



ICAZ-2022

# Abstract Book

5<sup>th</sup> International  
Conference On Applied Zoology  
(ICAZ-2022)  
October 17-18, 2022

Organized by:  
The Applied Zoological Society of Pakistan

In collaboration with  
Khawaja Fareed University of Engineering & Information Technology (KFUEIT),  
Rahim Yar Khan



ICAZ-2022 17-18<sup>th</sup> October, 2022



5th International Conference on Applied Zoology-2022

# **ABSTRACT BOOK**

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**KHWAJA FAREED UNIVERSITY OF ENGINEERING**

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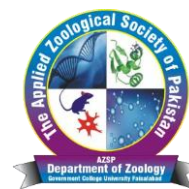


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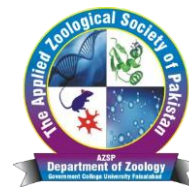


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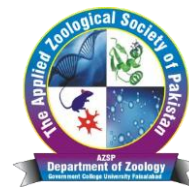
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ICAZ-2022 17-18<sup>th</sup> October, 2022

**5<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 5<sup>th</sup> International Conference on Applied Zoology-2022 (ICAZ-2022). This will be held from 17<sup>th</sup> to 18<sup>th</sup> October, 2022 under the shelter of The Applied Zoological Society of Pakistan in collaboration with Khwaja Fareed University of Engineering and Information Technology 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 valuable contribution as a participant until the completion of ICAZ-2022. 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 17<sup>th</sup> to 18<sup>th</sup> October, 2022. Our AZSP central organizing committee, Prof. Dr. Farhat Jabeen, Prof. Dr. Tayyaba Sultana, Prof. Dr. Salma Sultana and Dr. Azhar Rasul, in collaboration with local organizing committee from KFUEIT, Raheem Yar Khan 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)**

Chairman, AZSP/Patron in Chief, ICAZ-2022

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**Keynote Speakers (International)**

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**Dr. Abdul Shakoor Chaudhry**  
School of Natural and Environmental Sciences,  
Newcastle University, UK



**Prof. Dr. Zeliha Selamoglu**  
Professor / Chairperson  
Department of Medical Biology,  
Nigde Omer Halisdemir University, Turkiye



**Dr. Lai Ngit Shin**  
Institute for Research in Molecular Medicine,  
Universiti Sains Malaysia, Pulau Pinang, Malaysia



**Dr. Ilknur Ucak**  
Faculty of Agricultural Sciences and Technologies,  
Nigde Ömer Halisdemir University, Turkiye



**Prof. Dr. Volkan Eyupoglu**  
Science Faculty,  
Çankırı Karatekin University, Turkiye



**Dr. Khatereh Khorsandi**  
Department of Photodynamic,  
Medical Laser Research Center,  
YARA Institute, ACECR, Tehran, IRAN

ICAZ-2022 17-18<sup>th</sup> October, 2022

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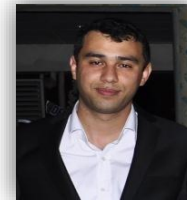
**Dr. Fatima Kies**  
Department of Earth and Environmental Sciences  
University of Milano-Bicocca, Italy



**Dr. Muhammad Asghar**  
Department of Medicine  
Karolinska Institute, Sweden



**Pro. Dr. Sevki Adem**  
Department of Biochemistry,  
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Osmaniye, Türkiye



**Dr. Shahram Dadgar**  
Iranian Fisheries Sciences Research  
Institute (IFSRI), Iran



**Prof. Dr. Taherah Mohammadabadi**  
Agricultural Sciences and Natural  
Resources University, Iran



**Prof. Dr. Yusuf TUTAR**  
Health Sciences Institute  
University of Health Sciences  
Istanbul, Türkiye

ICAZ-2022 17-18<sup>th</sup> October, 2022

**5<sup>th</sup> International Conference on Applied Zoology**  
**Keynote/Invited Speakers (National)**



**Prof. Dr. Shahid Mehmood Baig**  
Chairman, Pakistan Science  
Foundation, Islamabad



**Prof. Dr. Habib Bukhari**  
Vice Chancellor, Kohsar  
University Murree



**Prof. Dr. Muhammad Idrees**  
Vice Chancellor, University of Peshawar



**Prof. Dr. Naeem Tariq Narejo**  
University of Sindh, Jamshoro



**Prof. Dr. Muhammad Hidayat Rasool**  
Prof. Microbiology/ Registrar,  
GCUF



**Prof. Dr. Mushtaq Ahmad**  
Department of Plant Sciences,  
QAU



**Prof. Dr. Ameer Fawad**  
Department of Chemistry,  
GCUF



**Prof. Dr. Muhammad Ishtiaq Ali**  
Department of Microbiology,  
Quaid-i-Azam University, Islamabad

ICAZ-2022 17-18<sup>th</sup> October, 2022

**5<sup>th</sup> International Conference on Applied Zoology**  
**Keynote/Invited Speakers (National)**



**Dr. Khizar Samiullah Malik**  
Department of Zoology,  
Ghazi University,  
Dera Ghazi Khan



**Prof. Dr. M. Aamer Mehmood**  
Department of Bioinformatics and  
Biotechnology,  
GCUF



**Dr. Asif Jamal**  
Department of Microbiology  
Quaid-i-Azam University, Islamabad



**Dr. Syed Qaswar Ali Shah**  
Department of Zoology, CUVAS



**Dr. Shahzad Ali Shahid Chatha**  
Department of Chemistry, GCUF



**Dr. Muhammad Shahid**  
Department of Biochemistry,  
University of Agriculture, Faisalabad



**Dr. Riffat Sultana**  
Department of Zoology, University  
of Sindh, Jamshoro



**Dr. Khalid Abbas**  
Department of Zoology, Wildlife and  
Fisheries, UAF

**ICAZ-2022** 17-18<sup>th</sup> October, 2022

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**Keynote/Invited Speakers (National)**

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**Dr. Saadat Majeed**  
Department of Chemical Sciences,  
BZU



**Dr. Azhar Rasul**  
Department of Zoology, GCUF



**Dr. M. Fayyaz ur Rehman**  
Department of Chemistry,  
UOS



**Dr. M. Furhan ul Haque**  
Department of Microbiology,  
Punjab University

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## Our Collaborators/Sponsored







K-01/ICAZ-2022

**Why whey? A dietary approach to the management of different health case**

Zeliha Selamoglu

Department of Medical Biology, Medicine Faculty, Niğde Ömer Halisdemir University, Niğde, Türkiye

**Abstract:**

Whey is a yellowish/greenish colour liquid which is a by-product of cheese making process and casein manufacture in the dairy industry. Whey can be obtained from any type of milk (i.e cow, goat, sheep, camel) by coagulation with chymosin enzyme (sweet whey) or mineral/organic acid (acid whey). Whey proteins are soluble and consisted of 20% of milk proteins including  $\alpha$ -lactalbumin,  $\beta$ -lactoglobulin, lactoferrin, lactoperoxidase, protease -peptones and bovine serum albumin. In recent years, whey proteins are gained popularity for their high nutritional quality, desirable sensory characteristics and excellent functional properties not only for food industry but also pharmaceutical and medicine scientist. For example commercial whey proteins are widely used as emulsifiers and stabilisers in the food industry, fortifying foods for increasing the nutritional quality of cheese, dairy desserts, bakery products, etc. on the other hand, whey proteins have immunomodulating properties, antimicrobial activity, prevention of cardiovascular diseases, improved muscle strength and body composition. In this work, it will be given information about production, utilization and health benefits of whey proteins.

