. The present study was conducted to elucidate the effects of PS-NPs on heart of male albino rats. 35 adult male albino rats were separated into 5 equal groups. First group was the controlled group, while the rats of other groups were injected orally with the different concentrations of PS-NPs (10, 20, 50 and 100mg/Kg). After 30 days of the experimental trial, the rats were made anesthetized and dissected. The heart of the rats was excised and separated into two parts. One half parts was kept in 10% formalin solution for histopathological analysis while the second half parts were stored in zipper bag for biochemical analysis at -20 °C. The intoxication of PS-NPs reduced the activities of anti-oxidant enzymes i.e., CAT, SOD, GSR and GST, while increased the levels of ROS and MDA. The levels of inflammatory markers (NF-kB, TNF- $\alpha$ , IL-1 $\beta$ , IL-6 and COX-2) were also increased in PS-NPs treated groups. The exposure to PS-NPs induced histopathological damages in the heart of rats. Data were statistically analyzed by using one-way analysis of variance (ANOVA) followed by Tukey's test.

**Keywords:** Polystyrene nanoplastics, Antioxidant, Cardiac damage, Inflammation.

O-211/ICAZ-2023

**Effects of Dietary Black Seeds Against Thiamethoxam Insecticide Induced Neurotoxicity In**

**Labeo Rohita**

Nabila Munir

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**Abstract:**

This study investigates the ameliorative potential of *Nigella sativa* seeds oil against thiamethoxam-induced neurotoxicity in *Labeo rohita*, a crucial aspect of sustainable aquaculture. Thiamethoxam, a neonicotinoid insecticide, poses a threat to aquatic life. Behavioral changes in fish exposed to thiamethoxam include swirling movement, suffocation, scales shedding and mucus secretion, escalating with higher concentrations. The study divided fish into control, thiamethoxam-exposed, and antioxidant-supplemented groups. After 30 days, histopathological changes were assessed, revealing thiamethoxam-induced damage in organs. Supplementation with black seed oil mitigated histopathological effects and increased acetylcholinesterase and butyrylcholinesterase activities, countering thiamethoxam exposure. This research highlights the potential of dietary interventions in mitigating adverse effects induced by pesticides in aquaculture systems. **Keywords:** Thiamethoxam, *Nigella sativa*, Neonicotinoids, Neurotoxicity, Acetylcholinesterase

O-212/ICAZ-2023

**Impact of Soybean Meal Replacement with *Chlorella vulgaris* Powder on Growth Performance, Body Composition, Hematobiochemical Parameters, and Bacterial Abundance in Intestine of *Ctenopharyngodon idella***

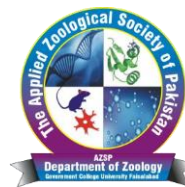
Shakeela Parveen<sup>1</sup>, Fayyaz Rasool<sup>2</sup>, Kashif Manzoor<sup>3\*</sup>, Shahid Mahmood<sup>3</sup>, Matiullah<sup>3</sup>, Ghulam Rabbani<sup>3</sup>, and Amina Ayub<sup>4</sup>

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## Abstract

*Chlorella vulgaris* (*C. vulgaris*) powder, a novel non-grain single-cell protein, shows considerable potential as a protein source in the feed supplementation of aquatic organisms in aquaculture. Despite this potential, the utilization of *C. vulgaris* in aquatic animals remains insufficiently explored. This study aimed to investigate the impact of soybean replacement with *C. vulgaris* powder on the growth performance, body composition, hematobiochemical parameters, digestive enzymes, and bacterial abundance in intestine of intensively reared grass carp (*Ctenopharyngodon idella*). Five isonitrogenous and isolipidic diets were formulated, wherein soybean meal was replaced with *C. vulgaris* at varying ratios: 0% (control), 25% (CVP-1), 50% (CVP-2), 75% (CVP-3), and 100% (CVP-4). The fish was fed for 8 months. At the trial's end, fish of CVP-4 resulted the highest growth performance (2871g, average), followed by CVP-3 (2734g), CVP-2 (2587g), CVP-1 (2471g), and the control (2192g). Fish from CVP-4 demonstrated the highest concentrations of total protein (6.83g/dl) and crude protein (22.31). The control group exhibited the highest triglyceride (219.63mg/dl) and crude lipid content (9.06). The maximum concentration of glutathione peroxidase (291.64  $\mu$ /mg), catalases (82.53 $\mu$ /mg), and superoxide dismutase (6.55  $\mu$ /mg) were recorded in the liver of CVP-4 fish. TBARS values were recorded as 6.87  $\mu$ g/mg (muscle), 3.82  $\mu$ g/mg (liver), and 3.55  $\mu$ g/mg (serum) in CVP-4 fish. Amino acid profiling of experimental diets revealed the highest concentrations of serine (4.91), followed by Glutamic acid (3.77), Proline (3.59), Hydroproline (3.57), and Lysine (3.43) in CVP-4 diet. Hematological analysis showed 503.41  $10^6$  / $\mu$ l of WBC, 2.09 of RBC  $10^6$  / $\mu$ l, and 8.58 g/dl HGB in the blood of CVP-4 fish. Protease activity was recorded as 536.12 in CVP-4, and lipase activity as 507.52 in CVP-1. Bacterial abundance analysis indicated the minimum prevalence (0.75%) in the intestine of CVP-4 fish, followed by CVP-3 (1.75%), CVP-2 (3%), CVP-1 (5.25%), and the maximum (32%) in fish of control group. A 100% inclusion of soybean meal (control group) caused histopathological changes in the intestine, such as inflamed muscularis, swelling, and mucosal fold fusion (bridging), an increased prevalence of goblet cells, constricted villi, and a reduction in supranuclear absorptive vacuoles. In conclusion, the incorporation of *C. vulgaris* powder, particularly at a 100% replacement level (CVP-4), in grass carp diets showed significant improvements in growth performance, body composition, hematobiochemical parameters, digestive enzymes, and intestinal bacterial abundance. Future research should investigate the mechanisms, optimal inclusion levels, long-term effects, and economic feasibility of *C. vulgaris* powder as a sustainable protein source in aquaculture.

**Keywords:** *Ctenopharyngodon idella*, *Chlorella vulgaris* powder, Feed supplementation, Growth performance, Digestive enzymes, Hematobiochemical parameters, Amino acid profile, Bacterial abundance

O-213ICAZ-2023

## Biochemical Properties And Biological Potential Of *Syzygium heyneanum* With Antiparkinson's Activity In Paraquat Induced Rodent Model.

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### Abstract

The plant *Syzygium heyneanum* (*S. Heyneanum*) belong Myrtaceae family and is part of the genus *Syzygium*. It was hypothesized that *Syzygium Heyneanum* ethanol extract (SHE), has antioxidant potential and can treat Parkinson disease (PD) via modulating acetylcholinesterase, TNF- $\alpha$ , and IL-6. A research brought way to identify and appraise the anti-Parkinson's potential of SHE. In vitro and in vivo studies were presented for investigation of this proposal. The steps of phytochemical investigations that involved separation, purification, and structure elucidation were carried out using chromatographic and spectroscopic techniques. The potential for antioxidants in vitro was evaluated using DPPH. By administering a large dose of plant extract (1000 mg/kg), the acute oral cytotoxic activity was evaluated. 10 mg/kg of paraquat is administered to induce PD. For the experiment, rats were allocated into six groups: control, disease control (paraquat), standard (L-dopa+ carbidopa), and treatment groups receiving 150 mg/kg, 300 mg/kg, and 600 mg/kg of SHE, which was implemented for 21-days. Behavioural and biochemical analysis, estimation of neurotransmitters and AChE level, estimation of IL-6 and TNF- $\alpha$  (by ELISA), and other analyses were carried out. Alkaloids, sugars, proteins, glycosides, phytosterols, phenolic compounds, and tannins are all found in plants, according to phytochemical study. Six compounds are identified using HPLC analysis, including p. coumeric acid, sinapic acid, caffeic acid, and chlorogenic acid. The inclusion of phenols and flavonoids causes SHE to have an IC<sub>50</sub> value of 25.41 in the DPPH scavenging assay. Rats' vital organs (lungs, heart, spleen, liver, and kidney) histopathology reveals little or almost no harmful effect. Biochemical measures (RFT, LFT, and lipid profiles) and



blood hematology exhibit minimal or almost no harmful effect. A behavioural research in PD rats using a dose-dependent method (150-300-600 mg/kg) demonstrates a considerable improvement in motor skills. In the group that received SHE treatment, the biochemical markers SOD, CAT, and GSH remarkably improved ( $p < 0.05$ ) at high doses (600 mg/kg), while MDA significantly declined ( $p < 0.05$ ) at high doses. At 600 mg/kg of SHE, the proportions of acetylcholinesterase was dramatically decreased ( $p < 0.05$ ). At 600 mg/kg of SHE treated groups, the levels of serotonin, noradrenaline, as well as dopamine were remarkably increased ( $p < 0.05$ ). According to the ELISA statistics, the SHE treated group had lower levels of IL-6 and TNF- $\alpha$  than the disease control group, which is a sign of neuroprotection. It is concluded that the SHE may minimize the PD symptoms and indications.

O-214/ICAZ-2023

**Toxicity, Phytochemical Composition and Enzyme Inhibitory Activity Of Weed Plants, Euphorbia Prostrata And Convolvulus Arvensis Against Stored Grain Insect Pest Tribolium castaneum Herbsts (Coleoptera: Tenebrionidae)**

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**Abstract**

The insecticidal activity of Euphorbia prostrata and Convolvulus arvensis weed plants were investigated against stored grain insect pest, Tribolium castaneum. Whole plants were used to prepare extracts in petroleum ether. Diet incorporation method was used for mortality bioassay against adult T. castaneum; whereas area preference method was used for repellency bioassay. Three different concentrations 10, 20 and 30% of extracts were used for different exposures intervals of 2, 4 and 6 days. The results showed a relatively high rate of adult mortality after 6 days at all concentrations. The highest mortality was shown at 30% concentration by E. prostrata (21%) and C. arvensis (23%), respectively. While, in repellency assay, 83 and 85% insects were moved away from the treated region of the filter paper with 30% extracts of E. prostrata and C. arvensis, respectively. There was positive relationship revealed between repellency and the applied dosage of both the plants extracts; however, they were negatively correlated with exposure time. In addition, the lowest mean number of T. castaneum in F1 generation was found at 30% concentration for E. prostrate (31) and C. arvensis (36.33) in comparison to control. The treatment of both extracts revealed significant reduction in the activity of AChE, AcP, AkP,  $\alpha$ -Carboxyl, and  $\beta$ -Carboxyl enzymes in treated group. Phytochemical analysis showed the presence of flavonoids, saponins, tannins, steroid, cardiac glycosides, alkaloids, anthraquinones, and terpenoids. FTIR analysis of E. prostrata showed the presence of phenolic compounds. It is suggested that further studies are needed in order to incorporate weed plant extracts in combination with fungi or bacteria to make it more potent biopesticide product in future.

**Keywords:** Tribolium castaneum, Weed plant extract, Euphorbia prostrate, Convolvulus arvensis Mortality, Repellency, Growth regulation, Enzyme Inhibition, Phytochemical Composition.

O-215/ICAZ-2023

**Antidiabetic Activity Of Fraxinus xanthoxyloides Bark Extract In Alloxan-Induced Diabetic Rats**

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**Abstract:**

*Fraxinus xanthoxyloides* Wall. ex DC (Family-Oleaceae) is a small tree of dry hills, commonly known as “Afghan ash” having leaflets 5-11, ovate lanceolate, toothed with a winged rachis. This plant is present in Northern parts of Pakistan, Morocco, Algeria, India and Afghanistan. Leave and root bark of *F. xanthoxyloides* are used locally for the treatment of jaundice, malaria and pneumonia. Decoction of stem, twigs and bark is used in pain, internal injuries, rheumatism and in bone fracture. We explored the *in vitro* and *in vivo* anti-diabetic activity of *Fraxinus xanthoxyloides* bark extract for the first time by considering it as a potential source of drug candidate. Powder of *Fraxinus xanthoxyloides* stem bark was extracted with methanol to obtain the crude extract and the resultant was fractionated with solvents in escalating polarity; n-hexane, chloroform, ethyl acetate and the residual aqueous fraction. The evaporation of respective solvents was done by rotary evaporator, the extract/fractions were dried and stored in refrigerator at 4°C for further investigation. Among all the extract/fractions, FXBH (IC<sub>50</sub> = 33.38  $\mu$ g/ml) showed the



powerful inhibition of  $\alpha$ -amylase that was comparable to the Acarbose (35.8  $\mu\text{g/ml}$ ) as well as FXBH ( $\text{IC}_{50} = 245.6 \mu\text{g/ml}$ ) also showed the powerful inhibition of  $\alpha$ -glucosidase comparable to Acarbose (12.53  $\mu\text{g/ml}$ ). HPLC-DAD analysis of FXBH showed the presence of Gallic acid, Catechin, Caffeic acid, Ferulic acid and Quercetin. In addition, *in vivo* antidiabetic potential of n-hexane fraction of *Fraxinus xanthoxyloides* bark extract was evaluated through a trial of 15 days on albino rats (Sprague Dawley). Glibenclamide (5 mg/kg) was used as positive control. Different biochemical parameters like serum Triglyceride, Low-density lipoprotein (LDL) cholesterol (mg/dl), Lipase (mg/dl), Amylase (mg/dl), Alanine aminotransferase (ALT) (mg/dl), Aspartate aminotransferase (AST) (mg/dl), Creatinine (mg/dl), Urea (mg/dl) and C-reactive protein (CRP) (mg/dl) levels were decreased along with HBAIC (mg/dl) while serum High-density lipoprotein (HDL) was increased in rats treated with *Fraxinus xanthoxyloides* bark extract when compared to diabetic control. Histopathological analysis of pancreas of rats demonstrated the restoration of beta cells.

O-216/ICAZ-2023

### Garlic as a Dietary Additive: Effects on Growth Performance and Body Composition of Catla catla Fingerlings Fed Canola Meal Diets

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#### Abstract

The present study aimed to investigate the effects of diets supplemented with garlic powder, garlic peel powders, and combination on the growth performance and body composition of *Catla catla* fingerlings fed on canola meal. At 0%, 1.5%, 3%, and 4.5% of the diet, garlic powder, garlic peel powders, and combination were introduced. The control group was designated as 0%. Three copies of the experiment were run. Feeding was done using 5% of the fingerlings' live, moist body weight. The trial lasted for seventy days. Two-way Analysis of Variance (ANOVA) was performed on the data. The study's findings showed that a canola meal-based diet supplemented with garlic powder, garlic peel powders, and a mixture improved the growth performance and body composition of *C. catla* when compared to the control group. Additionally, in all diets, T3, T7, and T11 levels showed superior growth performance and body composition. Garlic powder, garlic peel powders, and mixtures demonstrated greater growth, higher SGR, and lower FCR when compared to the T3, T7, and T11 diets.

Keywords: *Catla catla*, Growth performance, Garlic powder, garlic peel powder and mixture

O-217/ICAZ-2023

### Exposure to Polystyrene Nanoplastics Triggers Pulmonary Damages Via Modulation of Oxidative Stress And Inflammation In Male Albino Rats

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#### Abstract:

Polystyrene nanoplastics (PS-NPs) are one of the most potential environmental toxicants that cause oxidative stress in multiple organs. Therefore, the present study was designed to assess the adverse effects of PS-NPs on the lungs of albino rats. 35 albino rats were divided into 5 groups. The 1<sup>st</sup> group was serve as the control group. The 2<sup>nd</sup> group was provided with an oral dose (10mg/kg) of PS-NPs. The 3<sup>rd</sup> group was treated with PS-NPs (20mg/kg). 4<sup>th</sup> group was given an oral dose of PS-NPs (50mg/kg). 5<sup>th</sup> group was provided with 100mg/kg of PS-NPs. It was indicated that PS-NPs exposure reduced the activities of antioxidant enzymes (catalases (CAT), superoxide dismutase (SOD) and glutathione peroxidases (GPx), whereas increased the levels of malondialdehyde (MDA) and reactive oxygen species (ROS). Moreover, the levels of anti-inflammatory markers i.e., tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ), nuclear factor kappa-B (NF- $\kappa$ B), interleukin-1 $\beta$  (IL-1 $\beta$ ), interleukin-6 (IL-6) and cyclo-oxygenase-2 activity (COX-2) were increased. Furthermore, lungs specific markers (Neutrophils, BALF and assenophils) were also increased following the PS-NPs exposure. Data obtained from this trial will be statistically analyzed by one way ANOVA (analysis of variance) followed by Tukey's test.

Keywords: Polystyrene nanoplastics, Lungs damage, Toxicity, Inflammation, Oxidative stress



O-218/ICAZ-2023

**Dose-Dependent Effects Of Polystyrene Nanoplastics On The Gastrointestinal Tract Of Albino Rats**

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**Abstract:**

Polystyrene nanoplastics (PS-NPs) are one of the potential environmental pollutants, which are reported to cause multiple organs toxicity. The present study was designed to evaluate the gastrointestinal toxicity of polystyrene nanoparticles (PS-NPs) in albino rats. A total of 35 albino rats were utilized in the study. The rats were divided into five groups. The first group was designated as the control group. The second group was treated with a dosage of 10 mg/kg of PS-NPs. The third group was administered with a dosage of 20 mg/kg of PS-NPs. The fourth group received a dosage of 50 mg/kg of PS-NPs. The fifth group was administered with a dosage of 100 mg/kg of PS-NPs. The findings of the study revealed a significant decrease in the activities of anti-oxidant enzymes (catalase, glutathione reductase, superoxide dismutase, glutathione peroxidase, glutathione-S-transferase, and reduced glutathione), whereas the levels of reactive oxygen species (ROS) and malondialdehyde (MDA) were increased in the rats exposed to PS-NPs. Moreover, a significant upsurge in the level of inflammatory markers (TNF- $\alpha$ , IL-6, NF- $\kappa$ B, IL-1 $\beta$  and COX-2 activity) were observed in PS-NPs treated rats. The exposure to PS-NPs also induced histopathological damages in the gastrointestinal tract of rats. Data obtained from this trial was statistically analyzed by one way ANOVA (one-way analysis of variance) followed by Tukey's Test.