**Keywords:** whey proteins, biological activity, pharmaceutical industry, whey protein isolates.

K-02/ICAZ-2022

**Identification of Antimalarial Compounds Isolated from Malaysian Soils (*Streptomyces* sp. H11809) and Their Mode of Actions**

Fauze Mahmud<sup>1,2</sup>, Ngit Shin Lai<sup>1</sup>, , Ping-Chin Lee<sup>2,3</sup>

<sup>1</sup> Institute for Research in Molecular Medicine, Universiti Sains Malaysia, Gelugor 11800, Malaysia.

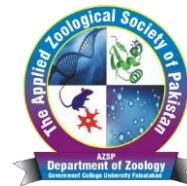
<sup>2</sup> Faculty of Science and Natural Resources, Universiti Malaysia Sabah, Kota Kinabalu 88400, Malaysia.

<sup>3</sup> Biotechnology Research Institute, Universiti Malaysia Sabah, Kota Kinabalu 88400, Malaysia.

**Abstract:**

Malaria is one of the most significant infectious diseases in the tropics that claims around half-million lives annually, mainly due to *Plasmodium falciparum* infections. The recent emergence of drug-resistance strains against artemisinin (the final effective antimalarials) in Africa further complicates the problem. Hence, there is an utmost need to identify a new antimalarial compound with a novel mode of action (MoA). This study was conducted to identify new antimalarial compounds from natural products of six Malaysian soil microorganisms. Their extracts were shown to inhibit human GSK-3 $\beta$  (Hs GSK-3 $\beta$ ) and exerted potent antimalarial activity. Overall, 14 antimalarials were identified/suggested from Malaysian soil microorganisms. Dibutyl phthalate (DBP) produced by *Streptomyces* sp. H11809 exerted inhibitory activity against human GSK-3 $\beta$  (Hs GSK-3 $\beta$ ) and *Plasmodium falciparum* 3D7 (Pf 3D7) malaria parasites. The current study aimed to determine DBP's plausible mode of action against Hs GSK-3 $\beta$  and Pf 3D7. Molecular docking analysis indicated that DBP has a higher binding affinity to the substrate-binding site (pocket 2; -6.9 kcal/mol) than the ATP-binding site (pocket 1; -6.1 kcal/mol) of Hs GSK-3 $\beta$ . It was suggested that the esters of DBP play a pivotal role in the inhibition of Hs GSK-3 $\beta$  through the formation of hydrogen bonds with Arg96/Glu97 amino acid residues in pocket 2. Subsequently, an in vitro Hs GSK-3 $\beta$  enzymatic assay revealed that DBP inhibits the activity of Hs GSK-3 $\beta$  via mixed inhibition inhibitory mechanisms, with a moderate IC<sub>50</sub> of 2.0  $\mu$ M. Furthermore, the decrease in Km value with an increasing DBP concentration suggested that DBP favors binding on free Hs GSK-3 $\beta$  over its substrate-bound state. However, the antimalarial mode of action of DBP remains unknown since the generation of a Pf 3D7 DBP-resistant clone was not successful. Thus, the molecular target of DBP might be indispensable for Pf survival. We also identified Nocardamine as another active compound from *Streptomyces* sp. H11809 chloroform extract. It showed potent antimalarial activity with an IC<sub>50</sub> of 1.5  $\mu$ M, which is ~10-fold more potent than DBP, but with no effect on Hs GSK-3 $\beta$ . The addition of  $\geq 12.5$   $\mu$ M ferric ions into the Pf culture reduced Nocardamine antimalarial activity by 90% under in vitro settings. Hence, the iron-chelating ability of Nocardamine was shown to starve the parasites from their iron source, eventually inhibiting their growth. (371 words)

**Keywords:** GSK-3 $\beta$  inhibitors; antimalarial; dibutyl phthalate; iron-chelating; mixed inhibition; Nocardamine.



**K-03/ICAZ-2022**

**V(V) removal by symmetrical imidazolium salts with and environmental friendly aspect**

Volkan Eyupoglu<sup>1</sup>, Aydin Calkap<sup>1</sup>, Civan Sagsoza, Muddather Abdelwahab Hassona<sup>2</sup>

<sup>1</sup>Department of Chemistry, Faculty of Science, Cankiri Karatekin University, 18100 Cankiri, TURKEY.

<sup>2</sup>Department of Chemistry, Faculty of Education, Alzaim Alazhari University, postal code Khartoum North, Sudan.

**Abstract:**

In our study, we were to aim the development of a new technique for separation of V(V) with 1,3-didodecyl imidazolium bromide and 1,3-ditetradecyl imidazolium bromide salts as a carrier from acidic aqueous solutions. Some executive parameters affecting the extraction and back-extraction of the V(V) that are feed phase pH, extractant concentration, phase ratio, extraction time interval, complexing agent "4-(2-pyridylazo) resorcinol (PAR)" concentration, stripping phase type and concentration was also optimized. In optimum conditions, the effect of initial V(V) ion concentration and the effect of interfered ions also was investigated. As a result, longer alkyl chain substituted imidazolium bromide salt was determined favorable extractive agent compared with shorter one due to its higher hydrophobicity and more steric coherence with V(V) ion.

**Keywords:** Selective solvent extraction, V(V) separation and removal, imidazolium salts, alkyl chain length dependent separation, ionic liquids. We will add a numerical results depend on the discussion section

**K-04/ICAZ-2022**

**An overview on antimicrobial photodynamic therapy**

Khatereh Khorsandi

Department of Photodynamic, Medical Laser Research Center, Yara Institute, ACECR, Tehran, Iran

**Abstract:**

Antimicrobial Photodynamic Therapy (aPDT) is based on application of three important parts including photosensitizer (PS), light at specific wavelength and oxygen which offers advantages over conventional antimicrobial treatments. In general, mechanism of aPDT action on microorganisms is light activated PS generates ROS, which mainly result in the killing of bacteria cells. PDT can use for treatment of different microorganisms such as bacteria, virus, and fungus with low side effects. The use of nano-vehicles is a promising strategy in potentiating aPDT by improving photosensitizer solubility, stability and targeting. Numerous studies are ongoing to determine the optimal combination approaches with other antimicrobial treatments. To conclude, more work is required for improvement of aPDT to bring it into clinics.

**Keywords:** Antimicrobial Photodynamic Therapy, Photosensitizer, Bacterial resistance, Combination Therapy, Nanoparticle

**K-05/ICAZ-2022**

**Anti-ageing effects of elite football and team handball trainings**

Muhammad Asghar<sup>1</sup>, Marie Hagman<sup>2</sup>, Bjørn Frstrup<sup>2,3</sup>, Magni Mohr<sup>2,3,4</sup>, Peter Krstrup<sup>2,3,4,5,6</sup>.

<sup>1</sup> Department of Biology, Lund University, Sweden.

<sup>2</sup> Department of Sports Science and Clinical Biomechanics, SDU Sport and Health Sciences Cluster (SHSC), Faculty of Health Sciences, University of Southern Denmark, Campusvej 55, 5230 Odense, Denmark.