**Keywords:** Polystyrene nanoplastics, Gastrointestinal toxicity, Inflammation, Oxidative stress,

O-219/ICAZ-2023

**Risk Factors of Diabetic Retinopathy (DR) Patients of Type-1 Diabetes Mellitus (T1DM) in Hyderabad and Jamshoro**

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**Abstract**

Diabetes mellitus (DM) is one of major chronic diseases that affects not every organ in a body but also has a huge impact on overall quality of life. DM is a major health problem globally. DM is a chronic endocrine disorder due to deficient secretion of insulin or improper action of insulin; it leads to be increased glucose level in the blood. Type 1 diabetes mellitus (T1DM) is an auto immune disease. T1DM has many risk factors like genetics and environment. DM is one of the world's quickest developing long-haul illnesses and a main source of procured vision misfortune. During the first twenty years of sickness, practically all patients with T1DM. The hazard elements of creating DR depend on length and the seriousness of hyperglycemia. Nonetheless, sufficient control of blood glucose, circulatory strain (BP), and lipid levels can essentially diminish the movement and dreariness of diabetic retinopathy DR. The aim of this study was to evaluate the frequency of risk factors of DR with T1-DM different age group patients and was conducted in medical outdoor patient (OPD) of two main hospitals named as Civil Hospital Hyderabad and LUMHS Hospital Jamshoro from July to December 2018. The results found that out 180 DR patients were enrolled in the present study. Out of 180 patients DR 120 (66.66%) males and 60 (33.33%) females. Of the total DR patients, the majority 100 (55%) had 15-20 years of duration of T1DM, followed by 60 (33.3%) 10-15 years and 20 (11.1%) up to 10 years. The results found that the maximum number of patients of DR were at the age 26–30 years 99 and 81 patients of 20-25 years of age. Out of 180 DR patients 60 have positive family history and 120 patients have negative family history. Out of 180 DR patients 30 had good glycemic control and 150 patients had poor glycemic control. Out of 180 DR patients 100 patients were hypertensive (BP >145/95mmHg) and 80 patients were normotensive (BP <145/90mmHg).

**Key words:** Risk, Retinopathy, Type 1, Diabetes mellitus, Hyderabad, Jamshoro

O-220/ICAZ-2023



### Prevalence of Hyperandrogenic Hirsutism In Adolescence To Elderly Woman In The Area Of Hyderabad District

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#### Abstract:

The hormonal disease known as hyperandrogenic hirsutism causes excessive terminal hair, which often appears in a masculine pattern, to grow in strange places on the female body where vellus hair would normally grow, giving the illusion of baldness. The term "hyper androgenic condition" refers to the bodily repercussions of excessive testosterone levels in females. From July 2021 to July 2022, this research project was carried out in private practices and government hospitals in the District of Hyderabad using a well-developed cross-sectional questionnaire that was adopted after discussion with the project supervisor and the certified gynecologists, dermatologists, and endocrinologists of the relevant hospitals. This research work followed the WHO method to collect data and conducted a systematic overview to find the prevalence of hyper androgenic hirsute patients. An ultrasound of the pelvis is performed to assess ovarian health. Females between the ages of 12 and 65 were found to have reported cases. 68 female hirsute patients were examined during this research among them 8 patients (12%) were ranging 12 to 19 years old, 28 patients (41%) were 20 to 30 years old, 19 patients (28%) were 31 to 40 years old, 9 patients (13%) were 41 to 50 years old and 4 patients (6%) were 51 to 65 years old. The other finding of study was that which parts of the body have terminal hairs by using Ferriman Gallway scoring scale method, during this study 27 patients (40%) had severe course hair on upper lips, chin, inner thighs, 16 patients (23%) had course hairs on lower abdomen side burns of face, and back of body, 15 patients (22%) had thicker hairs on upper arms and shoulders and 10 patients (15%) had on full face and lower body. From all the 68 HAH female patients, 25 (37%) were unmarried, 29 (43%) were married, 6 (9%) were divorced, and 8 (11%) were widow. In reported cases the literacy rate of 68 female patients is also evaluated that among them 5 (7%) females were post graduated, 20 (29%) were graduates, 23 (34%) were intermediate, 12 (18%) were primary, and 8 (12%) were not literate. The data about the prevalence of hyperandrogenic hirsute females have further examined according to the type of diet, out of 68 HAH female patients 15 (22%) consume balanced diet, 19 (28%) consume moderate diet, and 34 (50%) consume imbalance diet. The sign and symptoms of the HAH female patient out of 68, 33 (48%) females had symptoms like oily skin, acne on face and body, amenorrhea, masculinization, 15 (22%) experience obesity, deepening of voice and temporal baldness, 6 (9%) had virilization such as decreased breast size and enlargement of clitoris, 8 (12%) had Oligomenorrhea, infertility, mood swings and severe depression and 6 (9%) females had random nonspecific sign and symptoms. The females suffering from hyperandrogenic hirsutism have to face depression, physiological and psychological pain, and lack of confidence. Females have to compromise their physical wellbeing, mental peace and social life at various aspects.

O-222/ICAZ-2023

#### Synthesis and Biological Characterization of Chitin-Based Polyurethane Bio-composites for Biomedical Applications

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#### Abstract

Polyurethanes (PUs) are versatile materials and can be processed in a number of ways to obtain wide range of valuable products in medical field e.g. medical implants, sutures, artificial veins, arteries, wound dressing, dentistry, drug delivery and scaffolds. Polyurethane chemistry offers great degree of amalgamation of functional groups which can be used to modify properties of PU. In the present study, chitin based polyurethanes bio-composites with potential of biomedical applications were synthesized by the reaction of hydroxyl terminated polybutadiene (HTPB) and hexamethylene diisocyanate (HMDI), extended with different mole ratios of chitin, and 1,4-butanediol. The molecular characterization of synthesized samples were done by using FT-IR and NMR spectroscopy. Synthesized materials were further characterized by X-ray diffraction (XRD), scanning electron microscope (SEM), thermo gravimetric analysis (TGA) and differential scanning calorimetry (DSC). The surface properties such as water absorption (%), degree of swelling and contact angle was also studied. Cytocompatibility of the specimens was evaluated using cell culture method. Hemolytic studies were also performed. The results of various analytical parameters were statistically analyzed. Biocompatibility, biodegradability, less hemolytic effect, high thermal stability, low hydrophobicity and





mechanical properties boosted with increased chitin content. Thus synthesized novel materials have great potential for biomedical applications such as transplants, degradable sutures and control drug delivery.

**Keywords:** polyurethane, bio-composites; chitin; biomedical

O-223/ICAZ-2023

**Oleander A Persuasive Source of Bioactive Compounds and Natural Antioxidants**

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**Abstract**

Natural products have long been used therapeutically and this use has changed over the course of human history. It is used by about 80% of people around the world for their primary healthcare. Oleander is a significant medicinal plant with potent cardiac glycosides that is used to treat cardiac asthma. The current investigation examined the bioactive compounds and antioxidant capacity of numerous extracts of oleander. According to the findings, yield was higher in ethanol extract (9.2%) than methanol extract (8.5%) followed by water extract (7.3%). Oleander extracts contained numerous secondary metabolites including alkaloids, steroids, glycosides, terpenoids, flavonoids and phenols. The ethanol extract's total phenolic content study revealed a wide range of compounds. From all the extracts the ethanolic extract has a significant scavenging capacity, with percentage inhibition (DPPH) over 87% at a concentration of 50µg/mL, which have percentage inhibition of BHT (54%) at the same concentration. The reducing power of the ethanolic extract at (10–50 µg/ml) was also found to be noticeably higher (absorbance 0.20–1.85). The findings indicated that oleander leaves are an effective source of bioactive compounds and natural antioxidants, suggesting that they may be used in the treatment of a wide range of illnesses.

**Keywords:** oleander, bioactive compounds, natural antioxidants

O-224/ICAZ-2023

**Effect of Probiotic (Yeast) On Growth Performance, Intestinal Microbiota and Histology of *Labeo rohita***

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**Abstract**

Yeasts are single-celled, eukaryotic microbes that are categorized as fungus kingdom members. Yeast is also known to play key roles in improving the gastrointestinal health of fish. The goal of the current study is to see how probiotics (*saccharomyces cerevisiae*) effects on the growth parameters, intestinal histology and microbial fauna of fish *Labeo rohita*. Fish were placed into two groups, first receiving a diet that contain probiotic *saccharomyces cerevisiae* and the second group served as control fed with basal diet. The duration of trail was two months. During trail, growth performance of fish was observed by measuring daily weight gain (DWG), daily length gain (DLG), specific growth rate (SGR), condition factor (CF) and feed conservation ratio (FCR) on weekly basis. The outcomes of the study showed that growth performance parameters viz. DWG, DLG, SGR, CF and FCR shown more significant result of probiotic fed fish as compare to control. The intestine of fish used to observe the histological alteration and microbial fauna. The bacterial colonies in intestine of fish fed with yeast were identified as *Saccharomyces cerevisiae*, *Escherichia coli*, *Xanthomonas* and *Actinomyces* on probiotic fed fish. In intestine villus height (VH), villus width (VW), crypt depth (CD), muscularis mucosa (MM) and muscularis exterane (ME) were significantly increased by probiotic fed fish as compare to control.

**Keywords:** Yeast, growth, gut microbiota, histology, Fish, Feed.

O-225/ICAZ-2023

**Residual Effect of Insecticides On Ground Beetles**

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**Abstract:**

In the agricultural area, ground beetles are effective weed, insect and pest consumers. The objective of this study was determine negative effect of insecticides on ground beetles. Sampling was done from two different sites, (Sargodha Road and Jhang City) by pitfall traps, hand picking, and light traps from insecticide-treated and insecticide-free areas fields. The insecticides used in this study were pyrethroids and neonicotinoids. The EX-SITU study was executed to check the effect of pyrethroids and neonicotinoids on *Calosoma inquisitor* and *Pheropsophus verticalis*



predators of wheat crop. Parathion was the least toxic insecticide, caused approximately 55% mortality in calosoma inquisitor species. Lamda cyhalothrin was more toxic than Parathion insecticide and caused approximately 70% mortality in Calosoma inquisitor species. Highest mortality caused by Lamda cyhalothrin was at concentration of 0.04ml/cm<sup>2</sup>. Emmamectin benzoate was most toxic contact sprays, caused 95% mortality in pheropsophus verticalis species but the residual toxicity in soil remain constant for 1 week. Highest mortality (97%) caused by Emmamectin benzoate was at stock solution of 1ml/cm<sup>2</sup>. ANOVA under (CRD) was used to gather and evaluate the significant impact of data. The (ANOVA) statistically revealed highly significant association ( $P < 0.0000$ ) between insecticides and mortality while taking the insecticide as an independent variable and mortality of ground beetles as dependent variable.

O-226/ICAZ-2023

### Studies on the Effect Of Microplastics (Polyethylene Glycol) On the Growth Performance And Haematology Of

**Labeo rohita**

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#### Abstract

The aim of present study was to assess the physical effects of polyethylene glycol microplastics on growth performance and haematological parameters in freshwater *Labeo rohita*. Fish was exposed to different concentrations of microplastics T0 was treated as control group while the T1, T2 and T3 were exposed to 1, 10 and 100 mg/L of microplastics respectively for six weeks. Ten individuals were stocked in each experimental tank. Growth performance was measured weekly in terms of weight gain, specific growth rate, condition factor, total length and survival rate whereas haematological parameters i.e., RBCs, WBCs, differential WBCs, results showed significant effects of polyethylene glycol on growth performance and haematology of fish. Maximum weight, length gain, specific growth rate and condition factor were observed in T0 while the minimum values were observed in T3. RBCs, haemoglobin, haematocrit, MCV, MCH and MCHC were significantly increased in treatment T3 as compare to control group T0. Platelets numbers in *Labeo rohita* were decreased and WBCs were significantly increased in treatment T3 as compare to control group T0. Differential cells showed fluctuations in all treated groups (T1, T2 and T3). Results suggested that exposure of fish to high concentrations of polyethylene glycol microplastics have negative impacts on the fish physiology.

Keywords: *Labeo rohita*, Growth performance, Haematology, Weight gain

O-227/ICAZ-2023

### An Awareness Campaign and Solutions Techniques Dissemination For The Proper Disposal Of Dead Animals To Clean The Environment From Hazardous Microbes: A Survey In District Rahim Yar Khan, Pakistan (2022-2023)

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#### Abstract:

This research was conducted to highlight an issue expected to be created by not disposing/burying dead animals properly. It was assumed that a high-level increase in environmental deadly microorganisms is arising due to these non-disposed animals, also affecting birds' populations. It is crucial for the ecosystem and general public health to increase information and implement suitable disposal techniques for reducing the risk of hazardous microorganisms and to assure the safety of birds. This survey was conducted in District Rahim Yar Khan, Pakistan, from August 2022 to July 2023. Using a case-control study methodology, regions with bad disposal habits were chosen as cases, whereas regions with good habits were chosen as controls. A total of 100 awareness campaigns, 500 interviews, and 100 different site visits were done to deliver and gather information to evaluate present dead animal disposal techniques. The results of this study highlight the importance of effective awareness campaigns in attaining the objectives. The study's conclusions underline the presence of dead animals in the region the ubiquity of unsafe methods for disposing of dead animals and the dangers of microbial contamination that go along with them. Compared to locations with suitable disposal, those with improper disposal had more dangerous microorganisms in the environment and a loss of hygienic environment. To support these findings, statistical data was examined. This case-control study concludes by



emphasizing the significance of resolving the issue of improper animal disposal in all regions of Pakistan.

**Keywords:** Dead animal disposal, hazardous microbes, awareness campaign, environment, public health, Rahim Yar Khan District, Pakistan.

O-228/ICAZ-2023

**Antipyretic Effects Of Hydro-Methanol Extract Of *Melia azedarach* Linn. Seeds And *Cucumis melo* Linn. Seeds In Experimental Rabbits**

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**Abstract:**

To investigate the antipyretic activity of hydro-methanol extract of *Melia azedarach* Linn. (HMEMA) seeds and *Cucumis melo* Linn. (HMECM) seeds in experimental animals. Baker's yeast was used to induce fever in rabbits which were divided into six groups. The animal groups were thereafter administered distilled water (control), paracetamol (reference standard, 150mg/kg), HMEMA (250mg/kg), HMEMA (500mg/kg), HMECM (250mg/kg) and HMECM (500mg/kg) respectively. HMEMA and HMECM were also phytochemically screened for tannins, alkaloids, phenols, flavonoids, saponins and cardiac glycosides. Results indicate that hydro-methanol extract of *M. azedarach* Linn. Seeds (250mg/kg and 500mg/kg) significantly ( $p < 0.001$ ,  $p < 0.05$  respectively) reduced the elevated body temperature in dose dependant manner. Insignificant to no antipyretic effect was produced by hydro-methanol extract of *Cucumis melo*

*L. seeds*. Phytochemical analysis of the HMEMA showed the presence of flavonoids, saponins, tannins, phenols, alkaloids and cardiac glycosides While HMECM was positive for flavonoids, phenols and saponins. The result shows that there exists a potential benefit in utilizing *Melia azedarach* L. seeds in treating fever. This property can be attributed to the presence of phytochemical constituents present in the hydro-methanol extract of *Melia azedarach* L. seeds and the exact mechanism need to be evaluated.

**Keywords:** Medicinal plants, antipyretic activity, Baker's yeast, hydro-methanol extract, phytochemical screening.

O-229/ICAZ-2023

**Assesment of DNA status in gills and kidney of *Labeo rohita* inhabiting River Chenab**

Naiha Mehmood, Noor ul Huda, Salma Sultana, Zahid Iqbal

**Abstract**

The present study entitled "Assessment of DNA status in gills and kidney of *Labeo rohita* inhabiting River Chenab" was conducted. The periods for which the experiment is conducted was three months. Three groups were collected form the River Chenab and each groups depends on 10 samples. The aim of this study was to evaluate the effect of pollution on the *Labeo rohita* species which causes DNA damage. The study was carried out of wild species of *Labeo rohita* (Rohu) in natural environment. Total number of groups in this experiment were four. One is the control group and the other three were experimental groups named as G1, G2 and G3. Gill and Kidney of samples were drawn by dissection and is used to estimate the genotoxic effect of pollution using Comet assay or Single cell gel electrophoresis. The results showed the comet in the sampled groups of River Chenab. The data obtained from experiment was statistically analyzed by using one way ANOVA.

O-230/ICAZ-2023

**Surveillance study on Sustainable Management Strategies for Cattle Farming in Pakistan**

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**Abstract**

The livestock farming is an important component of the agriculture sector in Pakistan, which plays a significant role in the national economy. The cattle farming, is a source of income for rural communities and contribute to food securities through meat, milk and other animal products. However, the traditional extensive system face challenges in form of environmental impact, disease outbreaks, inadequate veterinary services and insufficient access to modern farming services. The present study was undertaken to find out the gaps that could minimize the challenges.