<sup>3</sup> Institute of Sports Medicine Copenhagen, Bispebjerg Hospital, 2400 Copenhagen, NV, Denmark.

<sup>4</sup> Danish Institute for Advanced Study (DIAS), University of Southern Denmark, Odense, Denmark.

<sup>5</sup> Sport and Health Sciences, St Luke's Campus, University of Exeter, Exeter EX1 6JA, UK.

<sup>6</sup> Shanghai University of Sport, Shanghai, China.

**Abstract:**

For a long time, scientists believed that ageing was unmodifiable process, which happened at the same rate for everyone. However, over the past decades researchers has shown that a variety of genes are associated with longer lifespan through different mechanisms in both mice and other mammals. A growing body of research published over the past 10 years also suggests that ageing can be influenced by behavioural changes, such as calorie restriction and lifestyle changes. This has raised the exciting possibility that we might be able to slow the ageing process.

Regular physical activity can make a big impact on both health span and lifespan. Beneficial effects of regular exercise have been demonstrated to reduce the risk and severity of several lifestyle diseases, such as cardiovascular diseases, type 2 diabetes, metabolic syndrome, osteoporosis, and cancer. Football training efficiently combines endurance training, aerobic high-intensity interval training (HIIT), and resistance training in one activity and has been shown to have positive effects on cardiovascular, metabolic, and musculoskeletal fitness (Krustrup et al., 2019).

Here we have investigated whether team football and team handball training slowdown cellular aging in women in a cross-sectional study of 129 healthy no smoking women, including young elite football players (YF, n=29), young untrained controls (YC, n=30), elderly team handball players (EH, n=35) and elderly untrained controls (EC, n=35). Our results show that young elite football players have ~23% longer telomeres and higher mtDNA copy number compared to young untrained controls, while elderly team handball players showed healthy mitochondria compared to elderly untrained controls. These cellular adaptations were also positively correlated with VO<sub>2</sub>max and the amount of weekly exercise, emphasizing the importance for these women, irrespective of age, to maintain a reasonable fitness and activity level (Hagman et al. 2021).



We expanded our study by performing RNA-seq analysis using illumina nextseq 550 sequencing platform to understand how football and team handball training impact the global gene expression pattern. Our preliminary results from the transcriptomic analysis show 51 genes were differentially expressed between young football players (YF) compared to young untrained controls (YC), including telomere maintenance genes (POT1 and TERT). While 46 genes were differentially expressed between elderly team handball players (EH) compared to elderly untrained control (EC). By comparing all the four groups, our systematic analysis identified 19 genes that were associated with physical training. We further aim to take holistic approach, performing system biology analysis, combining epigenetics, proteomics, transcriptomics, metabolomics and phenomics to understand the molecular mechanism underlying the anti-aging mechanisms in elite football and team handball women.

1. Krusturup P. & Krusturup B. R. et al., British J. Sports Med 2019.
2. Hagman M., Krusturup P., Asghar M. et al. Scientific Reports 2021.

**K-06/ICAZ-2022**

**Antimicrobial effects of chitosan coating supplemented with cinnamon essential oil on the rainbow trout fillets**

İlknur UCAK

Nigde Ömer Halisdemir University, Faculty of Agricultural Sciences and Technologies, Nigde, Turkey

**Abstract:**

In the present study, antimicrobial effects of chitosan coating enriched with cinnamon essential oil (CEO) emulsion on the rainbow trout fillets were evaluated. For this purpose, chitosan coating solutions were prepared with (CEO) and without (CF) 0.5% concentration of cinnamon essential oil emulsion. Fish fillets were coated with these chitosan solutions and stored at 4±1°C for 15 days. Total psychrophilic bacteria (TPB), total mesophilic bacteria (TMB), total Enterobacteriaceae and total lactic acid bacteria (LAB) were assessed. According to the results, the TPB count of the C and CF groups were reported as 7.32 and 7.04 log CFU/g at the end of storage, whereas this value was found as 5.97 log CFU/g in the CEO group. Total mesophilic bacteria count of fish fillets coated with chitosan solution containing CEO was found as 5.06 log CFU/g at the end of the storage. The highest LAB counts were determined in C and CF groups during the storage period. At the end of the storage, CEO group showed the lowest LAB count as 4.17 log CFU/g. The results of the study showed that the incorporation of cinnamon essential oil emulsion in the chitosan coating was effective to inhibit microbial growth in the rainbow trout fillets during the refrigerated storage.

Keywords: chitosan coating, rainbow trout, cinnamon oil, microbial quality

**K-07/ICAZ-2022**

**Smart Tuna Aquaculture**

Abdel Monaim Fakhry kame<sup>1</sup>, Mohamad<sup>1</sup> and Kies Fatima<sup>2</sup>

<sup>1</sup>Department of mechanical power engineering, Cairo University, Egypt

<sup>2</sup> Dipartimento di Scienze dell' Ambiente e del Territorio e di Scienze della Terra, Università Degli Studi di Milano-Bicocca, Italy.

**Abstract**

Tuna export and import as raw fish and processed foods are very important. But separating tuna manually is very stressful for the workers. This research aims to propose an automated system for classifying tuna species according to their images by artificial intelligence (AI), comparing it with statistical analysis (SPSS) using artificial neural networks (ANN). The results were 97.32% more precise in the classification methods, monitoring, and collection in terms of precision and classification of tuna. The results of the comparison with the statistical analysis were approximately 5% and were technically acceptable.

Keywords: Tuna aquaculture; Tuna Fisheries, ANN, AI

**K-08/ICAZ-2022**

**The Investigation of Inhibition Effect of Some Phenolic Compounds on Hexokinase-II Enzyme Activity**

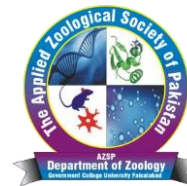
Şevki ADEM, Reyhan EYÜPOĞLU

Department of Chemistry, Faculty of Sciences, Çankırı Karatekin University, 18100 Çankırı, Turkey

**Abstract:**

Cancer is located in the first location among the World health problems and it became the topic for lots of different researches. Performed studies reported that the biochemical changes in the glycolysis metabolism that occurred inside the cancer cell can be guided to the cancer diagnosis and therapy (1). In the present studies show that cancer cells consume glucose 10-15 times more than normal cell to provide their energy demand. The pathway of this energy production is known as glycolysis (2, 3). With the inhibition of the glycolysis pathway, we can both disrupts the metabolic balance of cancer cell and limits the energy sources of the cancer cell. Heksokinase II (HK II) is one of the new target enzymes in cancer therapy (4). For these purposes, in the present studies, the inhibition of HK-II enzyme, which is the first rate restricting step of the metabolic pathway of the glycolysis, have been studied by using some phenolic compounds. Compounds exhibited inhibitor effects against HK2 with IC50 values 2-100 µM range. Also, we conducted docking studies to understand the interaction mechanism between compounds and enzyme active sites.