The surveillance study was conducted with questionnaire and farm visit and the data was collected. The farmers were asked about the health status, biosafety plan, handling of sick animals, use of antibiotics, farming practices, early detection and response to disease outbreaks and sanitation practices etc. The finding of the result showed, that most of livestock farmers raise their livestock with the traditional farming system. The results also showed that modern farming practices should be adopted for improved herd health and increase production. The key areas for improvement were highlighted through the questionnaire responses. In conclusion, the finding of the study explore the challenges within the traditional extensive system of cattle farming. These observations need the transition from traditional farming to modern farming practices to address the challenges effectively. Moreover, the study underscores the significance of embracing progressive and sustainable approach in cattle farming to ensure food security and contribute positively to the national economy.

Keywords: Cattle farming; Challenges; Surveillance; Traditional farming; National economy

O-231/ICAZ-2023

### **Radiolabeling of HNLZ with Technetium-99m and its biodistribution in Swiss Albino mice**

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#### **Abstract:**

Technetium-99m (Tc-99m) is the most widely used as radiotracer for diagnostic purposes. The aim of this research work was to label HNLZ with Tc-99m and its biodistribution study was carried out in Swiss Albino mice. <sup>99m</sup>Tc-HNLZ injection was prepared using <sup>99m</sup>Tc- pertechnetate (10mci) with HNLZ at pH 7 in presence of stannous chloride as reducing agent. The labeling efficiency of <sup>99m</sup>Tc- HNLZ injection was found to be greater than 99%. The <sup>99m</sup>Tc- HNLZ complex was stable up to 24 h at room temperature determined by paper chromatography and ITLC-SG. The charge on the <sup>99m</sup>Tc- HNLZ was determined by electrophoresis technique. The biodistribution study of <sup>99m</sup>Tc- HNLZ was carried out using male Swiss Albino mice for different interval of times.

O-232/ICAZ-2023

### **Hepatoprotective Role Of Vitexin Against Methotrexate-Induced Liver Damage In Male Rats: A**

#### **Biochemical, Inflammatory And Apoptotic Investigation**

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#### **Abstract:**

Methotrexate (MTX) is a folic acid antagonist, and it is most often used as chemotherapeutic drug in the therapy of cancer. However, it also exhibits several adverse effects on different organs including liver. Vitexin is a flavonoid found in a wide variety of plants that possesses several therapeutic effects. The current study was designed to assess the potential effects of vitexin on MTX induced hepatic damage. 24 male albino rats were separated into four groups. 1<sup>st</sup> group was designed as control group; 2<sup>nd</sup> group was administrated with MTX (20 mg/kg). 4<sup>th</sup> group was co-treated with MTX + vitexin (20 mg/kg + 40 mg/kg). Whereas the 4<sup>th</sup> group was treated with vitexin (40 mg/kg). MTX-intoxication significantly reduced the activities of glutathione reductase (GSR), catalase (CAT), superoxide dismutase (SOD) and glutathione peroxidase (GPx), while elevated the malondialdehyde (MDA) and reactive oxygen species (ROS) levels. Moreover, MTX augmented the hepatic serum markers including alkaline phosphatase (ALP), aspartate aminotransferase (AST) and alanine transaminase (ALT). The intoxication of MTX increased the levels of apoptotic markers (Bax and Caspase-4) and inflammatory markers. Additionally, the exposure to MTX decreased the level of anti-apoptotic protein (Bcl-2). However, vitexin supplementation reversed all of the hepatic damages due to its anti-oxidant, anti-apoptotic, anti-inflammatory as well as androgenic nature. Therefore, it is revealed that vitexin may prove to be a promising therapeutic agent to treat hepatic damage caused by MTX.

Keywords: Hepatotoxicity, Vitexin, Methotrexate, Apoptosis, Oxidative stress, Inflammation



O-233/ICAZ-2023

**Exposure To Polystyrene Nanoplastics Induces Kidney Damage In Rats By Inducing Oxidative Stress And Apoptosis**

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**Abstract:**

Polystyrene nanoplastics (PS NPs) are ubiquitous environmental pollutants that have the ability to induce oxidative stress. However, it is still unclear how they affect human health and the precise mechanisms underlying their toxicity. Therefore, the present study was conducted to evaluate the harmful effects of PS-NPs on the kidneys of adult male albino rats. 35 rats were separated into five groups. Each group was containing seven rats. group I was serve as the control group; group II was treated with 10 mg/kg of PS-NPs and group III was treated with 20 mg/kg of PS NPs, group IV was administrated with 50 mg/kg of PS NPs and group V was exposed to 100 mg/kg of PS NPs. The trial was executed for 30 days. The activities of anti-oxidant enzymes, CAT, GPx, SOD and GSR were significantly decreased, whereas the levels of ROS and MDA were increased in PS-NPs-intoxicated rats. Moreover, the administration of PS-NPs prompted a considerable ( $P < 0.05$ ) upsurge in the levels of inflammatory markers such as NF-kB, TNF- $\alpha$ , IL-1 $\beta$ , IL-6 and COX-2 activity. Moreover, the administration of PS-NPs also induced histopathological damages in the renal tissues of rats. Data obtained from this trial was statistically analyzed by ANOVA (one way analysis of variance) followed by Tukey's test.

**Keywords:** Polystyrene nanoplastics, Renal damage, Inflammation, Oxidative stress

O-234/ICAZ-2023

**Dose-Dependent Effects Of Polystyrene Nanoplastics On The Hepatic Tissues Of Albino Rats**

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**Abstract:**

The continued influx of polystyrene nanoplastics (PS-NPs) into the environment is raising global concerns about their adverse consequences on the health of organisms. However, the hazardous effects of PS-NPs have not been thoroughly described in mammals. Although the liver is frequently mentioned as a potential target organ of PS-NPs, there is a dearth of data regarding the adverse effects of PS-NPs on the mammalian liver. Therefore, the current research was designed to ascertain the possible toxic effects of PS-NPs on the liver of albino rats. Rats were divided into five groups and placed in separate cages. First group was designed as the control group. The rats of the remaining groups were administered different doses of PS-NPs. PS-NPs were administered to the second group orally at a dose of 10 mg/kg. An oral administration of 20 mg/kg of PS-NPs was given to the third group. The fourth group received an oral administration of 50 mg/kg of PS-NPs. The dose of 100 mg/kg of PS-NPs was administered via oral gavage to the fifth group. Our findings revealed that PS-NPs induced toxicity in rats, especially at high doses of PS-NPs. The activities of anti-oxidant enzymes, CAT, GPx, SOD and GSR were significantly ( $P < 0.05$ ) decreased, whereas the levels of oxidative stress markers, ROS and MDA were increased substantially ( $P < 0.05$ ) in the hepatic tissues of PS-NPs-intoxicated rats. Moreover, PS-NPs administration induced a remarkable ( $P < 0.05$ ) increase in the levels of inflammatory markers such as NF-kB, TNF- $\alpha$ , IL-1 $\beta$ , IL-6 and COX-2 activity. Moreover, PS-NPs exposure instigated a considerable ( $P < 0.05$ ) upsurge in the levels of liver serum markers, ALT, AST and ALP. Furthermore, PS-NPs intoxication resulted in significant ( $P < 0.05$ ) disruptions in the histopathological profile of the hepatic tissues of rats. The present study suggest that PS-NPs have the potential to trigger oxidative stress in the hepatic tissues of rats.

**Keywords:** Polystyrene nanoplastics, Liver damage, Toxicity, Inflammation, Oxidative stress

O-235/ICAZ-2023

**Curative Effect of Taxifolin Against Bisphenol F Induced Cardiac Damage in Rats**

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**Abstract:**

Bisphenol F (BPF) is an endocrine disrupting chemical which is widely used in the production of polycarbonate plastics, epoxy resins and thermal papers. Taxifolin, a potent bioactive flavonoid exhibits versatile therapeutic and



pharmacological

activities. The existing research was designed to explicate the mitigative role of taxifolin against BPF induced cardiac dysfunction in rats. Twenty-four male albino rats were randomly divided into 4 different groups' viz. control group, BPF (100mgkg<sup>-1</sup>), BPF +Taxifolin (100mgkg<sup>-1</sup> + 50mgkg<sup>-1</sup>) group, and Taxifolin (50mgkg<sup>-1</sup>) group. BPF intoxication substantially reduced the activities of catalase (CAT), superoxide dismutase (SOD), glutathione reductase (GSR), glutathione S-transferase (GST), and glutathione (GSH) contents while upregulating the levels of reactive oxygen species (ROS) and malondialdehyde (MDA. BPF intoxicated rats exhibit considerably higher creatinine phosphokinases (CPK), creatine kinase-myoglobin binding (CK-MB), lactate dehydrogenase (LDH) and troponin contents. The findings indicated that BPF remarkably up-surfed the levels of inflammatory markers including nuclear factor kappa B (NF-κB), interleukin-1β (IL-1β), tumor necrosis factor-α (TNF-α), interleukin-6 (IL-6) levels and cyclooxygenase-2 (COX-2) activity. Besides, Caspase-3, Bax & Caspase-9 expressions were increased, and Bcl-2 expression was decreased after BPF exposure. Moreover, BPF instigated various histopathological alterations. However, Taxifolin supplementation efficiently curtailed the BPF-triggered biochemical, inflammatory and histopathological damages in cardiac tissues of rats. The results of the investigation showed that Taxifolin significantly alleviated BPF-induced cardiac damage in rats.

**Keywords:** Bisphenol F, Cardiac damage, Cardiotoxicity, Oxidative stress, Taxifolin

O-236/ICAZ-2023

#### Ameliorative Efficacy of Caffeic Acid Against Paraquat Induced Liver Damage in Rats

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#### Abstract:

Paraquat (PQ), which is widely used around the globe, is highly toxic for humans. Caffeic acid (CA), a ubiquitous phenolic compound present in several plants, has a variety of pharmacological properties. Therefore, the present study was designed to investigate the ameliorative effects of caffeic acid against paraquat induced hepatotoxicity. Twenty four male albino rats were randomly divided into 4 different groups' viz. control group, PQ (5mgkg<sup>-1</sup>), PQ+CA (5mgkg<sup>-1</sup> + 40mgkg<sup>-1</sup>) group, and CA (40mgkg<sup>-1</sup>) group. PQ intoxication substantially reduced the activities of catalase (CAT), superoxide dismutase (SOD), glutathione reductase (GSR), glutathione S-transferase (GST), and glutathione (GSH). The levels of reactive oxygen species (ROS) and malondialdehyde (MDA) raised after PQ-treatment. The levels of alanine aminotransferase (ALT), alkaline phosphatase (ALP) and aspartate aminotransferase (AST) were escalated following PQ administration. The findings indicated that PQ remarkably up-surfed the inflammatory markers, including nuclear factor kappa B (NF-κB), interleukin-1β (IL-1β), tumor necrosis factor-α (TNF-α), interleukin-6 (IL-6) levels and cyclooxygenase-2 (COX-2) activity and histopathological damages. However, CA supplementation efficiently curtailed the PQ-triggered biochemical, inflammatory and histopathological damages in rat liver. The results of the investigation showed that CA significantly alleviated PQ-induced hepatotoxicity in rats.

**Keywords:** Paraquat, Liver damage, Hepatotoxicity, Oxidative stress, Caffeic acid

O-237/ICAZ-2023

#### Therapeutic Effect of Genistein Against Furan-Induced Kidney Damage In Rats: A Histological And Biochemical Assessment

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#### Abstract:

Furan is a naturally occurring organic compound. It develops as a result of the thermal processing of food and stimulates critical impairments in various organs including kidney. Genistein is a natural dietary flavonoid possessing diverse pharmacological potential. The present investigation was planned to evaluate the protective role of genistein against furan-prompted renal toxicity in rats. 24 male rats were divided into 4 groups i.e., control, furan-induced group (10 mg/kg), furan + genistein-treated group (10 mg/kg + 5 mg/kg), and genistein-treated group (5 mg/kg). Our results revealed that treatment of furan reduced the activity of catalase (CAT), glutathione peroxidase



(GPx), superoxide dismutase (SOD), glutathione-disulfide reductase (GSR), glutathione S-transferase (GST) as well as glutathione (GSH) while elevating ROS and MDA levels. Furan administration raised the level of urea, creatinine, KIM1 along with NGAL while significant reduction in creatinine clearance. Additionally, furan treatment substantially elevated the level of caspase-3, caspase-9 and Bcl-2 associated X protein (Bax) while reducing the level of B cell lymphoma protein 2 (Bcl-2). Furan administration significantly elevated the concentration of nuclear factor kappa-B (NF- $\kappa$ B), interleukin 6 (IL-6), interleukin 1 beta (IL-1 $\beta$ ) as well as tumor necrosis factor  $\alpha$  (TNF- $\alpha$ ) and instigated histopathological damages in renal tissues. However, Co-treatment of furan + genistein showed palliative effects against furan-induced renal impairments. The current study manifested that genistein is a potential flavonoid that could be used as a therapeutic drug to ameliorate renal damages instigated by furan.

**Keywords:** Furan, Genistein, Oxidative stress, Inflammation, Apoptosis, Kidney damage

O-238/ICAZ-2023

### Ameliorative potential of Kolarviron against polyethylene microplastics instigated liver damage

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#### Abstract:

Polyethylene microplastics (PEMPs) are hazardous environmental pollutants which instigate various damages to body organs including liver. Kolarviron (KV) is well known flavonoid extract which exhibits a wide range of pharmacological potentials. The current investigation was planned to evaluate the protective effects of KV against PEMP-induced liver toxicity in albino rats. Twenty-four albino rats were divided into four equal groups such as control, PEMP (1.5mg/kg), PEMP (1.5mg/kg) + KV (100mg/kg) and KV (100mg/kg) only. It was observed that administration of PEMP downregulated the activities of catalase (CAT), glutathione peroxidase (GPx), superoxide dismutase (SOD), glutathione-disulfide reductase (GSR), glutathione S-transferase (GST) as well as glutathione (GSH) while upregulating the levels of ROS and MDA. Additionally, PEMP exposure escalated the levels of (ALT) alkaline phosphatase (ALP), and aspartate aminotransferase (AST). Moreover, the levels of inflammatory cytokines such as nuclear factor kappa-B (NF- $\kappa$ B), interleukin 6 (IL-6), interleukin 1 beta (IL-1 $\beta$ ) as well as tumor necrosis factor  $\alpha$  (TNF- $\alpha$ ) were augmented in PEMP group. Besides, PEMP treatment increased the levels of Caspase-3 and Bax while downregulating the levels of Bcl-2. Furthermore, PEMP instigated various histopathological impairments in hepatic tissues. However, supplementation of KV protects the hepatic tissues by regulating aforementioned irregularities. Therefore, KV can be used as a mitigative agent against PEMP-induced liver damage.

**Keywords:** Oxidative stress, Inflammation, Hepatic damage, Apoptosis, Antioxidants

O-239/ICAZ-2023

### Attenuative Effects of Grifolic Acid Against Methotrexate-Induced Pulmonary Toxicity In Rats

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#### Abstract

Methotrexate (MTX) is a chemotherapeutic agent used to cure various types of cancers, but its efficacy is limited due to its side effects on multiple organs including the lungs. Grifolic acid (GFA) is a phenolic compound reported in fruiting bodies of *Albatrellus confluens* mushroom, that exhibits multiple pharmacological properties i.e., anti-oxidative, anti-cancer, anti-apoptotic & anti-inflammation. Therefore, this research was intended to evaluate the palliative role of GFA against MTX-prompted pulmonary dysfunctions in rats. In the experiment, 24 rats were separated into 4 groups viz. control, MTX (20 mgkg<sup>-1</sup>) treated, MTX + GFA (20 mgkg<sup>-1</sup> + 5 mgkg<sup>-1</sup>) co-treated, and only GFA (5 mgkg<sup>-1</sup>) treated group. MTX treatment instigated a notable decrease in anti-oxidants activity i.e., glutathione S-transferase (GST), superoxide dismutase (SOD), glutathione (GSH), glutathione peroxidase (GPx), glutathione reductase (GSR) & catalase (CAT), whereas increased reactive oxygen species (ROS) & thiobarbituric acid reactive substances (TBARS) levels. Moreover, MTX treatment noticeably elevated (p<0.05) the inflammatory indicators i.e., interleukin-1 $\beta$  (IL-1 $\beta$ ), tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ), interleukin-6 (IL-6), nuclear factor kappa-B (NF- $\kappa$ B) & cyclooxygenase-2 (COX-2) activity. Furthermore, Caspase-3, Caspase-9 & Bax expressions were increased while Bcl-2 expression was decreased after MTX exposure. Additionally, the histopathological examination revealed notable pulmonary tissue damage in MTX treated group. Besides, GFA treatment substantially (p<0.05) recovered MTX-induced damages & histopathological impairments. Consequently, it can be deduced that GFA may be a possible therapeutic candidate to mitigate MTX-induced pulmonary dysfunctions.

**Keywords:** Methotrexate, Grifolic acid, Lungs, Oxidation, inflammation, apoptosis, Histopathology.



O-240/ICAZ-2023

**Effect of dietary supplementation of Mannan oligosaccharide and Moringa oleifera on growth performance of albino mice**

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**Abstract:**

Antibiotic resistance has led nutritionists to find alternatives for antibiotic growth promoters in farming industry. Among these substitutes, mannan oligosaccharides (MOS), a yeast cell wall fragment and Moringa oleifera leaf extract (MOLP) are two most commonly used prebiotics to boost production in farming industry. This research work was designed to check the impacts of dietary supplementation of Mannan oligosaccharides and M oleifera on growth performance and intestine histology of albino mice. During 21-days experimental period, both MOS and MOLP treated mice showed significant increase in growth performance in term of feed conversion ratio as compared to control group. As well as the average length of the small intestine was increased significantly ( $p < 0.05$ ) in the MOLP-treated group as compared to control group. However, when compared MOLP-treated group and MOS-treated group, they were also significant ( $p < 0.05$ ). The mean height and width of the villus in the duodenum, jejunum, and ileum were significantly ( $p < 0.05$ ) different in the MOLP-treated and MOS-treated groups with respect to control group. Likewise, the difference in mean crypt depth in treatment groups was statistically significant ( $p < 0.05$ ) in the duodenum, jejunum, and ileum villus. In conclusion, the MOS and MOLP has a positive effect on the small intestine as it improved the morphology and length resulting in better growth and production.

Key words: Antibiotic resistance, Histology, Feed conversion ratio, Intestine, Villus

O-241/ICAZ-2023

**Antimicrobial Analysis of *Mentha spicata*-based Silver Nanoparticles Against Multi-drug resistant**

**Bacterial Isolates**

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**Abstract**

Green synthesis of silver nanoparticles (AgNPs) using plant extract has emerged as a viable environment friendly method. Therefore, the aim of the study was to synthesize AgNPs using an aqueous plant extract of *Mentha spicata* and further their potential application on antibacterial activity. The synthesis of AgNPs was achieved by mixing 15 mL of *Mentha spicata* plant extract into 10 mL of silver nitrate solution. The UV-visible surface Plasmon resonance peak of AgNPs in colloidal solution showed maximum absorption at 420-440 nm. The FT-IR analysis showed that the plant extract contains essential functional groups of alcohol, ester, and carboxylic acid that facilitate the green synthesis of AgNPs. The crystalline nature of synthesized AgNPs was confirmed by XRD, while the elemental composition of AgNPs was detected by energy dispersive X-ray analysis (EDX). SEM studies showed the mean particle diameter of AgNPs. The synthesized AgNPs had promising inhibition efficiency on antibacterial activity when paired with commercially available antibiotics against Multi-Drug Resistant strains of *K. pneumoniae*, *E. coli*, and *P. aeruginosa*. The results indicate that AgNPs showed maximum antibacterial activity against all the selected bacterial pathogens. Furthermore, the minimum inhibitory concentration (MIC) of AgNPs were 80  $\mu$ L against all selected bacterial pathogens. Thus, we conclude that the antibacterial activity showed satisfactory results from the synthesized AgNPs.

O-242/ ICAZ-2023

**Replacement of fishmeal with plant and animal based protein ingredients to check efficacy of freshwater fishes**

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#### Abstract:

Fishmeal is the main protein ingredient of fish feed. It is considering as chief protein source in aqua-feed because of its stable constituents' micronutrients, consistent amino acid profile, and good digestible energy. But its high cost makes it a hurdle for farmers to use in its fish farming. It contains 70% cost ratio in the whole feed ingredients. Due to this, different researches made to overcome this hurdle. Researchers identifies different plant-based and animal protein sources that can be less in cost and fulfil the nutritional profile of freshwater fishes. Soybean is the most acceptable plant-based protein that can be replaced nearly 70%. Moringa is considered as good protein source. 25-35% protein present in leaves of moringa. In the study 30% moringa olifera is replaced in the diet of *Labeo rohita* fingerlings that can give good growth results. Microalgae (chlorella) is used as an alternative source of protein in the feed of fishes. In the study feed prepared for crucian carps, 50% fishmeal replaced by chlorella that is more favorable for their growth than the plant-based protein diet. In the study animal meat byproduct is used that contain 80% protein and a good source of lysine, methionine and tryptophan. By product of meat in slaughter houses use in feed of fish as an animal source protein are less in cost than fishmeal. Zooplankton an aquaculture ecosystem unit is also considered as feed ingredient for fish, it contain 45% crude protein. It can be used for the diet of larvae and juveniles of freshwater fishes. Silkworm pupae an animal protein contain 52-72% protein and good amino acid profile (valine, methionine and phenylalanine). 30% silkworm pupae used in the feed of *Catla catla* and *Labeo rohita*. In the study 20% azola used in the diet of *oreochromis niloticus* can enhance its growth. Poultry by product contain high crude protein content ranging from 45% to 65% and favorable amino acid profiles. Peanut a source of vitamin E contain considerable protein to use as an alternative source of fishmeal. 20% replaced in the diet of tilapia. Palm date is used in shrimps and Tilapia diet as an alternative source because it is good source of potassium, manganese, copper, magnesium, phosphorus, calcium and iron.

O-243/ ICAZ-2023

#### A comparative study on *in vitro* cytotoxic potential of different parts of *Albizzia lebbeck* against human hepatocellular cancer cells

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#### Abstract

Liver cancer is a widely prevailing lethal disease worldwide. Approximately, there are about 19,610 deaths occurring annually due to liver cancer and it is major cause of disability and deaths globally. Plants, herbs and their secondary metabolites play a major role in the formulation of anticancer drugs. *Albizzia lebbeck* is used as folk medicine to treat various diseases. This plant is used for few types of cancer but there is no report of *A. lebbeck* extract cytotoxicity against Human Hepatocellular cancer. The aim of this researcher work to decipher the cytotoxic potential of different parts (leaves, flowers, and seeds) of *A. lebbeck*. The methanolic crude extract were prepared by using Soxhlet apparatus. Then the extract fractions were prepared by using six different solvents i.e., n-hexane, chloroform, acetone, n-butanol, methanol, and aq. extract, as a result 9 extract fractions were obtained and showed the presence of different of phytochemical such as tannins, saponins, steroids and flavonoids. The cytotoxicity of various parts of *A. lebbeck* against liver HepG2 cells was measured by MTT assay. The results of MTT assay showed a % viability of HepG2 cells after 48 hours treatment of flowers extract at concentration of 200 ug/ml showed efficient inhibitory activity (61%), In addition, the leaves extract showed maximum % viability of HepG2 cells at concentration of 200 ug/ml with efficient inhibitory activity of 59%. The growth inhibitory efficacy of *A. lebbeck* extracts enhanced in dose dependent mode in HepG2 cells. In addition to anti-cancer activity, this plant extract also possesses antibacterial and antifungal activities against *Bacillus licheniformis*, *S. aureus*, *E. coil*, *A. Niger*, *F. oxysporum* strains respectively. The growth inhibition zone for 20 mg/ml leaves concentrations of *A. lebbeck* extracts against *E. coil*, *S. aureus* and *A. niger* was calculated as 1.3, 1.2, 1.5 mm respectively. The growth inhibition zone for 20, 80 and 100mg/ml concentrations of *A. lebbeck* seeds extracts against *Bacillus licheniformis*, *S. aureus*, *E. coil* and *F. oxysporum* was calculated as 1.1, 1.2, 1.3, 1.9 mm. Our study provides the rational for further in-vivo and in-vitro studies of *A. lebbeck* by specifically focusing on mechanism of actions as anticancer and antimicrobial agents.

O-244/ ICAZ-2023

#### Synthesis, Characterization and Antibacterial activity of Flexible Ether linked Aromatic Bis-Schiff bases



### against multi-drug resistant bacteria

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#### Abstract

Multidrug-resistant (MDR) bacteria have emerged as a pressing global health concern, challenging our ability to combat bacterial infections effectively. Traditional antibiotics are losing their efficacy against these resilient pathogens, necessitating the development of innovative antibacterial agents. This study focuses on the synthesis and characterization of a novel class of compounds, bis-Schiff bases, and investigates their potential as antibacterial agents against MDR bacteria. Typically an aldehyde and primary amines condense to form bis Schiff bases, usually using an addition elimination reaction between the dialdehyde terephthalaldehyde and aromatic dialdehyde. The compounds were systematically characterized using various spectroscopic techniques, including Scanning electron microscopy (SEM) and X-ray Diffraction (XRD) in the Centralized Resource Laboratory Peshawar. Additionally antibacterial activity were performed using standard agar well diffusion method, allowing the determination of minimum inhibitory concentrations (MIC). The results revealed the remarkable antibacterial activity of several bis-Schiff base derivatives, with MIC values falling within the low microgram per milliliter range. This study underscore the potential of bis-Schiff bases as promising candidates for combating MDR bacteria. Additionally, their chemical characterization provides valuable insights into the structural features responsible for their antibacterial efficacy, paving the way for rational drug design in the future. It was concluded that the synthesis and characterization of aromatic bis Schiff bases represent a significant step forward in the search for effective antibacterial agents against MDR bacteria. These compounds have shown potent antibacterial activity, laying the foundation for future research endeavors aimed to explain their mechanisms of action and optimizing their pharmacokinetic properties. This study lies in potential to discover novel antibacterial agents that could address the growing problem of antibiotic resistance.

**Keywords:** Synthesis of Bis-Schiff bases, Antibacterial activity, MDR , SEM , XRD, MIC.

O-245/ ICAZ-2023

### Catalytic Fabrication of Azomethine-based Titanium Dioxide Nanoparticles for Targeting Multidrug-Resistant Bacteria

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#### Abstract

The Multidrug-resistant (MDR) bacteria are an important global health concern that creates significant difficulties for modern medicine. These resilient microorganisms have acquired the ability to withstand the action of multiple antibiotics, rendering conventional treatment regimens ineffective. Proper strategies are needed to manage multi-drug resistant (MDR) bacterial infections. Nanotechnology is considered an advanced approach due to the smaller size of nanoparticles, which can play a crucial role as drug carriers, delivering antibiotics to the target site of resistant organisms and reducing the phenomenon of antibiotic resistance. The current study aims to bridge the gap between azomethine chemistry and nanotechnology by synthesizing titanium dioxide nanoparticles using novel azomethine compounds and subsequently assessing their antimicrobial efficacy against selected MDR microorganisms. This research study will help to contribute significantly to the development of innovative approaches in the battle against MDR bacteria, ultimately improving patient outcomes and public health. A chemical synthesis approach was used for the synthesis of TiO<sub>2</sub> NPs using Azomethine compounds. Furthermore, standard techniques were used for the characterization of synthesized TiO<sub>2</sub> NPs in the Centralized Resource Laboratory, Peshawar. Additionally, the antimicrobial activity of coated and non-coated antibiotic discs against MDR bacteria was evaluated using the standard agar dilution method. In the current research study, UV-Visible spectroscopy revealed an absorption peak at 310 nm within the prescribed range, confirming the synthesis of TiO<sub>2</sub> NPs. Scanning electron microscopy (SEM) demonstrated the morphology of TiO<sub>2</sub> NPs, while energy dispersive analysis of X-rays diffraction (XRD) quantified the presence of titanium, carbon, and oxygen in the synthesis of TiO<sub>2</sub> NPs. Moreover, it was observed that TiO<sub>2</sub> NPs significantly enhanced the antibacterial activities of the test antibiotics against MDR bacteria. This was confirmed by comparing the zones produced by non-coated antibiotics with those produced by TiO<sub>2</sub>-NPs coated antibiotics. It was concluded that TiO<sub>2</sub> NPs synthesized from Azomethine compounds could be of great importance in



pharmaceutical and medical applications due to their biocatalytic activity. Keywords: Azomethine compounds , TIO<sub>2</sub> NPs, SEM,TEM,XRD, MDR bacteria, Chemical synthesis.

O-246/ ICAZ-2023

### Soft Ticks Infesting Pigeons in District Buner

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#### Abstract

Ticks are the haematophagous group of arthropods infesting mammals, birds and reptiles worldwide. Ticks are the prevalent vectors of different types of pathogen second to mosquitoes having the ability to spread contagious illnesses, causing threat to the veterinary and public sectors. The two families Ixodidae (hard ticks) and Argasidae (soft ticks) are the main concern regarding the pathogens transmission. The objectives of the current study were to identify morpho-molecularly the soft ticks infesting pigeons in district Buner Khyber Pakhtunkhwa, Pakistan. For the fulfilment of the designed study, a total of 332 ticks were collected during the period of May 2022 to December 2022 from the selected sites in 04 tehsils of the district. For ticks collection 930 hosts were examined in which 46 were found infested. Sequence of the infestation rate may be showed as tehsil daggar (45.65%), tehsil chagharzi (19.56%), tehsil gadezi (17.39%) and tehsil gagra (17.39%). By comparing the body features with the relevant identification keys, the collected ticks were then identified morphologically under the Stereo Zoom microscope. The morphological identification revealed the tick life stages including nymphs, males and females. In a total of 332 identified ticks, 183 (55.12%) were nymphs, 64 (19.27%) were males and 85 (25.60%) were females. The morphologically identified ticks were then subjected to molecular characterization. For this purpose, DNA extraction was carried out using phenol-chloroform method. For the confirmation of collected ticks to the species level, polymerase chain reaction(PCR) was the next step for the amplification of partial sequences of mitochondrial gene 16S rDNA. The obtained sequences were then compared with the homologous sequences and were downloaded from GenBank. Then subjected to Basic Local Alignment Search Tool (BLAST) in National Center for Biotechnology Information (NCBI). The BLAST analysis showed the maximum percentage identity of 99% with the soft tick species *Argas hermanni*. Phylogenetic tree was constructed and the obtained sequences were clustered with the sequences of the same tick species reported from Iran. The current study was the first approach towards the identification and reporting of soft tick species *A. hermanni* in district Buner. Further studies are needed to characterize and explore the diversity of ticks along with their associated pathogens in the current and other districts of Khyber Pakhtunkhwa, Pakistan.

Keywords: Pigeons, Soft ticks, Buner, 16S rDNA, *Argas hermanni*, Identification

O-247/ ICAZ-2023

### *Lactobacillus fermentum* Y-55 For Controlling of Alternaria fruit rot in Apples

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#### Abstract

Apple is grown and consumed worldwide containing minerals and nutrients including iron and vitamins. In Pakistan, apple is produce around the country including Sindh, Baluchistan, Gilgit Baltistan. Apple being a nutrition and juicy fruit badly attacked by different pathogen including fungi. Some common disease of Apple fruit rot, apple scab, and apple blotch. Biocontrol agents is considered one of the best possible strategy against the post-harvest disease of apple caused by the pathogenic *Alternaria*.

**Objectives:** This study was focused on conduction of *in vitro* and *in vivo* assays to analyze the activity of the *Lactobacillus fermentum* as putative biocontrol agents against pathogenic *Alternaria*.

**Methodology:** In this study, lactic acid bacterial strain (*Lactobacillus Fermentum* Y-55) were used against pathogenic namely *Alternaria in vitro and in vivo* assays.

**Results:** Among Lactic acid bacterial strains (*Lactobacillus Fermentum* Y-55) showed best activity and controlled the fungal pathogens *Alternaria in vitro and in vivo* as well.

**Conclusion:** It is concluded that the lactic acid bacterial strains (*Lactobacillus fermentum* Y-55) significantly controlled the fungal pathogenic *Alternaria* used in the present study. Based on this report it is suggested that the



putative biocontrol strain of lactic acid bacterial may further be evaluated for its *in situ* ability and mechanisms.

O-248/ ICAZ-2023

**Genetic Analysis of the Sequence Variants Associated with Polydactyly in Families from District Lakki**

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**Introduction:**

Polydactyly is defined as appendicular defect that can affect hands or feet. It can be transmitted in isolated form or in syndromic forms in which other abnormalities can also be observed. Globally, the reported incidences of polydactyly are very much common and can be found in 0.3-0.6 per 1000 births. In addition, polydactyly is one of the most varied digit abnormality kinds in terms of clinical diversity. Additionally, genetic heterogeneity has also been reported in polydactyly.

**Study Area:**

Moreover, no research work has been done in Lakki Marwat, on polydactyly therefore, aim of study is to perform research on that particular area is to identify the sequence variations that cause polydactyly in selected families in the Lakki Marwat region.

**Methodology:**

A family affected with polydactyly was recruited for this study and prior informed consent was obtained from the family. Genomic DNA was extracted from the blood samples of the participating members of the family and WES was performed. WES data was analyzed and candidate variants were filtered for segregation analysis. Allele specific primers were designed and PCR was performed for amplification of the target region. Sanger Sequencing determined the segregation pattern of the candidate variant. Insilico analysis was performed to analyze the pathogenicity of candidate variant.

**Results**

In the recruited family, a range of polydactyly presentations were observed. One-member (II:1) of the family had post axial type B polydactyly, wherein the additional digits appear on the ulnar (little finger) side of the hand. Concurrently, other affected family member (II:2) displayed preaxial polydactyly, a condition where the supernumerary digits emerge on the radial (thumb) side of the hand. In addition, the insilico analysis of the WES data revealed a novel candidate synonymous variant [NM\_003882.4: c.69G>A, p.Thr23=] in CCN4 gene. The variant segregates in an autosomal recessive manner which aligns with the autosomal recessive mode of inheritance. Although the variant does not affect the structure of protein however, the insilico analysis of the candidate genetic variant (p.Thr23=) revealed that the variant may affect the normal splicing of the mRNA during transcription. Mutation Taster and Human Splice Finder have predicted that the variant may result in the loss of wild type splice donor site that may lead to the loss of function of CCN4 protein. The investigation into the segregation of the c.69G>A variant within the recruited family has provided valuable insights into the genetic basis of polydactyly. Notably, the seemingly synonymous nature of the variant, coupled with its position at the exon-intron boundary and its predicted impact on splicing, adds a layer of complexity to its functional consequences.

O-248/ ICAZ-2023

**Physicochemical and microbiological characterization of pulp and paper industry effluent before and after treatment through Gravity Driven Integrated Bioreactor**

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**Abstract**

In the present study, wastewater discharged from pulp and paper industry was evaluated for different



physicochemical and microbiological parameters. Physicochemical parameters includes COD, BOD5, TDS, pH, Sulphate, phosphates and total nitrogen, while microbiological parameters include CFU and MPN. A lab scale, low budget and environmental friendly gravity driven integrated bioreactor was constructed and evaluated for its efficiency to treat black liquor. Our findings revealed that during operation period of 9 weeks, various pollution indicators were significantly reduced with treatment efficiency of 60.69 % (COD), 71.80 % (BOD5), 84.88 % (TDS), 81.25 % (PO4), 50.74 % (SO4), 66.36 % (TN). Moreover, substantial reduction in microbial contamination in terms of CFU/ml (77.98 %) and MPN index/100 ml (90 %) was observed. Thus, present study illustrates that GRIB comprising of stone filter media proves to be a successful and budget friendly alternative for treatment of highly contaminated effluent from pulp and paper industry.