Keywords: Heksokinase II, Glycolysis metabolism, Phenolic compounds



K-10/ICAZ-2022

### Mushrooms and their Medicinal Effects

Mustafa Sevindik

<sup>1</sup>Osmaniye Korkut Ata University, Department of Food Processing, Osmaniye, Turkey

#### 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-2022

### Dissolving Combinatory Effects to Make Innovative Breast Cancer Drugs

Yusuf Tutar

<sup>1</sup>Division of Biochemistry, Department of Basic Pharmaceutical Sciences, Faculty of Pharmacy,

<sup>2</sup>Molecular Oncology Division, Health Sciences Institutes,

<sup>3</sup>Personalized and Immunotherapy Practice and Research Center,

<sup>4</sup>Validebağ Experimental Medicine Practice and Research Center, University of Health Sciences, Istanbul, Turkey

#### Abstract:

Background: Molecular mechanism of breast cancer and its immune subtypes has been searched in my lab for two decades. Non-coding RNAs, interaction of proteins between cellular organelles, energy metabolism, cell death, and cancer stem cells affect small molecule drug candidates' function.

Materials and Methods: Cell cytotoxicity and proliferation and QPCR arrays provide a comprehensive approach to identify cancer and signaling pathways. Cell division and cellular death assays along with heat shock protein biochemical assays provide preliminary data for in vivo experiments. Resistant cell lines provide complementary approaches in drug development. Novel salicylate and indazole derivatives from aryl hydrazonal compounds were synthesized. For anti-cancer screening with pre in silico studies. **Results:** The compounds are effective in suppressing cancer stem cells (NANOG, STAT3, SOX2, POU5F1) in most of the immune types. Further, the compounds augment cytotoxicity and drive doxorubicin resistant cell to apoptosis. The derivatives also induce immunity and are have potential to be an innovative drug.

Conclusion: Aryl hydrazonal compounds have superior properties as evidenced through ADME and anticancer properties. The compounds are in patenting process and are effective at lower micromolar concentration.

K-17/ICAZ-2022

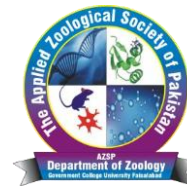
### Lumpy Skin Disease: What We Need to Know?

Muhammad Hidayat Rasool<sup>1</sup>, Muhammad Saqalein<sup>1</sup>

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

#### Abstract:

Pakistan is an agricultural country and sustainable growth of this sector is crucial for its food security and rural development. It contributes to 22.7% of total GDP and provides employment to approximately 37.4% of labour force. Livestock is the backbone of agriculture with a share of 61.89% and 14.04% in GDP during 2021-22. Among livestock population, maximum number is of cattle (53.4 Million) with a significant contribution in milk (24,238 thousand tons) and meat (2,461 thousand tons) according to the Economic Survey of Pakistan 2021-22. Unfortunately, the cattle industry in Pakistan has always been confronted with a number of infectious and non-infectious diseases in spite of all possible biosecurity measures, disease surveillance and immunization. Among infectious diseases, viral diseases are of paramount importance due to heavy morbidity and mortality which results in huge economic losses in terms of milk and meat. Currently an emerging threat to the livestock worldwide: Lumpy Skin Disease (LSD) in cattle is one of the infectious, fatal diseases with 5-50% morbidity but usually low mortality. The greatest loss is due to reduced milk yield, loss of condition, and rejection or reduced value of the hide. It is caused by Capri poxvirus which is genetically related to goat pox and sheep pox virus family. Disease is originally found in Africa but also has spread to Eastern Europe, Middle East and Asia including recent outbreak in Pakistan especially in Sindh Province. It is estimated that five million dairy farmers and meat sellers are suffering from the economic fallout of recent outbreak of LSD which has caused a national concern. Blood-feeding insects may act as mechanical vector with three species of African hard ticks as its biological vector. Its incidence is highest in wet summer weather but also occurs in winter. Infected cows have fever, lacrimation, nasal discharge, and hypersalivation, followed by the characteristic lesions



on the skin and other body parts. The nodules are well circumscribed, round, slightly raised, firm and painful and involve the entire skin and mucosa of GI, respiratory and genital tracts. It is usually diagnosed through histopathology, virus isolation and PCR. Attenuated viral vaccines may be used for immunoprophylaxis. Unfortunately, most of the farmers in Pakistan are illiterate and are not aware of prophylactic measures that are vital to stop the progression of disease. Thus, educating cattle farmers on simple things like cleaning wounds, applying antibiotics and properly isolating sick animals should be the primary focus of livestock and dairy development department alongside taking measures for proper diagnosis and immunization to help implement a better disease control program against LSD in the country.

**Words Key:** Lumpy Skin Disease; Capri pox Virus, Cattle; Pakistan

K-19/ICAZ-2022

**Novel ciprofloxacin derivatives as anticancer agents: Synthesis, anti-proliferative effect on human cancer cell lines and structure-activity relationship**

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<sup>2</sup>Department of Zoology, Government College University Faisalabad, 38000-Faisalabad, Pakistan.

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<sup>4</sup>Department of Pharmacology, Government College University Faisalabad, 38000-Faisalabad, Pakistan.

**Abstract:**

Cancer is a fatal disease throughout the world. Overall burden of cancer incidence and mortality is rapidly progressing in developing countries. Presently available cytotoxic agents are connected with a lot of side effects. In this work, a series of novel structural hybrids of ciprofloxacin linked with a variety of anilides and oxadiazoles were synthesized. Moreover, the synthetic pathway of ciprofloxacin-based  $\beta$ -amino alcohols and carboxamide/sulfonamide derivatives of ciprofloxacin have also been described. After that antitumor activity of these derivatives was assessed against breast (MCF-7), lung (A549), and liver (Huh-7 and Hep G2) cancer cell lines. Preliminary results of MTT assay and structure-activity relationship study exhibited that among all the series ciprofloxacin-based  $\beta$ -amino alcohols are superior in cytotoxic potential as compared to the other synthesized series. The representative compounds were then in-silico modeled to explain the potential mechanistic insights for their anticancer activity. Strong inhibition of topoisomerase II with higher binding affinity emphasized the significance of structural hybrids of ciprofloxacin which can be helpful in the near future to develop potent anticancer agents.

K-20/ICAZ-2022

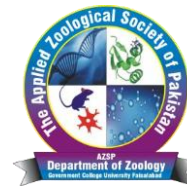
**Biodegradation of plastics: An Ecofriendly waste management approach**

Muhammad Ishtiaq Ali

Department of Microbiology, Quaid-i-Azam University Islamabad

Plastics are high molecular weight polymers. Considering the increasing load in the environment, biodegradation of plastics by microorganisms and enzymes seems to be the most effective process. Oxidative enzymes play significant role in biodegradation of recalcitrant materials. Fungi are important among microorganisms for the production of extracellular enzymes. Limited production and slow release of the particular enzymes are the limiting factor. The study was aimed for enhanced production, molecular characterization of oxidoreductases for plastic biodegradation. Molecular examination as well as the heterologous expression of ligninolytic enzymes i.e. laccase and lignin peroxidase were carried out. These enzymes are mainly produced under nutrient starved condition i.e. carbon or nitrogen limited medium. Microscopic examination of these enzymes producing organism showed that they are filamentous, coenocytic, aseptate and spore producing organisms. An experiment was set up by adding the PVC polymer in the MSM media and inoculating the respective enzymes after screening and purification. The Fourier transform infrared (FTIR) spectroscopy and Scanning electron microscopy (SEM) results of enzyme treated plastic films revealed the structural changes as compared to control (without enzyme treatment). Enzyme assay of both enzymes such as laccase and lignin peroxidase were carried out with vertryl alcohol and DMP as substrates. Current study results suggested, that Microorganisms have the potential for biodegradability of recalcitrant plastic waste and can be used for bioremediation at large scale

**Keywords:** Biodegradability, Lignin peroxidase, FTIR,



K-21/ICAZ-2022

**Bioprospecting of Indigenous Microalgae & Cyanobacteria for the Sustainability of Food-Water-Environment  
Nexus: Challenges & Opportunities**

Muhammad Aamer Mehmood

Bioenergy Research Center, Department of Bioinformatics and Biotechnology, Government College University Faisalabad, Faisalabad 38000, Pakistan

**Abstract:**

Cultivating microalgae and cyanobacteria using city wastewater as low-cost growth media offers a *three-in-one* set of advantages including pollutant removal, mitigation of atmospheric carbon, and subsequent utilization of the biomass to produce biofuels and other high-value bioproducts. The present study was focused on employing microalgae/cyanobacteria for multiproduct algal biorefinery using city wastewater as low-cost growth media. Several algal/cyanobacterial strains including *Pseudoscillatoria coralii* BERC01, *Chlamydomonas* sp. BERC09, *Bracteacoccus* sp. *Acaryochloris* sp. BERC03, *Pleurocapsa* sp. BERC04, *Oscillatoria* sp. BERC06, *Chlamydomonas* sp. BERC07, and *Haematococcus* sp. BERC09, and *Plectonema terebrans* BERC10 were characterized for their potential for wastewater cultivation, atmospheric carbon mitigation, and production of biofuels and high-value industrial products. All strains exhibited excellent wastewater cultivation and pollutant removal potential and respectively produced 1.9 g L<sup>-1</sup>-2.23 g L<sup>-1</sup> with 3.54-4.2 g L<sup>-1</sup> of CO<sub>2</sub> fixation ability, along with 100% removal of suspended solids, 50-100% removal of total nitrogen and phosphorus. Moreover, wastewater cultivation improved biomass and lipid production without having any negative impact on the biodiesel composition. Furthermore, 62.9-300 mg g<sup>-1</sup> of phycobilins were produced by these strains. Besides, each step starting from cultivation, harvesting to biomass processing was studied to improve cost-effectiveness via establishing a cascading biorefinery in a circular biorefinery paradigm. The data demonstrated suitability of urban wastewater for enhanced biomass production while keeping the energy-water-environment nexus sustainable.

**Keywords:** microalgae & cyanobacteria; urban wastewater; low-cost cultivation; multiproduct cascading biorefinery; circular bioeconomy

K-22/ICAZ-2022

**Fossil Proboscidean and their evolutionary history from the Siwalik Group of Pakistan**

Khizar Samiullah<sup>1\*</sup>, Riffat Yasin<sup>2</sup>, Rana Mehroz Fazal<sup>1</sup>, Tehreem Raza<sup>1</sup>

<sup>1</sup>Department of Zoology, Ghazi University, DG Khan, Punjab, Pakistan

<sup>2</sup>Faculty of Veterinary and Animal Sciences, MNSUA, Multan, Pakistan

**Abstract:**

We have described proboscideans fossil remnants which belongs to six species: *Prodeinotherium pentapotamiae*, *Gomphotherium browni*, *Choerolophodon corrugatus*, *Protanancus chinjiensis*, *Stegolophodon stegodontoides* and *Elephas planifrons*. The described specimens are collected from six different localities of the Siwaliks. These localities are Bhilomar, Chinji type section, Lawa, Dhok Bun Ameer Khatoon (Chinji Formation), Ochri (Dhok Pathan Formation) and Rathia (Pinjor Formation), belongs to the Lower to Upper Siwaliks, district Chakwal and Jhelum, Punjab, Pakistan. The specimens were collected from these localities after extensive fieldwork from 2015 to 2020, which confirms the presence of large mammalian fauna during the Middle Miocene to Late Pleistocene. *Prodeinotherium pentapotamiae* is rare taxa in the Middle Siwaliks of Pakistan, first time discovered from new fossil section Satroma wali dhal in the vicinity of the Dhok Bun Ameer Khatoon locality. Bhilomar is a less explored fossil locality belongs to the Chinji Formation, *Gomphotherium browni* and *Choerolophodon corrugatus* is reported from the Chinji type section. A beautiful juvenile mandibular ramus of *Protanancus chinjiensis* has been recovered first time from Lawa. *Stegolophodon stegodontoides* were also recovered first time from the Ochri which belongs to the Dhok Pathan Formation and *Elephas planifrons* were recovered from Rathia which belongs to Pinjor Formation dated as Plio-Pleistocene age of Upper subgroup of Siwaliks. Based on palaeoenvironment and stratigraphy the age of these localities is suggested as Miocene to Pleistocene. The recovered proboscideans fossil fauna indicates about the climatic changes and confirm that more seasonal extensive grasslands and savannah like ecosystem was present at that time.

**Keywords:** proboscideans, fossil, fauna, paleoenvironment, savannah, Siwaliks, Pakistan



K-24/ICAZ-2022

**Microbial surfactants: Structural diversity, unique properties and biotechnological potential**

Asif Jamal

Department of Microbiology, Quaid-i-Azam University, Islamabad

**Abstract:**

Biosurfactants are surface active metabolites produced by different microorganisms with astonishing chemical diversity and physiochemical properties. Because of their superior properties at lower cmc values, they are becoming important component of modern biotechnological industry. Biosurfactants are now being used as antimicrobial, antifoaming, wetting and dispersing agents. They offer several advantages over the chemical regimes such as better adsorption at interfaces, low toxicity, biodegradability and high performance under hostile chemical environments. Biosurfactants yield thermodynamically stable supramolecular aggregates in the aqueous system and can improve the bioremediation of organic contaminants and increases drug delivery rate of hydrophobic drugs. Fascinating details has been emerging advancing scientific knowledge of these versatile bio-molecules with great possibility of developing innovative industrial products.

**Keywords:** Biosurfactants, drug delivery, micelles, antimicrobial agents, bioremediation.

K-25/ICAZ-2022

**Endophytic Microflora: An Untapped Source of Bioactives Moieties for their Application in Therapeutics and Plant Sciences**

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<sup>1\*</sup>Department of Biochemistry, University of Agriculture, Faisalabad

<sup>2</sup>Department of Biochemistry, Government College University, Faisalabad

**Abstract:**

*Endophytic mycoflora* are colonize in the internal tissues of plants during a part or all of their life cycle without producing apparent harm to their hosts. They can be originally isolated from any microbial or plant growth medium. Endophytic microbes produced natural products these products have unique structures and great bioactivities. Endophytic microflora from plants use as a sources of bioactive compounds. These compounds related to diverse structural groups such as alkaloids, benzopyranones, flavonoids, furandiones, peptides, polyketones, phenols, terpenoids and xanthenes which have been shown antitumor effects. Recently, more researches focus on the endophytic fungi act as an anticancer agents. Worldwide cancer is a lethal disease containing abnormal cell growth. Endophytic fungi have become a part of modern drug discovery process due to huge variety of chemicals compounds they produce. Therefore, endophytes represent as a chemical factory for the bioactive compounds which have a battery of biological potential. In this study, our group is more interested to isolate the bioactives from the LAB and other endophytes for their application to mitigate the stress in plants with special reference to maize. Microbes were cultured, inoculated and processed for the optimal production of metabolites. Then these lead molecules were subjected to different biological and toxicological assays. Finally, these metabolites were applied to mitigate the stress in maize and significant results were obtained.