**Keywords:** Wastewater, COD, BOD, Black liquor

O-249/ ICAZ-2023

**Screening of Antioxidant, Antimicrobial and Anti-hepatic Cancer (HepG2 cells) Potential of Artemisia absinthium Extract**  
**Screening of Antioxidant, Antimicrobial and Anti-hepatic Cancer (HepG2 cells) Potential of Artemisia absinthium Extract**

Uzma Parveen, Shahzad Ahmed, Azhar Rasul, Saba Riaz, Mudassir Hassan, Ayesha Sadiqa  
 Department of Zoology, Government College University, Faisalabad

**Abstract**

Artemisia absinthium belongs to Asteraceae family has several therapeutic properties such as antiseptic, antiaging, neuroprotective, antidiabetic and hepatoprotective. This study was carried out to investigate antimicrobial, antioxidant and anti-hepatic cancer potential of Artemisia absinthium. Primarily, plant was collected and grinded then extract was prepared through Soxhlet extraction method. Qualitative phytochemical screening was done by phytochemical assays to check bioactive compounds in Artemisia absinthium. Antimicrobial activity was measured through well diffusion method and micro dilution method while DPPH scavenging assay was performed to determine antioxidant potential. MTT assay was established to check the cytotoxic potential of plant extract. The results of present study demonstrated the presence of Tannins, steroids, alkaloids, saponins and flavonoid. Among seven bacterial strains, Artemisia absinthium extract was found to be most susceptible against Salmonella enterica with inhibition zone  $21.33 \pm 1.52$  mm and least susceptible against Pseudomonas aeruginosa with inhibition zone  $18.33 \pm 2.51$  mm at 500mg/m. Similarly, among fungal strains it was found most susceptible against Fusarium avenaceum with inhibition zone  $31.66 \pm 1.52$  mm and least susceptible against Candida albicans with inhibition zone  $18.33 \pm 2.51$ mm at 500mg/mL. Artemisia absinthium extract also exhibited significant free radicle scavenging activity with IC50: 55.47  $\mu$ g/mL. Artemisia absinthium extract also exhibited moderate anti-hepatic cancer results with HepG2 cell line. In conclusion, Artemisia absinthium could be new source for the development of antibacterial and antifungal drugs especially against diseases caused by Salmonella enterica and Fusarium avenaceum respectively.

Key words: Phytochemicals, Antioxidant, Antimicrobial, Anticancer

O-250/ ICAZ-2023

**Toxicity Analysis of Carbon, Gold and Silver Nanoparticles on the DNA Damage of Earthworms**

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<sup>1</sup>The women University Multan email

**Abstract**

Nanoparticles are an essential part of life. They are beneficial to mankind, but on the other hand they are harmful and toxic for the entire environment. The toxicity of nanoparticles increases into the lithosphere, as a result soil organisms are disturbed, causing them to not function properly for soil fertility. In this research nanoparticles were synthesized. Carbon nanoparticles were synthesized from three different sources (brick kiln, carbon charcoal, and green tea waste). Silver and gold nanoparticles were synthesized from chitosan. Their toxicity tests were conducted on earthworms. Earthworms were exposed to different concentration of carbon, and silver and gold nanoparticles on filter paper for 48 hours. The brick kiln carbon induced slight toxicity, even the lethal dose could not determine. The carbon charcoal nanoparticles and green tea waste carbon nanoparticles were highly toxic than brick kiln carbon. The lethal dose of carbon charcoal and green tea waste nanoparticles after 48 hours of exposure was 0.4 mg L<sup>-1</sup>. The toxicity of silver nanoparticles were not more differently from toxic carbon nanoparticles. The lethal dose of silver nanoparticles was 0.008 g L<sup>-1</sup>. The toxicity test was performed to determine reactive oxygen species (ROS) in earthworms. This study was used to determine the toxic effects of different concentration of carbon, silver and gold nanoparticles in earthworms and main toxicity was checked by DNA extraction using comet assay. The



results shows that these nanoparticles are very toxic to earthworms. The toxic effects of these nanoparticles are discussed in this reaserch.

Keywords: Nanoparticles, Carbon, Silver, Gold, Earthworms, Reactive oxygen species, DNA Damage, Comet assay.

O-251/ ICAZ-2023

**Interactive effect of rhizobacteria and lufenuron on physio-biochemical attributes and defence responses of cauliflower (*Brassica oleracea* L. var. botrytis) against insects**

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**Abstract**

Insect attack on plants is a severe problem in agriculture sector. The damages caused by insects have an adverse impact on plant growth which leads to slow economic growth, particularly in countries dependent on agriculture. Plant growth-promoting rhizobacteria (PGPR) are now widely used in agriculture as they provide an appealing option to supplement chemical fertilizers and pesticides. Insect growth regulators (IGRs) belong to third generation insecticides and have inhibitory effects on the growth and life cycle of an insect/pest. Lufenuron is an IGR having a broad spectrum insecticidal activity. Lufenuron prevents insect growth by reducing chitin synthesis. A field experiment was conducted at Ayub Agricultural Research Institute, Faisalabad to evaluate the effect of Planomicrobium sp. MSSA-10 (a potential PGPR) and lufenuron on cauliflower under insect attack. Cauliflower (Naran F1) seedlings were grown in the presence and absence of MSSA-10 using randomized complete block design. Attack of cutworms, diamondback moth, armyworm and aphid was recorded periodically. Lufenuron was applied as a foliar spray, to inoculated as well as non-inoculated plants. Foliar spray of lufenuron exerted positive effect and reduced the insect attack. Plant biochemical analysis manifested the higher activities of secondary metabolites such as phenolics and proline in MSSA-10 inoculated plants. Upon insect attack, increased levels of malondialdehyde and hydrogen peroxide indicated the oxidative stress in plants. MSSA-10 inoculation enhanced the activity of the superoxide dismutase, peroxidase, and catalase thereby assisted plants in defense against insect induced biotic stress. It was concluded that MSSA-10 inoculation combined with lufenuron spray was more beneficial in reducing insect associated damages in cauliflower.

O-252/ ICAZ-2023

**Fish mucus: A reservoir for immune-related biomolecules**

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**Abstract**

Fish have a variety of unique and intricate defense systems that fight against pathogenic infections among which fish epidermal mucus; a slimy, slippery layer is considered as a main component of innate immunity. Fish epidermal mucus is secreted by goblet cells contains series of innate immune components such as enzymes (protease, antiprotease, lysozyme, alkaline phosphatase and peroxidase), antimicrobial peptides and glycoproteins (mucin) that provide defense against different pathogenic microbes. Proteases expressed in response to various immune stimulants, including injuries and pathogenic bacteria invasion. Anti-protease restricts the ability of bacteria to invade and grow in fish. Lysozyme provides significant bacteriolytic action by damaging the cell walls of bacteria. Peroxidase and Alkaline phosphatase are also antibacterial agents and potential indicators of stress. Antimicrobial peptides are short, cationic, germline-encoded peptides having molecular weight less than 13 kDa with an ability to act as first line of defense against a variety of microbial infections. Mucins play a crucial role in mucosal defense mechanism as they bind to a variety of pathogens and eliminate them. The aim of this review is to provide broad overview of these immune components of epidermal mucus of fish as well as their mode of action on pathogens.

Key words: Pathogens, Immunity, Lysozyme, Anti-microbial peptides, Mucin

O-253/ ICAZ-2023

**Prebiotics: A novel approach for sustainable development of aquaculture**

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### Abstract

Intensive fish culture has been growing as one of the most encouraging methods to meet the high demands of fish food. The nutrition available for intensive cultured fish may be limited due to restricted food sources that decrease diversity of the intestinal microbial community in this fish. This weakens fish immune systems, leading to increased susceptibility to diseases. Restriction on antibiotics and greater public awareness for healthy fish production have sparked interest in the potential of functional feeds as health promoters. Natural feed additives such as prebiotics, may compensate for this problem. Prebiotics are indigestible fibers that increase beneficial gut commensal bacteria resulting in improvements of the host's health. Inulin,  $\beta$ -glucan, oligosaccharides, mannan oligosaccharide (MOS), arabinoxylan oligosaccharide (AXOS), galactooligosaccharide (GOS) and fructooligosaccharides (FOS) are commonly used prebiotics in aquaculture. Prebiotics benefit fish in terms of increased feed utilization efficiency, increased weight of vital organs and muscles, improved gut physiology, increased mean villus lengths in digestive tract of fish, improved intestinal microbiota and enhanced immunity. This review summarizes the role of different types of prebiotic administration on growth performance, gut physiology, intestinal microbiota, immune response and health status of fish.

Key words: Oligosaccharide, Intensive culture, Gut physiology, Villus length, Intestinal microbiota

O-253/ ICAZ-2023

### Development of Serum Plate Agglutination Antigen using *Mycoplasma gallisepticum* Field Isolate

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### Abstract:

*Mycoplasma gallisepticum* is an important pathogen responsible for respiratory tract infections in poultry. Clinical manifestation of disease varies from mild respiratory infection to chronic respiratory disease (CRD) in case of co-infections with other viral or bacterial pathogens. *Mycoplasma* infections cause huge economic losses due to reduction in hatchability and egg production as well as due to increased morbidity and mortality in a flock. Early screening of infection is done by using serological assays including Serum Plate Agglutination Assay (SPA) and Enzyme Linked Immunosorbent Assay (ELISA). The present study was aimed to prepare SPA antigen using *M. gallisepticum* isolate recovered from the field. In house developed antigen was compared with commercially available antigen using sera collected from the suspected flocks. Results revealed 205/300 (68.35%) positive reactions using locally developed antigen and 198/300 (66%) positive reactions while using commercially available imported antigen. After statistical analysis by using Fisher's exact test, it was inferred that difference between detection rate of both antigens was non-significant ( $P = 1.0000$ ). Local antigen was assessed for cross reactivity and it gave suitable results till 4 months. Local antigen appears to provide a cheaper and easy method for initial screening of *M. gallisepticum* infection.

O-253/ ICAZ-2023

### Updates on Clinical and Genetic Heterogeneity of ASPM in 12 Autosomal recessive Primary Microcephaly Families in Pakistani Population

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### Abstract

Microcephaly (MCPH) is a genetically heterogeneous disorder characterized by non-progressive intellectual



disability, small head circumference, and small brain size compared with the age- and sex-matched population. MCPH manifests as an isolated condition or part of another clinical syndrome; so far, 25 genes have been linked with MCPH. Many of these genes are reported in Pakistani population, but due to a high rate of consanguinity, a significant proportion of MCPH cohort is yet to be explored. MCPH5 is the most frequently reported type, accounting for up to 68.75% alone in a genetically constrained population like Pakistan. In the current study, whole exome sequencing (WES) was performed on probands from 10 families sampled from South Waziristan and two families from rural areas of the Pakistani Punjab. Candidate variants were validated through Sanger sequencing in all available family members. Variant filtering and in silico analysis identified three known mutations in ASPM, a MCPH5-associated gene. The founder mutation p.Trp1326\* was segregating in 10 families, which further confirmed the evidence that it is the most prominent mutation in Pashtun ethnicity living in Pakistan and Afghanistan. Furthermore, the previously known mutations p.Arg3244\* and p.Arg1019\* were inherited in two families with Punjab ethnic profile. Collectively, this study added 12 more families to the mutational paradigm of ASPM and expanded the Pakistani MCPH cohort.

Keywords: Primary microcephaly, MCPH5, whole exome sequencing, Pakistani population, founder effect

O-253/ ICAZ-2023

### Residual Efficacy of Formulations of Novel Chemistry Insecticides on Different Packaging Materials Against Saw Toothed Grain Beetle and Red Flour Beetle

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#### Abstract

Two significant insect pests of dried fruits, grains, and other products kept in storage are the saw-toothed grain beetle (*Oryzaephilus surinamensis*) and the red flour beetle (*Tribolium castaneum*). They deteriorate the quality of stored food products. Fumigation and application residual spray on the wall and floor of the warehouses are the traditional practices for the control of stored products pests. Majority of the pest population has developed resistance against these traditional synthetic pesticides. So, there is a need to work for dose optimization of new chemistry insecticides having less mammalian toxicity. Therefore, residual toxicity of three insecticides viz. flubendiamide, chlorfenapyr and chlorantraniliprole were evaluated using six concentrations (50, 100, 150, 200, 250 and 300 ppm) of each insecticide. Completely randomized design was followed using three replications of each concentration of insecticides along with a control treatment where no insecticide were sprayed. Three kinds of packaging materials (jute, polypropylene and polythenes) were cut in circular pieces of Petri dish size. These pieces of packaging materials were treated with dilutions of insecticides separately. After treatment, dry treated pieces were placed in labeled petri dishes. Then 30 adults of test insect species were released on treated pieces of packaging materials placed in petridishes which were covered tightly and were placed in insect growth chamber at optimum growth conditions. Data for % mortality were noticed after 24, 48 and 72 hours. The surviving insects were shifted to fresh food medium for post treatment progeny development. The already treated surfaces (pieces of packaging materials) were again be used for 2<sup>nd</sup> bioassay after 15 days. Thirty insects were released on the treated surfaces of 1<sup>st</sup> bioassay placed in petridishes, covered tightly and were be placed growth chamber. Data of percent mortality were observed after 24 hours for 3 days exposure period. The surviving insects were shifted to fresh food medium for progeny development. After 30 days of first treatment, same packaging materials were placed petridishes for 3<sup>rd</sup> bioassay. Thirty adults of insect species were released on thirty days before treated pieces of packaging materials placed in petridishes. Data of mortality (%) were observed after 24 hours for 3 days of exposure period. 4<sup>th</sup> and 5<sup>th</sup> bioassay studies were also conducted after 45 and 60 days following the same procedures. Data of progeny developments of each bioassay were observed after 30 days of release of surviving insects to a fresh diet. The statistica-10 software statistically assessed all the given data regarding the percentage of infant deaths and births. Tuckey Kramer test at 5% probability were used to compute the means of important treatments. Insect mortality was seen after 24, 48, and 72 hours. The overall maximum percent mortality of *T. castaneum* at 300ppm after 72 hours of exposure time treated on a Jute bag, Polythene, and Polypropylene for (flubendiamide) was 20.51, 19.46, and 17.77%, for (chlorfenapyr) was 18.07, 13.33, and 24.16%, and for (chlorantraniliprole) was 16.39, 20.31, and 17.22% respectively. Similarly, maximum mortality of *O. surinamensis* after 300ppm concentration and 72 hours exposure time treated on Jute bag, Polythene, and



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Polypropylene for flubendiamide was 20.31, 20.81, and 19.46%; for chlorfenapyr was 22.56, 20.28, and 23.56, and for chlorantraniliprole was 11.93, 17.51, and 21.43% respectively. Flubendamide was most effective as compare to chlorfenapyr and chlorantraniliprol. Mortality of the insects increased with the increase of exposure time. The highest mortality was observed on jute bag treated with insecticides. Mortality rates in 2<sup>nd</sup> and 3<sup>rd</sup> bioassay studies were higher as compare to 4<sup>th</sup> and 5<sup>th</sup> bioassay studies.

**Keywords:** Stored grain insect, toxicity, packaging materials, new chemistry insecticides, mortality



P-01/ICAZ-2023

**First Report on Detection of *Hepatozoon ayorgbor* in *Rhipicephalus haemaphysaloides* and *Hepatozoon colubri* in *Haemaphysalis sulcata* and *Hyalomma anatolicum*: Risks of Spillover of *Hepatozoon* spp. from Wildlife to Domestic Animals**

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**Abstract**

This study aimed to detect *Hepatozoon* spp. in ticks infesting asymptomatic domestic animals and to provide insight into their potential spillover from wild to domestic animals. In total, 537 tick specimens were collected in Khyber Pakhtunkhwa, Pakistan, and morphologically identified. The most prevalent tick species was *Haemaphysalis cornupunctata* (69; 12.8%), followed by *Haemaphysalis kashmirensis* (62; 11.5%), *Rhipicephalus microplus* (58; 10.8%), *Haemaphysalis montgomeryi* (51; 9.5%), *Rhipicephalus sanguineus* (49; 9.1%), each *Haemaphysalis bispinosa* and *Haemaphysalis sulcata* (43; 8.0%), each *Hyalomma anatolicum* and *Rhipicephalus turanicus* (37; 6.9%), *Rhipicephalus haemaphysaloides* (33; 6.1%) *Hyalomma scupense* (30; 5.6%), and *Hyalomma isaaci* (25; 4.7%). The extracted DNA from a subset of each tick species was subjected to PCR to amplify 18S rRNA fragments of *Hepatozoon* spp. By BLAST analysis, the *Hepatozoon* sp. detected in *Hy. anatolicum* infesting cows and in *Ha. sulcata* infesting sheep showed 99.7% maximum identity with *Hepatozoon colubri*. Similarly, the *Hepatozoon* sp. detected in *R. haemaphysaloides* infesting goats shared 99.49% maximum identity with *Hepatozoon ayorgbor*, and the *Hepatozoon* sp. detected in *R. sanguineus* infesting dogs exhibited 99.7% identity with *Hepatozoon canis*. Having an overall infection rate (9.3%; 16/172), the highest infection rate was recorded for each *H. canis*, and *H. colubri* (3.5%; 6/172), followed by *H. ayorgbor* (2.3%; 4/172). In the phylogenetic tree, *H. colubri* clustered with corresponding species from Iran, *H. ayorgbor* clustered with the same species from Croatia, Ghana, and Portugal, and *H. canis* clustered with the conspecifics from Iran, Israel, Romania, and Zambia. Regarding the potential spillover of *Hepatozoon* spp. from wildlife through ticks, free ranging animals was at higher risk compared to confined animals (RR = 3.05), animals consuming food from wildlife habitats were at higher risk compared to those consuming domestic food (RR = 3.06), and animals residing in farm buildings located in wildlife habitats were at higher risk compared to those residing in farm buildings located in villages (RR = 3.28). In addition to the first report on *H. canis* in *R. sanguineus* in Pakistan, this is the earliest data showing *H. ayorgbor* in *R. haemaphysaloides* and *H. colubri* in *Ha. sulcata* and *Hy. anatolicum*. These preliminary findings suggest a potential spillover of *Hepatozoon* spp. from wild to domestic animals via ticks under certain risk factors.