K-26/ICAZ-2022

**Development of Bioactive Rich Process Foods: Challenges and Opportunities**

Shahzad Ali Shahid Chatha

Director International Linkages, Government College University, Faisalabad, Pakistan

**Abstract:**

There has been a remarkable resurgence of interest in natural product based food items from the last few decades. With the outstanding/developments in the areas of separation science, spectroscopic techniques, and microplate-based ultrasensitive in vitro assays, natural product research is enjoying renewed attention for providing novel and interesting chemical scaffolds. The various available hyphenated techniques (GC-MS, LC-PDA, LC-MS, LC-FTIR, LC-NMR, LC-NMR-MS, CE-MS) have made possible the preisolation analyses of crude extracts or fractions from different natural sources, isolation and on-line detection of natural products, chemotaxonomic studies, chemical finger printing, quality control of herbal products and metabolomic studies. This talk will presents, with practical examples, a general overview of the processes involved in natural product research, starting from extraction to determination of the structures of purified products and their biological activity.

**Keywords:** Natural products; secondary metabolite; extraction; isolation; bioassay.

K-27/ICAZ-2022

**Biodiversity and Conservation of Orthoptera in Times of Global Change in Pakistan**

Riffat Sultana

Department of Zoology, University of Sindh, Jamshoro, Pakistan

**Abstract:**

The Orthoptera are the most species-rich group among the lower neopterans, and there is a tremendous amount of diversity in biology, ecology, and morphology in the order. Orthopterans can be found in almost every conceivable habitat. Besides some of the obvious ones, such as temperate grasslands and tropical rainforests, many orthopterans thrive in unusual and unexpected habitats. Numerous orthopterans are adapted to the xeric environment while some like Tetrigidae are found near water channels, where they feed on algae and mosses. Unfortunately, climate change alters biodiversity, agricultural production, and food security at large scale. Many species increased in alarming ratios like *Schistocerca gregaria* (Forskål, 1775) (Desert locust) its recent upsurge has had an impact on East Africa and the Middle East as far as India & Pakistan. It has significantly affected and slowed down many aspects of the Pakistani economy. Swarms of locusts have infested many areas and caused immense damage to all types of crops mostly wheat, rice, sugarcane, cotton and vegetable. Similarly, many endemic species are under extinction i-e *Grylloblatta africana* Palisot de beauvois 1805 & *Grylloblatta kimbasi* Baccetti, 1992. This paper is an attempt to provide a diagnostic list for extinct species in Pakistan, which could prove helpful to scientists and **conservation management** system (CMS) practitioners in the region. We also provided observational data on taxonomic descriptions, host plants, occurrence, and distribution, along with some anthropogenic threats that cause decline in their population.

K-31/ICAZ-2022

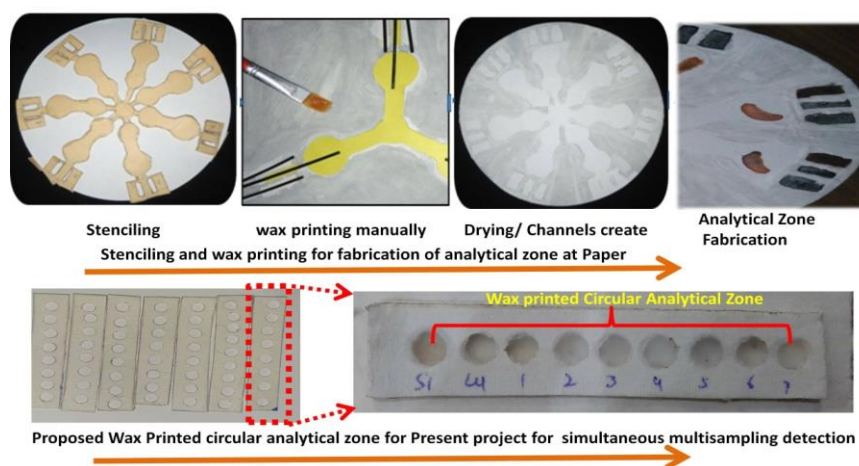
**Methods and Techniques for the Sensing of Biologically Important Molecules**

Saadat Majeed\*

Division of Analytical Chemistry, Institute of Chemical Sciences,  
Bahauddin Zakariya University Multan, Pakistan.

**Abstract:**

Research and development of sensors is becoming the most extensively studied discipline for detecting target biomolecules with high accuracy, selectivity, and signal-to-noise ratio. The sensor technologies have huge multidisciplinary contributions to the world. These sensors are contributing in health and medicine such as point of care detection of bio-markers for early diagnosis of diseases and for other biomolecules. The sensors are designed to produce an electronic signal which is directly proportional to the concentration of a particular biochemical or a set of biochemical in the presence of interfering species. These sensors can be classified as electrochemical, optical, thermal, and piezoelectric sensors. Various sensing platform has been designed for the detection of bio-molecules using different materials and techniques. The methods show ability to detect the analyte concentration at nanomolar level.



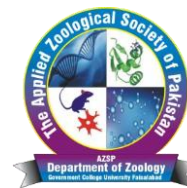
**Figure:** Printing and fabrication of paper-based sensor for detection of biologically important molecules



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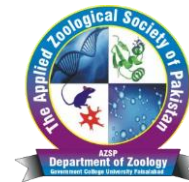
**Investigating the bacterial mitigation of greenhouse gases**

Muhammad Farhan Ul Haque

School of Biological Sciences, University of the Punjab, Lahore

**Abstract:**

Substantial amount (500-600 Tg) of the potent greenhouse gas methane is released to the atmosphere each year, contributing to the 25% of global warming. Geological seepage of natural gas from buried geological formations into the atmosphere is a major source of methane as well as photochemical pollutants (e.g., ethane), and ozone precursors (e.g., propane). A unique group of bacteria, methanotrophs, are crucial in mitigating the global warming effects of methane, as they oxidise around 50% of methane in the biosphere. The nature of methanotrophs is usually obligate (i.e., grow only on methane and not on other alkanes). Bacteria that grow on the gaseous alkanes (ethane and propane) in natural gas have also been characterised (propanotrophs), but they have not been reported as methane oxidisers. Only *Methylocella*, a unique and remarkable facultative methanotroph is capable of growing on methane as well as other components of natural gas. Therefore, we hypothesised that *Methylocella* are prevalent at these natural gas seeps sites and play a major role in consuming all components of natural gas. We surveyed several environments emitting biogenic methane or thermogenic natural gas for the relative abundance of methanotrophs. Our data revealed that *Methylocella*, a methanotroph that have been overlooked in the past, was the most abundant in these natural gas seep sites. Active bacterial communities in these environments were investigated by DNA stable isotope probing (SIP) analyses in microcosms consisting of environmental samples from natural gas seeps incubated under <sup>13</sup>C and <sup>12</sup>C labelled C substrates. The results showed that *Methylocella* are actively involved in methane utilisation and possibly utilise other components of gas released from natural seeps, the environments that have previously been ignored in this regard.