**Keywords:** Ticks, *Hepatozoon ayorgbor*, *Hepatozoon colubri*, *Hepatozoon canis*, Spillover.

P-02/ICAZ-2023

**Effect of Induced Pyrethroid on the Blood Parameters of *Cyprinus carpio***

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### Abstract

Pollution caused by insecticide (pyrethroid), particularly in aquatic ecosystems has become a major concern for researchers. This study aims to ascertain how induced pyrethroid (bifenthrin) affects the blood parameters of *Cyprinus carpio*. A well-known insecticide called bifenthrin interacts with blood components and genetic material to cause cellular alterations in exposed animals. This study was conducted at the Toxicology Laboratory, Department of Zoology, Wildlife and Fisheries, University of Agriculture, Faisalabad. The duration of the experiment was three months. Fish collected from Fish Seed Hatchery, Satyana Road, Faisalabad, and acclimatized for 10 days before starting the trial. The experiment consisted of a control group (without pyrethroid) and two treated groups T<sub>1</sub> and T<sub>2</sub> with three replications for each group with the same conditions. All the experimental treatments were monitored on daily basis. Results showed significant alterations in hematological parameters were checked after chronic exposure to different sub-lethal concentrations of pyrethroid. Different physicochemical parameters were also monitored and recorded on a weekly basis. Water quality characteristics were recorded for chronic experiments every week while the result of these physicochemical parameter values showed positive or negative correlations. Hematological parameters showed a highly significant relationship in the chronic experimental period. The values of RBCs, Hb, and Hct decreased and MCHC increased. WBCs increased in 30 and 60 days and decreased in 75 and 90 days while MCH and MCV also showed biphasic response. The relationship between physicochemical parameters is checked by correlation. ANOVA and Tukey's test were used to statistically analyze data on various factors and variables.

P-03/ICAZ-2023

### Synthesis and Antibacterial Activities of Substituted Salicylaldehyde Based Ligand and their Metal Complexes

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### Abstract:

Condensation reaction between the 3-methoxysalicylaldehyde with 2-chloro-4-nitroaniline and 2-chloro-4-aminobenzoic acid in the methanol and 5-6 drops of glacial acetic acid were used to synthesized (*E*)-2-chloro-4-nitrophenyl(imino)methyl)-6-methoxyphenol [HL1] and (*E*)-2-chloro-4-((2-hydroxy-3-methoxybenzylidene)aminobenzoic acid [HL2] respectively. Complexes of Co(II), Cu(II), Ni(II), Zn(II) and Hg(II) in 1:2 (M: [HL]) molar ratio were prepared by reacting the ligands [HL1] and [HL2] with metal salts such as Cu(CH<sub>3</sub>COO)<sub>2</sub>.H<sub>2</sub>O, Zn(CH<sub>3</sub>COO)<sub>2</sub>.2H<sub>2</sub>O, Co(CH<sub>3</sub>COO)<sub>2</sub>.H<sub>2</sub>O, NiCl<sub>2</sub>.6H<sub>2</sub>O and HgCl<sub>2</sub> in the solution of ethanol. Similarly the synthesis of mixed ligand metal complexes involves the ratio of 1:1:1 (Metal salts: [HL]: 1-10 phenanthroline). Then solution was refluxed for 10 hours. Physical properties like melting point, solubility, molar conductivity and color were also checked. The structure of synthesized ligands and its complexes were done by UV-Visible, FT-IR, <sup>1</sup>H-NMR and <sup>13</sup>C-NMR spectroscopy. The antibacterial activities of [HL1], [HL2] and its metal complexes were determined against different strain of bacteria *Staphylococcus aureus* (gram positive) and *Escherichia coli* (gram negative). These complexes were found to be more active towards the strains of bacteria as compared to the [HL1] and [HL2]. Gentamicin was used as standard.

P-04/ICAZ-2023

### Assessment of Antifungal Activity of *Saccharum Arundinaceum*

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<sup>2</sup>Department of Microbiology, Faculty of Biological Sciences, Quaid-i-Azam University, Islamabad, Pakistan,

### Abstract:

**Purpose:** Microorganisms have a major role in most infectious diseases and both the incidence of such infections and the number of people dying from them are rising daily. The rise of multi-drug resistant (MDR) microorganisms has made the problem worse. Researchers have discovered that plants are the most readily available and affordable source of antimicrobials. As a result, various species of *Saccharum* have been investigated to determine their potential as pharmaceuticals. *Saccharum arundinaceum* (Poaceae) commonly known as hardy sugarcane, is traditionally used for the treatment of fever, diarrhea, kidney and urinary tract infections (UTI). In the present study, the methanolic extract of *S. arundinaceum* was assessed *in vitro* for its antifungal activities. **Methodology:** Antifungal



activity was performed by using the agar well diffusion method against *Candida albicans*, *Aspergillus flavus* and *Aspergillus niger*. **Results:** The plant extract showed best antifungal activity against the two tested strains i.e., *Aspergillus niger* and *Candida albicans*. The zones of inhibition were noted to be highest against *Aspergillus niger* (16 mm) and *Candida albicans* (15 mm). No activity was recorded against *A. flavus*. **Conclusion:** In present study, it is concluded that the methanolic extract of *S. arundinaceum* has fungicidal activity against *C. albicans* and *A. niger*. Hence, *S. arundinaceum* exhibited a potential for the betterment of well-being health and a major source of discovering novel drugs.

**Key words:** *Saccharum arundinaceum*, Poaceae, Antifungal, Sugarcane, Multi-drug resistant

P-05/ICAZ-2023

#### A preliminary study of biodiversity of termites associated with urban trees and their damage assessment from different localities in District Faisalabad, Pakistan

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#### Abstract:

Termites are highly organized insects that live in colonies, and they can be found worldwide, especially in tropical regions. They primarily serve as invertebrate decomposers. Only a small fraction of termite species, about 3%, are considered significant pests that cause harm to agriculture, forestry, and structures. In Pakistan, the diverse ecological conditions make it a suitable habitat for termites to thrive across the country. One of the major challenges in urban areas is the significant damage caused by termites to urban trees, which is degrading the urban landscape. A preliminary study was conducted to investigate diversity, abundance and damage assessment of termites associated with mango and citrus trees planted at the main campus of the University of Agriculture, Faisalabad. The survey specifically focused on several locations within the University, mainly including horticulture areas like square 9 and 32 and botanical garden. Our study reveals a total of eleven termite species of the genus *Odontotermes* and four species of the genus *Microtermes* etc. Further, our data interprets the termite infestations, diversity, and the damage they caused, considering both living and dead-standing trees. Simpson and Shannon diversity indices were used to assess the diversity of termite species which ultimately helps to understand the factors such as species richness, evenness, and dominance. The study found that termites were most prevalent in the month of August in horticulture square 9. Overall, the Simpson diversity index recorded a value of 90%, while the Shannon diversity index showed a value of 88%. The highest diversity was observed in September, with a Simpson scale score of 78%, and in April, with a Shannon scale score of 99%. Out of the examined trees 20% were found to be severely damaged by termites. This initial data provides a valuable insight that can facilitate the development of sustainable strategies for managing termite populations in urban ecosystems.

**Key words:** Termite diversity, Urban tree, Shannon diversity index

P-06/ICAZ-2023

#### Wildlife, Transboundary Parasites and One Health World: A State of Interplay

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#### Abstract

Transboundary parasitic pathogens are highly contagious and transmissible across nature, infecting domestic animals, wildlife and humans, threatening public health, food security and trade issues. Wildlife act as reservoir in the transmission of parasitic and vector borne diseases. Ecto-parasites (lice, flies, ticks, mites) and endo-parasites (Liver fluke, Strongyles, *Taenia*, *Echinococcus*, enteric protozoans) are significant parasites of wildlife. It is believed that around 80% of animal borne pathogens have significant link with wild animals and are still at increasing trend. The spread of these pathogens is usually across the borders, tribes, nations and regions threatening global health. The major risk factors in this regard are migration of human population, livestock and their products resulting in the spread of potential pathogens. Complete eradication of such shared pathogens is not possible if wildlife is ignored. A



multidisciplinary approach involving stakeholders from around the globe is much needed to safeguard the world one health concept. Pathogenic zoonosis across the regions can only be prevented through collective/collaborative national and international efforts. On the other hand, the importance of transboundary public health education cannot be ignored for control/prevention of wildlife parasites. Public health surveillance programs should also focus pathogens at wildlife-livestock-human interface to prevent potential spread.

P-07/ICAZ-2023

**Elucidation of Antimicrobial, Antioxidant and *In Vitro* Anti-Lung Cancer (A549 Cells) Potential Of Prickly Pear Fruit Extract**

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**Abstract:**

Natural products (NPs) have long been reported and used as a complete source of compounds for drug discovery. Prickly pear fruit (*Opuntia ficus-indica*) belongs to Cactaceae family that has about 1600 species within 97 genera. It has nutritional and medicinal values because of presence of phytochemicals. Although, it contains several polyphenols, flavonoids and alkaloids etc. but very little data is available on the biological activities of prickly pear fruit. This study was carried out to investigate antimicrobial, antioxidant and anticancer potential of prickly pear fruit. Firstly, fruit was collected; shade dried and grinded into coarse powder. Then the extract was prepared by using Soxhlet extraction method. The extract was stored at -20°C until further analysis. Qualitative phytochemical screening of extract was done by phytochemical assays and antimicrobial potential was assessed through well diffusion method. DPPH assay was performed to determine the antioxidant potential of *Opuntia ficus-indica* Soxhlet extract. Cytotoxic potential of *Opuntia ficus-indica* extract was examined against lung cancer cell line (A549 cells) via MTT assay. The result of this study confirmed the presence of Flavonoids, steroids and alkaloids. In our study the trend of inhibitory zone (mm) of *Opuntia ficus-indica* extract was against *Salmonella anserica* (18mm) > *Staphylococcus aureus* (16.01mm) > *Escherichia coli* (16mm) > *Bacillus cerus* (15.99mm) > *Aeromonas hydrophila* (15.31mm) > *Postrella multocida* (15.03mm) > *Pseudomonas aeruginosa* (15mm). Furthermore, *Opuntia ficus-indica* extract exhibited significant antibacterial potential against *Escherichia coli*, *Salmonella anserica*, *Bacillus cerus*, *Staphylococcus aureus* with MIC ≤ 375 µg/ml. *Opuntia ficus-indica* also contained fungicidal activity against *Fusarium brachygibbosum* (23.03mm) > *Fusarium avenaceum* (21.46mm). Moreover, it also exhibited significant free radical scavenging activity with IC<sub>50</sub> 451 µg/ml and 70% growth of A549 cells at the final concentration of 200 µg/ml. Overall results indicated that *Opuntia ficus-indica* fruit extract has significant antimicrobial activity against various strains and it also reported moderate antioxidant and anticancer activity. These findings suggested that *Opuntia ficus-indica* could be used as antimicrobial agent

**keywords:** OFI, A549 cell line, IC<sub>50</sub>, Antioxidant, Antimicrobial.

P-08/ICAZ-2023

**Let the Animals Breathe Easier on Earth**

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**Abstract:**

The relationship between humans and animals has been immense significance throughout the history of our planet. The coexistence of various species on Earth is not merely a matter of convenience, but an integral part of the delicate ecological balance. However, with ongoing human activities, encroaching upon natural habitats and disrupting this delicate balance, it becomes crucial for us to acknowledge the significance of enabling animals to thrive on Earth. Biodiversity is the product of millions of years of evolution. From the majestic African elephant to the smallest invertebrate, every species has its place and purpose and an intrinsic right to exist. Animals are not just isolated individuals but integral parts of ecosystems. Their presence or absence can have a disproportionately big effect on the composition and functionality of the ecosystem. Protecting these animals ensures the health of the entire ecosystem. From childhood tales featuring beloved animal characters to the role of pets in our homes, animals hold a special place



in the human heart. This emotional connection has led to a global movement for animal welfare and conservation to protect and preserve the animal kingdom. In this way, we can ensure a harmonious coexistence with our fellow creatures, letting animals breathe easier on Earth.

Keywords: Animal welfare, Earth, Ecosystem, Human

P-09/ICAZ-2023

### More Animal Welfare or More Environmental Protection?

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#### Abstract:

The debate over whether we should prioritize more animal welfare or more environmental protection is a complex and often contentious issue. Both animal welfare and environmental protection are critical concerns in increasingly interconnected world and finding the right balance between the two is essential. Animal welfare is a matter of ethical and moral concern. Humans have long held a special responsibility for the welfare of animals. Treating animals with respect and minimizing their suffering reflects the values of our society. On the other hand, environmental protection, focuses on the broader health and sustainability of the planet. This includes addressing issues like climate change, habitat loss, pollution and biodiversity loss. When natural habitats are degraded or destroyed, it often leads to the displacement and suffering of animals. This interconnectedness underscores the importance of striking a balance between the two. While it may seem that environmental protection takes precedence over animal welfare due to its global impact. The environmental movement is based on the idea that people have a moral duty to preserve the biosphere for coming generations and to protect the wide variety of creatures that coexist with humans on Earth. We can endeavor to achieve a peaceful coexistence of animals and environment by supporting sustainable practices.

Keywords: Animal, Environment, Protection, Conservation, Human

P-110/ICAZ-2023

### Population Density and Diversity of Subterranean Termites of District Lahore, Pakistan

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#### Abstract

Subterranean termites cause destruction to the wooden structures and eat cellulose based products all over the world, causing economic loss on large scale. This study is conducted to observe the presence of subterranean termites and their species in district Lahore Punjab Pakistan, from the months May to September, 2021. Manual method was used to collect the termites from herbs, weeds, shrubs, trees, plant debris, wooden logs and buildings of desert different areas of the District Lahore. The population density of termites was estimated using Simpson's diversity index equation. For further examination, the preserved (in 80 percent alcohol) termites were carried to Zoology Department, The University of Lahore, Pakistan. The number of termites was maximum in the months of July and August. Four species of termites, *Odontotermes obesus*, *Coptotermes heimi*, *Hetrotermes indicola* and *Microtermes obesi* were found in three areas of the District Lahore. The most numerous termite species was *O. obesus*. The diversity and population density of termites in places near wahga border is more than Jallo park and Safari Park. The aim of the present study is to evaluate population diversity of termites in District Lahore.

Keywords: Castes; Cellulose based; Diversity; Simpson's diversity index; Subterranean; Workers

P-111/ICAZ-2023



### Biodiversity of Soil Microarthropods in Relation to Some Soil Factors.

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#### Abstract:

Soil sampling was done on weekly basis and the extraction of soil micro arthropods was carried out by using a Berlese-Tullgren funnel. During study period, a total of 15 different groups of soil micro arthropods were extracted from the collected soil samples. Springtails (53%), and mites (12%), appeared as the two most common groups throughout the study period in soil samples. Other recorded microarthropods such as larvae (6%), miscellaneous (4%) wasps, Ants, dipturans, proturans, and unidentified (3%) and pauropods, spiders, and beetles (2%) also shared much contribution. Further, from collected samples Symphylans and Pseudoscorpions made smallest contribution with 1% of total percentage. The pairwise comparison for means of all the collected specimens showed that collembola and mites (59%, 9%) were the most prevalent groups. The correlation matrix analysis revealed that mites had a significant correlation with soil pH (-0.65\*), moisture content (0.52\*), and electrical conductivity (0.53\*), while springtails did not show any significance with these factors. Similarly, paroupsods showed a significant correlation with soil temperature (0.62\*), moisture content (-0.54\*), electrical conductivity (-0.60\*), and organic matter (-0.57\*). Other groups, like Proturans, Dipturans, Pauropods, Spiders, and Beetles, did not show significant differences regarding correlation. The overall findings indicated that specific micro arthropod groups were influenced either positively or negatively by various soil factors like pH, temperature and moisture.

**Key words:** Soil fauna, biodiversity, edaphic factors, abiotic parameters

P-12/ICAZ-2023

### Analyzing the Salvaging Products of TiO<sub>2</sub>/PbS Solar Paint Productin Process via Pseudo-SILAR Method

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#### Abstract:

The idea of solar paints has been recently introduced which deals with the advantage of covering no extra space but the paintable roofs or walls or windows of the buildings, making it possible to coat the surfaces which need to be converted to solar cells directly. For such application, TiO<sub>2</sub>/PbS nanocomposite (NC) is the most extensively researched material so far, owing to the facile development (i.e. by successive ionic layer adsorption and reaction of PbS quantum-dots (QDs) on TiO<sub>2</sub> nanoparticles NPs)). However, by the synthesis of TiO<sub>2</sub>/PbS nanocomposite involves substantial wastage of residual ionic precursors of Pb, S and Zn (from ZnS passivation layer) which is toxic at one end, while costly on the other. Parellel to many other investigations focusing on the salvaging of ionic products from these wet-chemical precursors, we have explored the development of ZnS, PbS and ZnS/PbS based by-product from SILAR and utilized them all as photocatalysts owing to their tendency to harvest ultraviolet and/or visible light. We employed scanning electron microscopy (SEM) and EDS for basic material characterization and did XRD, UV-Vis spectroscopy for connecting the revealed characteristics with photocatalytic dye degradation performance of ZnS, PbS and ZnS/PbS based salvaged products.

**Keywords:** Salvage of p-SILAR, ZnS/PbS nanocomposites, photocatalysis

P-13/ICAZ-2023

### Comparative Potential of Five Different Botanicals (Aqueous Extracts) Against Different Pests and Predators in Laboratory Conditions.

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#### Abstract:

Botanical insecticides have a long history of use since ancient times. They are considered safer than chemical insecticides and are more cost-effective. Overall, botanical insecticides are an effective alternative to chemicals. The current study was conducted to evaluate the toxicity and repellency of five different botanicals (aqueous extracts) against aphids and two-spotted spider mites and natural enemies such as predatory mites and ladybird beetle & to control using bakain (*Melia azedarach*), tobacco (*Nicotiana tabacum* L.), peppermint (*Mentha piperita* L.), moringa (*Moringa oliefera* L.) and eucalyptus (*Eucalyptus globulus* L.) leaf aqueous extracts. Leaf dip method was used for this bioassay & this experiment was laid out in Complete Randomized Design. Data was collected every 24, 48, 72



and 96 hours and was corrected by Henderson and Tilton's formula. The research work was conducted in Acarology Research Laboratory, Department of Entomology, University of Agriculture, Faisalabad. The results of the study showed that tobacco has a more toxic effect causing mortality on aphids (80.82%), mites (81.49%) and ladybird beetles (39.77%), predatory mites (51.55%) after 96 hours of application. Bakain aqueous extract killed (79.85%) of aphids, (70.54%) of TSSM and (31.05%) of ladybird beetles and (46.49%) of predatory mites after 96 hours of application. Mortality trends were observed in other aqueous extracts such as Eucalyptus > Moringa > Peppermint. The repellent effect of these extracts was also evaluated and observed after 12 and 24 hours. Maximum repellency was observed by tobacco against pests (80.55%, 86.88%) and predators (68.55%, 74.34%) followed by Bakain, Peppermint, Moringa and Eucalyptus. The results revealed that all these extracts can be used effectively against aphids and TSSM while having lower toxic effects on predators.

Key Words: botanicals, aqueous extracts, pests, predators, toxicity, repellency, mortality

P-14/ICAZ-2023

### **Evaluation of Bitter Melon (*Momordica charantia*) Seed Powder as a Potential Infertility Inducer in Female Nile Tilapia (*Oreochromis niloticus*)**

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#### **Abstract**

The challenge of early maturation in Nile tilapia (*Oreochromis niloticus*), causing overpopulation, poor growth and productivity, has prompted a need of strategy to control its reproduction. Nowadays, medicinal plants are getting importance in aquaculture, as they are safe, effective, locally available and biodegradable. The herb *Momordica charantia* has been utilized as a nutritional and therapeutic supplement. This plant has a rich historical use across cultures for its impact on uterine functions, including promoting menstruation and inducing abortions. Therefore, this present study was carried out for 90 days to evaluate Bitter melon (*Momordica charantia*) seeds as a natural infertility inducer and to determine its effects on gonadal characteristics and histology of female Nile tilapia (*Oreochromis niloticus*). The experiment was carried-out in an indoor facility under semi-control condition, comprised of a Control group (C) fed only with basal diet, and treatment groups S2, S4, S6, S8, and S10, each supplemented with 2, 4, 6, 8, and 10g of *Momordica charantia* seeds/kg diet respectively, to provide 35% of crude protein required by tilapia. Uniform size, active and healthy fish with an average body weight of  $10 \pm 1.6$  grams, distributed across eighteen fiberglass tanks with triplicates for each treatment. The results revealed a significant effect on growth parameters (WG, SGR and FCR), hematological indices and ovarian antioxidant enzyme. Furthermore, all doses of *M.charantia* seed significantly decreased GSI and fecundity values ( $p < 0.05$ ) with increasing dietary dosage of seeds. Histological examination showed dose-dependent structural alteration in ovary of all treatment groups. Consequently, the results showed that inclusion of *M. charantia* seed powder could be effective as infertility inducer in female *O. niloticus*. Therefore, it seems a possible way to control a vigorous spawning in tilapia thus help to prevent the issue of overcrowding in *O. niloticus* culture farms.

P-15/ICAZ-2023

### **Evaluation of adaptogenic activity of Dietary (Bitter melon) *Momordica charantia* seed powder on (Nile tilapia) *Oreochromis niloticus***

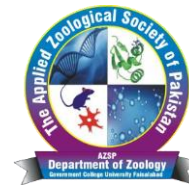
Andleeb Ashraf

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#### **Abstract**

The primary objective of this investigation was to explore the potential relationship between adaptogenic constituents inherent to dietary *Momordica charantia* (bitter gourd) seeds and their ameliorative role during an increase in cortisol, a biomarker indicative of stress in *Oreochromis niloticus* (Nile tilapia). *M. charantia* plant is used for medicine and has substantial pharmacological effects due to its bio-actives and phytochemical composition and also an adaptogens source. Six discrete dietary protocols were implemented. One functioned as the control group (denoted as C), while the remaining five involved the supplementation of MC seed powder at levels of 0.2, 0.4, 0.6, 0.8, and 1 g per 100g feed (g/100g). Among the groups, one showing the most substantial growth response (S10) was chosen for confinement stress protocol incorporation. Fish from both the C and the S10 group were exposed to a 1-hour





confinement stressor, to evaluate the potential adaptogenic or anti-stress properties of MC seed in mitigating the stress-induced alterations in plasma cortisol levels and hepatic antioxidant activity level, since various oxidative processes are known to be involved in stress. The fish were subsequently allocated certain release times, including 0 (with immediate sampling), 0.5, 1, 2, 4, 8, 12, 24, and 48 hours. Then the fish were dissected for further examination after the end of their respective recovery periods. We employed an instantaneous sampling protocol to investigate the impact of a 1-hour confinement stress. This stress resulted in more elevation of plasma cortisol levels in C group but significantly ( $P < 0.001$ ) less in S10 group fish pretreated with MC seed powder in diet, along with this significantly (0.001) enhanced activity levels of hepatic antioxidant enzymes (SOD, POD, CAT) and decrease in LPO level in S10 fish.

P-16/ICAZ-2023

**Antifertility antioxidants and hemo immunological effects of sesbania sesban on *Oreochromis mossambicus*.**

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**Abstract:**

Tilapia is the second most culturable fish after carp. However, wild tilapia (*Oreochromis mossambicus*) poses a significant danger to the freshwater system, especially aquaculture, due to its rapid breeding. About 75% of the published research indicates the detrimental effect of tilapia's introduction in aquaculture. Similarly, hormonal-administered mono-sex tilapia is also not satisfying the consumer's demand due to its potentially hazardous effects. Therefore, this study explores the antifertility and growth-promoting effects of the medicinal plant *Sesbania sesban* in *O. mossambicus*. A 90-day feeding trial in a replicate of three was conducted in an indoor facility under semi-control conditions. Uniform size, active fry of *O. mossambicus*, average body weight  $1.7 \pm 0.4$ g were equally distributed in 21 glass aquaria (13 fry/aquarium) having well-aerated water. The aquaria were randomly divided into 7 groups, one group (C) was fed a 40% crude protein basal diet while others, each of three groups (S1, S2, S3 and R1, R2, R3) were fed a basal diet fortified with graded level i.e., 12.5, 25 and 50g per kg diet of *S. sesban* seed and root powdered. Initially, fish were provided feed at the rate of 7% body weight, three times a day. Afterward, based on the body weight, feeding frequency, and ratio were changed. Results indicated a dose-dependent significant effect of both the seed and root of *S. sesban* on the growth performance of *O. mossambicus*. However, all pairwise comparisons among groups indicated the most significant effects of *S. sesban* seed compared to roots. The S3 group showed the highest weight gain and SGR and the lowest FCR. In addition to these *S. sesban*, supplemented diet also showed significant ( $P > 0.05$ ) dose-dependent positive effects on blood indices i.e., S3 the group showed the highest RBCs and WBCs count, hemoglobin level, HCT%, MCV, MCH, MCHC; and status of antioxidant enzymes SOD, POD, CAT, and the lowest LPO level. However, metabolic enzymes, AST, ALT, and LDH showed no significant difference among the treated and control groups. Both seed and root of *S. sesban* showed dose-dependent negative effects on the GSI of both male and female fish. In males, both roots and seeds at higher doses showed statistically similar effects, i.e., a 92% decrease in GSI as compared to the control group. However, in females, the roots of *S. sesban* showed the most significant effect on the GSI, in contrast to plant seeds. The GSI of the R3 group was 94.6% decreased as compared to the control, while the S3 group showed an 89.8% reduction in GSI. Serum testosterone levels also showed a dose-dependent decrease in response to both roots and seeds of the *S. sesban* plant. However, at higher dosage levels, in contrast to roots, seeds of plants most significantly reduced the testosterone level. Based on the results, the *S. sesban* plant could be recommended for improving the growth, and health status, and controlling the reproduction of *O. mossambicus*.



P-17/ICAZ-2023

**Association of CDKAL1 gene polymorphism (rs10946398) with gestational diabetes mellitus in the Pakistani population**

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**Abstract:**

Background CDK5 regulatory subunit associated protein 1 like 1 (CDKAL1) encodes a tRNA modifying enzyme involved in the proper protein translation and regulation of insulin production encoded by the CDKL gene. Sequence variations in the CDKAL1 gene lead to the misreading of the Lys codon in proinsulin, resulting in decreased glucose-stimulated proinsulin production. Various polymorphic sequence variants of the CDKAL1 gene such as rs7754840, rs7756992, rs9465871, and rs10946398 are reported to be associated with type 2 diabetes mellitus and gestational diabetes mellitus (GDM) incidence. One of these single nucleotide polymorphisms i.e., rs10946398 has been reported to impact the risk of GDM and its outcomes in pregnant women of different ethnicities i.e., Egypt, Chinese, Korean, Indian, Arab, and Malaysian. Numerous findings have shown that rs10946398 overturns the regulation of CDKAL1 expression, resulting in decreased insulin production and elevated risk of GDM. However, there is no data regarding rs10946398 genotype association with GDM incidence in our population. Methodology In this study, 47 GDM patients and 40 age-matched controls were genotyped for rs10946398 CDKAL1 variant using Tetra primer Amplification Refractory Mutation System Polymerase Chain Reaction (Tetra ARMS-PCR). 2 Results Analysis of the results showed the significant association of the C allele of CDKAL1 SNP rs10946398 ( $\chi = 0.02$   $p = 0.001$ ) with the risk of GDM development. Conclusively, the results support the role of SNP i.e., rs10946398 of CDKAL1 gene in GDM development in Pakistani female patients. However, future large-scale studies are needed to functionally authenticate the role of variant genotypes in the disease pathogenesis and progression.

P-18/ICAZ-2023

**Enhancing Silkworm Health and Silk Yield Through Nutritional Strategies: A Focus on Ascorbic Acid**

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**Abstract:**

The sericulture industry relies on silk production from *Bombyx mori* L., with significant economic implications. Ascorbic acid, a natural antioxidant, is of interest for enhancing silk yield. We investigated its impact on silkworm development, examining body weight, hemolymph protein, cocoon traits, and correlations. Local silkworm strains received four ascorbic acid concentrations, with consistent weight gain across races and a positive correlation between body weight and hemolymph ascorbic acid. Cocoon and shell weights showed strong correlations. Multivoltine races displayed varied 5th instar durations. Analysis of variance revealed temporal and genetic influences. Correlation coefficients showed diverse responses to ascorbic acid. Foodstuff parameters offered insights, and corpora allata size analysis revealed temporal responses. This study uncovers ascorbic acid's multifaceted effects on silkworm development, highlighting the role of genetics and environment.

P-19/ICAZ-2023

**The prevalence of Type 2 Diabetes and its association with Different Demographic Factors among the Female Population of Chenab Nagar.**

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**Abstract**

Type 2 diabetes (T2D) is when the body fails to regulate glucose metabolism, mostly because of insulin resistance. Pakistan ranked 3rd in prevalence. The age-standardized global T2D prevalence in females was 5.0% in 2019. In Pakistan according to World Bank, it is 30.8% among those aged 20 to 79. Genetic factors and lifestyle changes, such as a sedentary lifestyle and high-sugar diets contribute to T2D. Risk factors include obesity, hypertension and gestational diabetes. A study in Chenab Nagar conducted by using a structured questionnaire revealed prevalence of T2D 23.9% in non-pregnant women aged  $\geq 30$  (N=576). Rates were found to be rising significantly with age, 8.9% in 30-40 years, 32% in 45-59, and 50% in  $\geq 60$ . The cumulative percentage in Low-income localities was 26.8% ( $p=0.041$ ). The ratio of Allopathy to Homeopathy was found to be 86.2% and 11.4% whereas the tablet-to-insulin ratio was 91% and 4.3% respectively. Lifestyle awareness is crucial to combat the



escalating diabetes rates, emphasizing dietary changes and physical activity.

P-20/ICAZ-2023

**Production of Microalgal Biomass, as Potential Biofertilizer, using Wastewater leading to Removal of Pollutant and Pathogenic load**

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**Abstract:**

Growing population and global climate change caused detrimental effects on the overall ecosystem. Microalgae is employed as an eco-friendly and cost-effective biological resource to be used as a potential biofertilizer in modern agriculture and wastewater treatment. The characterization and comparative analysis of wastewater and pot experiment on different crops was performed. The identified strains were *Tetrademus nygaardii*, and *Closteriosopsis* has a potential to be used as a biofertilizer and wastewater treatment. These findings potentially influence the future of sustainable agriculture by creating multiple options for innovation and commercialization.

P-21/ICAZ-2023

**Impact of Added Sugars on Abdominal Obesity and BMI-Calorie Relationship in Females: A Cross-Sectional Study**

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**Abstract**

Abdominal obesity refers to the accumulation of excess fat around the abdomen and stomach area. It is a significant risk factor for various chronic conditions, including diabetes. The study investigates the impact of sugar consumption on abdominal obesity among 320 women aged 20 to 60 in Chenab Nagar. Examining sugar categories against BMI revealed a non-significant relationship (P-value of 0.906 is obtained), indicating sugar intake doesn't notably influence BMI. Calorie consumption, predominantly from refined sugar, showed no significant variance across age groups (P-value of 0.546) or marital status (P-value of 0.968). However, physical activity notably affected BMI; 41% (132 out of 320) not engaged in exercise were mostly obese, emphasizing the crucial role of exercise in managing weight. Despite a lack of direct correlation between sugar intake and BMI, the study underscores the importance of physical activity in mitigating obesity. Understanding the complexities of obesity requires a multifaceted approach considering not just diet but also exercise habits for effective management.

P-22/ICAZ-2023

**Toxicological Relevance of Diazinon (Organophosphate) on the Immune Competency of Major Carp**

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Department of Zoology, Wildlife & Fisheries, University of Agriculture, Faisalabad

**Abstract**

Aquatic organisms are greatly affected by pollutants such as pesticides. In this study, Effect of diazinon on the immune response of *Labeo rohita* was determined. The experiment was carried out at Toxicology Laboratory at the Fisheries Research Farms UAF. Different doses of diazinon were given to each experimental group for the determination of 96-hr LC50 and fatal concentration. Firstly, to check the 96 hour Lc50 the experimental fish was exposed to different concentration of diazinon. Then, to assess the chronic toxicity, diazinon at concentrations of 1/3rd, 1/6th and 1/9th of its LC50 was administered to three distinct treatment groups (T1, T2, and T3) and control group was unaltered. In the chronic exposure the activity of SOD and CAT in liver, gills and kidney and WBC, igM and lysozyme activity in blood were measured by using spectrophotometer at 450nm after each fortnight of experimental duration. SOD and CAT activity in liver, gills and kidney were higher in treatment groups than control group in the observation of first fortnight and then their values decrease in other observations. Correlation among physio-chemical parameters was also calculated in all experimental groups. Probit analysis was used to establish the LC50 and fatal levels of diazinon for *L. rohita*. Lethal concentration of diazinon and 96-hr LC50 for *L. rohita* was 2.11736 mgL-1 and 1.30630 mgL-1 respectively. Two-way Analysis of Variance was used to statistically analyse SOD and CAT activities in the liver, gills, and kidney. A significant increase of SOD and CAT activity in kidney, gills and liver of *L. rohita* was concluded. The findings concluded that the toxicity in fish is due to oxidative stress caused by release of ions as well as sensitivity of fish towards the pesticide toxicity.



P-23/ICAZ-2023

Innzamul huq

Fujian Agriculture and Forestry University, China

**Abstract:**

The Fall Armyworm (*Spodoptera frugiperda*) poses a substantial global threat to agriculture due to its adaptability, pesticide resistance, and capacity to inflict damage on crucial crops like maize. Conventional chemical pesticides, while widely used, present challenges such as resistance development and environmental pollution. This study explores an alternative approach by investigating the application of soluble silicon (Si) sources to enhance plant resistance against the Fall Armyworm. Maize plants were subjected to foliar spray treatments with silicon dioxide (SiO<sub>2</sub>) and potassium silicate (K<sub>2</sub>SiO<sub>3</sub>). Transcriptomic and biochemical analyses were employed to examine gene expression changes in Fall Armyworms feeding on Si-treated maize. Results revealed significant impacts on gene expression, with numerous differentially expressed genes (DEGs) identified in both SiO<sub>2</sub> and K<sub>2</sub>SiO<sub>3</sub> treatments. Gene Ontology (GO) and Kyoto Encyclopedia of Genes and Genomes (KEGG) enrichment analyses highlighted critical DEGs involved in various pathways, such as amino acid, carbohydrate, lipid, energy, xenobiotics metabolisms, signal transduction, and posttranslational modification. Biochemical analyses indicated that Si treatments inhibited certain enzyme activities while inducing others, suggesting a toxic effect on the Fall Armyworm. In conclusion, the application of Si on maize plants influences gene expression and biochemical activities in the Fall Armyworm, potentially offering a sustainable strategy for pest management.