O-7/ICAZ-2022

**Insecticides Resistance to the Cotton Whitefly (*Bemisia tabaci* Genn) under Laboratory Conditions**

Zeeshan Javed<sup>1</sup>, Bilal Rasool<sup>1</sup>, Usama Saeem<sup>1</sup>, Muhammad Imran<sup>1</sup>, Amna Batool<sup>1</sup>, Muhammad Asrar<sup>1\*</sup>

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

**Abstract:**

Insecticide resistance progression is mainly dependent on chemical control techniques used for the management of whitefly, *Bemisia tabaci* (Genn.). Five insecticides (phyriproxifen, acetamiprid, chlorfenapyr, imidacloprid, diafenthiuron) were examined for three years during (2017 to 2019) to examine the resistance level against field population of whitefly *B. tabaci*. Phyriproxifen exhibited low values at exposure of 24 hours, 48 hours and 72 hours respectively. It proved to be less resistant and extremely effective for the control of whitefly on cotton. acetamiprid revealed gradual value respectively at 24, 48 and 72 hours correspondingly less but more than the Chlorfenapyr and Imidacloprid towards the whitefly. However, diafenthiuron demonstrated high values as compared to the other insecticidal during the experiments. Therefore, in a conclusion, results exhibited that the Phyriproxifen proved to be more effective as compared to other tested insecticides. Further, diafenthiuron with high LC<sub>50</sub> than the rest of the four insecticides with more resistance and less effectiveness.

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

O-8/ICAZ-2022

**Bovine Colostrum: An meliorant for Muscle Growth and Fitness**

Sana Rauf<sup>1</sup> and Huma Umbreen<sup>1\*</sup>

<sup>1</sup>Dept. of Nutritional Sciences, GC University Faisalabad.

**Abstract:**

Bovine colostrum (BC) is termed as early milk formed during first few days post-parturition by cows, in which a large number of macronutrients, micronutrients, immunomodulatory constituents, growth factors and immunoglobulins are present as compared to mature milk. Bovine Colostrum supplementation increases endurance and anaerobic performance with enhanced resistance that is responsible for overall progresses in exercise and physical activity. BC supplementation reduces muscle tissue injury due to extreme physical activity because of many growth factors presents in it. The important growth factor in BC is Insulin-like Growth Factor-I (IGF-I). Furthermore, BC supplementation may also increase muscle mass, muscular strength and improves fitness. Therefore the present study had been planned to check the effect of bovine colostrum on growth factors and performance of highly active males. For the purpose, forty male participants of age 18 to 35 were selected through convenient sampling technique and different amount of bovine colostrum powder were provided to them before their training. The participants have been highly active and they were not allowed to take any other supplement. One mile run test was done before and after supplementation to assess fitness. Blood samples were collected at the end of training and different biochemical tests were performed accordingly. The results of biochemical paramters showed significant increase in levels of Insulin like growth factor-1 and Serum creatinine and some variables of CBC and reduction in levels of Creatine kinase after 8 weeks supplementation of bovine colostrum ( $p \leq 0.05$ ) as compared to controlled group, while some parameters of CBC remain unchanged. The one mile run test results also showed a significant reduction in time taken to cover distance from pre to post. On the basis of the present study it can be concluded that bovine colostrum acts as an ameliorant for muscular growth as well as for fitness.

**Keywords:** Bovine colostrum; Insulin like growth factor-1; exercise performance; muscle mass

O-9/ICAZ-2022

**Identification of Banana and Pumpkin Peels Extracts as Antioxidant, Antimicrobial and Antihepatic Therapeutic Agents**

Khudeja Afroz<sup>1</sup>, Azhar Rasul<sup>\*</sup>, Syed Makhdoom Hussain<sup>1</sup>, Muhammad Asrar<sup>1</sup>, Mudassir Hassan<sup>1</sup>, Saba Riaz<sup>1</sup>, Sajid Abbas<sup>1</sup>

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

**Abstract:**

Banana peels (*Musa accuminata*) and Pumpkin peels (*Cucurbita mixta*) have many pharmacological activities. Both peels have been well documented for their medicinal uses but our adopted method for extracts preparation was green extraction technology that has very limited reported data. In our study, Antioxidant activity of the peels extracts was performed through DPPH assay. The antimicrobial assessment was conducted through well diffusion method against selected strains. Cytotoxic potential against hepatic cancer (HepG2 cells) was investigated through MTT assay. In present study, banana peels have shown antioxidant activity with IC<sub>50</sub> 184.5µg/ml but IC<sub>50</sub> for pumpkin peels could not be determined. Banana peels were more potent against *Aeromonas hydrophila* with inhibition zone 12mm having MIC≤375µg/ml and was inactive against *E. coli* and *Staphylococcus aureus*. Pumpkin peels have shown higher activity against *Salmonella enterica* with inhibition zone 11mm with MIC≤187.5µg/ml and was inactive against other strains. Furthermore, zone of inhibition of banana peels against *A. niger*



(11mm at 40mg with MIC  $\leq$ 187.5  $\mu$ g/ml) and it was found inactive against *F. avenaceum*. Similarly, inhibition zone of Pumpkin peels was against *A. niger* (14mm at 60mg with MIC  $\leq$ 187.5 $\mu$ g/ml). Pumpkin peels were active against HepG2 cells with IC<sub>50</sub> 43.157 $\mu$ g/ml but IC<sub>50</sub> of banana peels could not be determined. Overall results suggested that banana peels can be save and effective drug against *A. hydrophila* and *A. niger* related diseases and pumpkin peels as novel natural drug for hepatic cancer.

**Keywords:** Phytochemical, Antioxidant, Antimicrobial, Antihepatic cancer.

O-10/ICAZ-2022

**Impact of Seed Dressing, Botanical Extracts and Insecticides on Wheat Aphid Population and Natural Enemies**

Usama Saleem<sup>\*1</sup>, Muhammad Asrar<sup>1</sup>, Dilbar Hussain<sup>2</sup>, Abdul Ghaffar<sup>2</sup>, Saddam Hussain<sup>1</sup>, Saba Riaz<sup>1</sup>, Zeeshan Javed<sup>1</sup>

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

<sup>2</sup>Entomological Research Institute, Ayub Agricultural Research Institute, Faisalabad, Pakistan

**Abstract:**

Wheat (*Triticum aestivum*) is a major cereal crop in the world. Pakistan is the eighth largest wheat-producing country in the world. Wheat aphid is a destructive pest of the wheat crop. It causes damage by sucking cell sap, injecting a toxin into the plant, and spreading destructive plant viruses. The purpose of this study was to evaluate the effectiveness of different treatments against wheat aphid and their impact on natural enemies. Our results indicated that the wheat aphid population appeared at the end of January then gradually start to increase up to the first week of March and then decline by the end of March. Synthetic insecticides were found most effective against the aphid population with minimum infestation per tiller (2.87 and 3.17 aphids per tiller) respectively, while the aphid population in the control plot was maximum (14.87 aphids per tiller) during the first week of March followed by seed dressing with Argyle & Combinex and botanical extracts. The maximum population of natural enemies was observed in the control plot followed by botanical extracts, seed dressing, and synthetic insecticides. It may be concluded that botanicals are economical and environmentally safe product alternatives against wheat aphids; they must be implemented into an integrated management program.