P-24/ICAZ-2023

**Impact of Carbohydrate Consumption on Abdominal Obesity and Waist Circumference**Durr-e-Samin Tahir, Tooba Nayab, Rashiqa Manan, Amatul Wadood Beenish

Department of Zoology, Nusrat Jahan College, affiliated with the University of Sargodha, Chenab Nagar

**Abstract**

Abdominal obesity refers to fat deposition in the body's abdominal region which increases waist circumference. Obesity risk factors include age, gender, sedentary lifestyle, high carb intake, and genetics. This study examines the relationship between carbohydrate consumption and abdominal obesity in 320 women aged 20-60 from Chenab Nagar. Through detailed interviews and physical measurements, the research focused on carbohydrate intake from staples like chapatti and rice, alongside physical activity levels. Waist circumference ranged from 0.635m to 1.27m within the sample. Significant findings emerged: marital status showed a strong correlation with increased waist circumference (p-value of 0.001), with married women exhibiting higher values. Moreover, across all age groups, the correlation between waist circumference and calculated carbohydrate calories proved highly significant (p-value of 0.001), reinforcing the link between carbohydrate intake and abdominal obesity. These results highlight the influence of marital status and carbohydrate consumption on abdominal obesity in the studied population. Understanding these correlations could aid in targeted interventions to manage abdominal obesity among women in this community.

P-25/ICAZ-2023

**Pale body mutation in the *Drosophila montium* species group and its association with reduced fertility and longevity**Durr-e-Samin Tahir, Najma Naeem, Rimsha Asghar

Department of Zoology, Abdus salaam school of sciences Nusrat Jahan College Rabwah Chenab Nagar Pakistan

**Abstract**

The linkage between genetics and its impact on traits stands a milestone in genetic research. In the realm of *Drosophila* research, the informative body colour trait plays a significant role. In a recent observation, a pale body mutant surfaced in the isofemale laboratory culture of the *Drosophila montium* species group. This culture originated from a wild-caught female in the Kalam Valley, KPK Pakistan, in August 2023. The present study delves into the investigation of the effects of the pale body mutation on fertility and longevity. Through multiple ovarian dissections, it was discovered that the genetic mutation resulted in rudimentary or significantly reduced (one-third size) ovaries in 87.5% of mutant *Drosophila*. This reduction in fertility and impact on longevity in pale-bodied *Drosophila*, as compared to the wild type, underscores the need for further research to understand and reshape the genetic effects of such mutations. Additionally, exploring their analogies in human genetic mechanisms related to infertility is a critical avenue for future investigation.



P-26/ICAZ-2023

**Histomorphological Characterization of Grass Carp (*Ctenopharyngodon idella*) Fed with Different Levels of Chlorella as Live Feed**

Mubshara Azam, Khalid Abbas\*, Rabia Maqsood, Taqwa Safdar, Muhammad Sarfraz Ahmed and Fatima Raza

University of Agriculture, Faisalabad

**Abstract:**

In intensive and semi-intensive aquaculture, live feed is recognized as a vital component of the fish diet due to its rich composition of nutrients such as proteins, vitamins, fatty acids, and pigments. This experiment aimed to assess the histomorphological impact of chlorella, a type of green algae, as live feed on grass carp. The experiment was conducted at the Fisheries Research Farms, University of Agriculture, Faisalabad, fingerlings of grass carp were obtained from the Government Fish Seed Hatchery, Faisalabad. Over a 60-day period, the fingerlings were reared in a controlled environment and fed varying proportions of chlorella at levels of 10%, 20%, and 30%. Fish were fed twice a day with 6% of their body weight. Fish body weight and total length were recorded weekly and feed quantity was re-adjusted according to the weight. Physicochemical parameters were monitored throughout the trial, histomorphological analyses of grass carp tissues were conducted using Image J. Software. The collected data were analyzed statistically by applying one way ANOVA the results showed that in all three groups' intestinal segments, the mucosal length, villi length, and the number of goblet cells increased when fish were fed with chlorella compared to the control group, with the 30% supplementation level demonstrating the most favorable outcomes. These findings indicate that chlorella supplementation positively influences the intestinal health of grass carp, suggesting its potential as a beneficial dietary component in aquaculture practices.

P-27/ICAZ-2023

**Comparative Evaluation of *Mentha longifolia* and *Mentha spicata* as Antimicrobial Agents**

Kaynat Firdos\*, Shoaib Alam, Iqra Muzzafar, Sumaira Saif, Arslana, Muhammad Naeem Khan, Saddam Hussain

Department of Zoology, Faculty of Basic Sciences, University of agriculture, Dera Ismail Khan

**Abstract**

Medicinal plants play a dynamic roll in health care, in prevention and in treatment of diseases, and play a valuable role in pharmaceutical industries, herbal medicines and in healing since ancient times. Ethnomedicinal plants have variety of significant compounds which play an important role in human health care. Among all the plant families, Lamiaceae is a significant plant family that includes over 7000 species spread across 250 genera. The majorities of these species are aromatic and have a complex mixture of bioactive compounds having valuable biological activities. *Mentha longifolia* and *Mentha spicata* are the most important species of Lamiaceae family have diverse traditional and pharmaceutical uses and both grow in almost all over the world. *M. Longifolia* is used as a medicinal plant with antispasmodic, antimicrobial, anti-bloating, anti-coughing, and anti-asthmatic properties. The essential oils of *M. Longifolia* are menthol (19.4–32.5%), 1,8-cineole (5.6–10.8%), pulegone (7.8–17.8%), and menthone (20.7–28.8%) that play significant roles in the various biological activities of this plant. Its leaf extract possesses anti-nociceptive and antipyretic qualities and are used in herbal remedies intended to treat digestive disorders. Due to presence of Rosmarinic acid it possessed high antioxidant activity. It has strong antimicrobial activities. *Mentha spicata* also have strong antioxidant qualities because they are rich in polyphenols, phenolic acids, flavonoids, carvone, and ascorbic acid. *M. spicata* leaves extract are a good source of phytochemicals. *M.spicata* can be used as antifungal, antidiabetic, antioxidant, antimicrobial anti-inflammatory agent. The purpose of our study is to check the comparative antimicrobial efficacy of these two species of *Mentha* from two different regions of Pakistan.



P-28/ICAZ-2023

### Phytochemical Profiling and Evaluation of *Acacia nilotica* Methanolic Extract for Potential Anticancer Compounds

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Department of Zoology, Faculty of Basic Sciences, University of agriculture, Dera Ismail Khan

#### Abstract

Liver cancer presents an ongoing global health challenge with a steadily increasing incidence worldwide. Projections indicate that by 2025, the annual number of individuals affected by liver cancer will exceed 1 million. Hepatocellular carcinoma (HCC) constitutes around 6% of all malignancies. The considerable mortality rates, along with the adverse effects and toxicity associated with conventional chemotherapeutic agents, underscore the need for alternative treatment options, such as herbal medicines. Plants are prolific producers of diverse secondary metabolites, which significantly contribute to the development of anti-cancer drugs and medications for various ailments. Specific compounds like terpenoids show promising potential in addressing inflammatory conditions and combating cancer. Recently, researchers have directed their focus toward studying the effects of plant-derived compounds on cell cycle regulation and apoptosis. Several plant-derived agents, including alkaloids, flavonoids, sulfhydryl compounds, terpenoids, and polyphenolics, hold promise in treating various types of cancer. Compounds like vincristine, vinblastine, taxol, irinotecan, etoposide, and topotecan are widely used globally for cancer treatment. *Acacia nilotica*, commonly known as 'keeker' or 'Babul', belongs to the Fabaceae family. The *Acacia* family comprises around 1350 species divided into three subfamilies. This plant contains a profile of diverse bioactive components, such as gallic acid, ellagic acid, isoquercetin, leucocyanadin, kaempferol-7-diglucoside, glucopyranoside, rutin, derivatives of (+)-catechin-5-gallate, apigenin-6,8-bis-C- glucopyranoside, m-catechol, and their derivatives. Reports indicate that various parts of the plant are rich in tannins (ellagic acid, gallic acid, and tannic acid), stearic acid, vitamin C (ascorbic acid), carotene, crude protein, crude fiber, arabin, calcium, and magnesium. Traditionally, the bark, leaves, pods, and flowers of *A. nilotica* have been used to address various health concerns, including cancer, colds, congestion, coughs, diarrhea, dysentery, fever, gall bladder issues, hemorrhoids, ophthalmia, sclerosis, tuberculosis, smallpox, leprosy, bleeding piles, leucoderma, and menstrual problems. *A. nilotica* exhibits anti-plasmodial, molluscicidal, anti-fungal, anti-microbial activities, and shows inhibitory effects against HCV and HIV-1. The plant's bark serves as an astringent, acrid, cooling, styptic, emollient, anthelmintic, aphrodisiac, diuretic, expectorant, emetic, and nutritive agent, used in treating hemorrhages, wound ulcers, leprosy, leucoderma, and various skin diseases. Our study focuses on assessing the effectiveness of *A. nilotica* in treating diseases, more specifically liver cancer.

**Key Words:** Natural products, *Acacia nilotica*, Anti-cancer, Anti-oxidant



### P-29/ICAZ-2023

Assessing the Health Risks of Heavy Metals in Major Carp and Water: Implications for Human Well-Being

Nargis Naheed<sup>\*</sup>, Naheed Bano<sup>1</sup>, Zareena Ali<sup>2</sup>, Areesha Fatima<sup>1</sup>, Muhammad Aatif Shahab<sup>1</sup>, Abida Razi<sup>1</sup>

<sup>1</sup>Department of Zoology, Wildlife and Fisheries, Muhammad Nawaz Shareef (MNS) University of Agriculture, Multan, Pakistan

<sup>2</sup>Department of Biochemistry, Muhammad Nawaz Shareef (MNS) University of Agriculture, Multan, Pakistan

#### Abstract:

The presence of trace and heavy metals in water sources and major carp tissues is a subject of growing concern due to its potential impact on human health. This study delves into the intricate relationship between metal concentrations in water and the tissues of major carp and their consequences for human health. Water is a vital resource for both humans and aquatic life. However, it can serve as a medium for the accumulation of trace and heavy metals, such as lead, mercury, cadmium, and arsenic, which find their way into water bodies through various sources, including industrial discharges, agricultural runoff, and natural geological processes. Major carp, as key components of many freshwater ecosystems, play a crucial role in this cycle. These fish species can accumulate these metals in their tissues through a process known as bioaccumulation. As humans are at the top of the aquatic food chain, the consumption of contaminated fish can lead to the ingestion of these accumulated metals. The consequences of such metal exposure on human health are a topic of significant concern. Prolonged exposure to trace and heavy metals can lead to a range of health problems. For example, lead exposure is associated with neurological impairment, particularly among children, while mercury is known to cause severe developmental anomalies, especially in fetuses. Cadmium exposure has been associated with adverse effects on kidney and lung health, and arsenic is a known carcinogen. Moreover, contaminated water can also exert deleterious effects on the overall aquatic ecosystem and biodiversity, culminating in adverse impacts on the ecosystem's health in its entirety. Therefore, this research not only addresses the human health implications but also contributes to the broader understanding of environmental preservation and sustainable resource management.

### P-30/ICAZ-2023

**The Study of Different Plant Extracts as Bio-Pesticides against Wheat Aphid (*Sitobion Avenae*) in Punjab**

Muhammad Ali and Muhammad Ashfaq

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#### Abstract:

This experiment was conducted to assess the various bio-pesticides against the wheat aphid. The experiment was trailed at the Faculty of Agriculture Sciences University of the Punjab, Pakistan. The wheat variety Galaxi was cultivated as crop in field. All the different plant extracts were used which were, neem leaves extract, Aloe vera, lemon peel extracts, moringa leaves extract and Tobacco leaves extract were used against the wheat aphid. The Randomized Complete Block Designs (RCBD) was used in field with three replications. After apply the plant extracts the aphid populations were noted after 24 h, 48 h, 72 h, 168 h and 240 h. Concentrations of 23 % each treatment were used. Data recorded after 240 h the statistical analysis results showed that highest pest control where noted at the neem leaves extracts its mortality was 85 percent. Lemon extracts also showed the good results with the effective control of 72 % mortality, 60 % mortality where noted at tobacco treatment. Same as lowest aphid controls were noted at the aloe vera leaves extract that was 52 % mortality. This study showed the effective control on wheat aphid by using the locally botanical plants which is safe for human health and same as our environment.

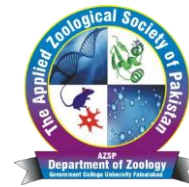
### P-31/ICAZ-2023

**Comparative analysis of the cardiac structure and transcriptome of scallop and snail, perspectives on heart chamber evolution**

Meina Lu, Rabia Hayat, Xuejiao Zhang, Yaqi Jiao, Jianyun Huang, Yifan Huangfu, Mingcan Jiang, Jieyi Fu, Qingqiu Jiang, Yaojia Gu, Shi Wang, Alexander A. Akerberg, Ying Su, Long Zhao  
Ocean University of China

#### Abstract:

The evolution of a two-chambered heart, with an atrium and a ventricle, has improved heart function in both deuterostomes (vertebrates) and some protostomes (invertebrates). Although studies have examined the unique structure and function of these two chambers, molecular comparisons are few and limited to vertebrates. Here, we



focus on the two-chambered protostome heart of the mollusks, offering data that may provide a better understanding of heart evolution. Specifically, we asked if the atrium and ventricle differ at the molecular level in the mollusk heart. To do so, we examined two very different species, the giant African land snail (*Lissachatina fulica*) and the relatively small, aquatic yesso scallop (*Mizuhopecten yessoensis*), with the assumption that if they exhibited commonality these similarities would likely reflect those across the phylum. We found that, although the hearts of these two species differed histologically, their cardiac gene function enrichments were similar, as revealed by transcriptomic analysis. Furthermore, the atrium and ventricle in each species had distinct gene function clusters, suggesting an evolutionary differentiation of cardiac chambers in mollusks. Finally, to explore the relationship between vertebrate and invertebrate two-chambered hearts, we compared our transcriptomic data with published data from the zebrafish, a well-studied vertebrate model with a two-chambered heart. Our analysis indicated a functional similarity of ventricular genes between the mollusks and the zebrafish, suggesting that the ventricle was differentiated to achieve the same functions in invertebrates and vertebrates. As the first such study on protostomes, our findings offered initial insights into how the two-chambered heart arose, including a possible understanding of its occurrence in both protostomes and deuterostome.

P-32/ICAZ-2023

### Estimation of foliage predatory beetles in wheat crop of district Layyah

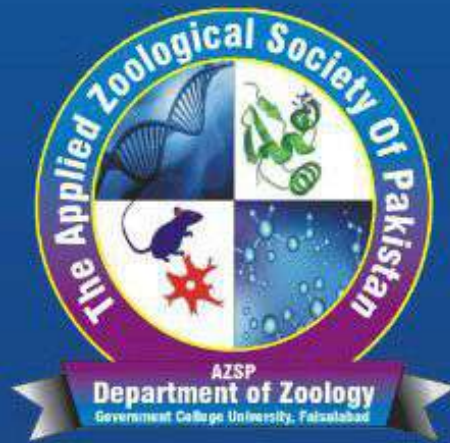
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#### Abstract

The population of Pakistan heavily relies on wheat for their daily food needs, and the wheat crop is susceptible to many pest species, especially aphids. To ensure economic prosperity and food security, it is important to control these pests. Beetles belonging to the family Coccinellidae, also known as foliage predatory beetles, are natural predators of aphids and other sucking insect pests. The present study was conducted to estimate the diversity and relative abundance of beetles belonging to the family Coccinellidae that are predators, of wheat crops in district Layyah, located in southern Punjab, Pakistan. This study was conducted over a five-month period. Field surveys of wheat crop from different sites i.e. Chowk Azam, Karor Lal Esan and Fatehpur represented ten species of Coccinellid predators in wheat crop. Sampling was carried out from January 2023 to May 2023 fortnightly and was involved the collection of data on the presence of specimens in wheat crops. Various methods such as sweep netting and handpicking were used to capture the foliage predatory beetles' fauna. The collected specimens were preserved in 10% formalin solution and were identified using taxonomic identification keys provided by Brunetti (1978), Borror and DeLong (2005), Rafi et al. (2005), Shunxiang (2010) and the Fauna of British India by Talbot (1978) and also online identification keys available on different websites. In this study, Diversity Index ( $H' = 2.003$ ), Evenness ( $E = 0.87$ ) and Dominance ( $D = 0.83$ ) of coccinellids species were recorded from wheat crops. The most abundant species of predator was *Coccinella septempunctata*. Maximum diversity was observed in March while minimum in May. Diversity of coccinellids species was observed maximum at Chowk Azam site while at the Fatehpur site, the lowest number of Coccinellid species was recorded. Significant variation ( $P=0.0003$ ) at  $p<0.05$  was computed for relative abundance of Coccinellid species at three different sites of District Layyah on monthly data. Thus, this information might be useful in developing biological control programs for regulating the agro-ecosystem in this area.





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