**Keywords:** *Triticum aestivum*, seed dressing, botanical extracts

O-11/ICAZ-2022

**Efficacy of Probiotic Isolates on Growth and Hematological Analysis of *Oreochromis niloticus* Fingerlings**

Danish Riaz<sup>1\*</sup>, Syed Makhdoom Hussain<sup>2</sup>, Fayyaz Rasool<sup>1</sup>, Muhammad Nosheed<sup>1</sup>, Azher Rasool<sup>2</sup>, Adnan Khalid<sup>2</sup>, Nisar

Ahmad<sup>1</sup>, Muhammad Mudassar Shahzad<sup>1</sup>, Muhammad Zubair ul Hasan Arsalan<sup>2</sup>

<sup>1</sup> Department of Zoology, Division of Science and Technology, University of Education, Lahore, 54770 Pakistan

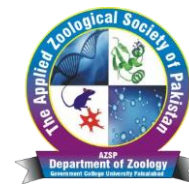
<sup>2</sup> Fish Nutrition Lab. Department of Zoology, Government College University Faisalabad 38000, Pakistan.

<sup>3</sup>Department of Zoology, University of Jhang, Jhang, Pakistan

**Abstract:**

This experiment was formulated to assess the efficiency of probiotics isolates on growth and hematological parameters of *Oreochromis niloticus* that was fed on microbial isolate strains based test diet. This commercial test diet was divided into seven test diet which were supplemented with different levels of probiotics (0,  $9 \times 10^8$ ,  $1.2 \times 10^9$ ,  $1.3 \times 10^9$ ,  $1.5 \times 10^9$ ,  $1.7 \times 10^9$  CFU) in fingerlings feed. The outcomes of the experimental work exposed that highest growth performance and most optimum hematological indices of *O. niloticus* fingerlings were found at  $1.2 \times 10^9$  CFU and  $1.5 \times 10^9$  CFU of probiotics respectively supplemented based test diets. It was also noted that supplementation of probiotics at  $1.2 \times 10^9$  CFU and  $1.5 \times 10^9$  CFU 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  $1.2 \times 10^9$  CFU and  $1.5 \times 10^9$  CFU is essential for maximum growth and hematology of *O. niloticus* fingerlings in SFM meal based diet.

**Keywords:** Growth, Hematology, Microbial isolates strains, *Oreochromis niloticus*



O-12/ICAZ-2022

**Partial Physio-Chemical Characterization and Identification of Microbial Strains from Gut of Major Carps**

Danish Riaz<sup>1</sup>, Ali Hassan\*, Syed Makhdoom Hussain<sup>2</sup>, Fayyaz Rasool<sup>1</sup>, Awais Maqsood<sup>2</sup>, Majid Hussain<sup>3</sup>, Muhammad Salman<sup>1</sup>

<sup>1</sup> Department of Zoology, Division of Science and Technology, University of Education, Lahore, 54770 Pakistan

<sup>2</sup> Fish Nutrition Lab. Department of Zoology, Government College University Faisalabad 38000, Pakistan

<sup>3</sup> Fish Nutrition Lab. Department of Zoology, Government College University Faisalabad 38000, Pakistan

**Abstract:**

Major carp's species are most diversified fish species among Cyprinidae in Pakistan. Various carp species are domesticated due to consumable choice in Asia and Europe. There are numerous number of probiotics and diversity of lactic acid bacteria reported. The present research aims to elucidating diversity of isolates from Major Carps i.e *Catla catla*, *Labeo rohita* and *Cirrhinus mrigala* species. However, the diversity of isolates from major carps is well documented in fresh water species of Pakistan. There are 7 isolates were purified from intestine of these species and morphologically characterized on MRS agar plates. Three strains formed halo-zone due to accumulation of CaCO<sub>3</sub> in vitro acid production. Seven bacterial strains (DZ1, DZ2, DZ3, DZ4, DZ5, DZ6, DZ7) identified after 16 rRNA gene and commercially sequence for phylogenetic analysis. The result concluded the bacterial diversity from fresh water species (Major carps) in Pakistan. This study also suggested, further investigation may prove strains novel.

O-17/ICAZ-2022

**Peanut Husk and Leaf Fumitory Extracts as Antioxidant and Antimicrobial Agents**

Laiba Ameen<sup>1</sup>, Azhar Rasul\*, Syed Makhdoom Hussain<sup>1</sup>, Amna Sajjad<sup>1</sup>, Muhammad Javid Iqbal<sup>1</sup>, Saba Riaz<sup>1</sup>, Khudeja Afroz<sup>1</sup>

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

**Abstract:**

Peanut husk (*Arachis hypogaea*) and Leaf Fumitory (*Fumaria parviflora*) have many pharmacological activities. Although both plants have been used for medicinal purposes but our adopted method for the preparation of these extracts has very limited reported data. This is the first study to investigate the therapeutic potential of these plants extracts by green extraction method against microbial diseases and antioxidant. Extracts prepared through green extraction technology were used for screening of phytochemicals, antioxidant, and antimicrobial potential. Antioxidant activity of the husk was done through DPPH assay. The antimicrobial assessment was performed through the well diffusion method against the selected bacterial strains. In our study, *A. hypogaea* was more antibacterial against *Pasteurella multocida* with inhibition zone 20mm having MIC ≤ 187.5 µg/ml as compared to *Pseudomonas aeruginosa* with inhibition zone 14mm. Furthermore, *F. parviflora* was better against *Escherichia coli* with inhibition zone 16.030mm with MIC ≤ 187.5 µg/ml as compared to *Pseudomonas aeruginosa* with inhibition zone 12mm. AH showed the excellent antioxidant activity with IC<sub>50</sub> > 3.49 µg/ml which is very close to the standard ascorbic acid with IC<sub>50</sub> > 3.37 µg/ml. While FP exhibited least antioxidant activity with IC<sub>50</sub> > 185.93 µg/ml. Overall results suggested the husk of *A. hypogaea* as novel natural drugs for bacterial diseases and excellent antioxidant properties as compared to *F. parviflora*.

**Keywords:** Natural products, Phytochemical, Antioxidant, Antimicrobial

O-18/ICAZ-2022

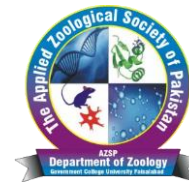
**Investigation of Hepatoprotective Agents from Natural Products against Acetaminophen Induced Hepatotoxicity in HepG2 Cell Line**

Saddam Hussain<sup>1</sup>, Muhammad Asrar<sup>1</sup>, Azhar Rasul<sup>1</sup>, Salma Sultana<sup>1</sup>, Usama Saleem<sup>1</sup>, Saba Riaz<sup>1</sup>

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

**Abstract:**

Acetaminophen (APAP) is a widely used analgesic and antipyretic drug. Although APAP is safer at usual therapeutic levels, its overdose is a significant contributor to acute liver and renal failure. Current study is designed to investigate hepatoprotective agents from Natural products against acetaminophen induced hepatotoxicity. Thirty plant extracts from Natural plant extract library and ten selected fruit and vegetable extracts from Fruit & vegetable extract library were prepared using Soxhlet apparatus and Rotary evaporator. HepG2 cells, grown in DMEM supplemented with 10% FBS and 100 IU/ml penicillin streptomycin were used for the screening of both libraries. After 24 hours of incubation following the specified extract dose administration, HepG2 cells were intoxicated by Acetaminophen (20 mM) for 1.5 hours. Viability of liver cells was measured by MTT reduction assay and absorbance was measured at 570 nm. Among 40 extracts of both



libraries, *Azadiracta Indica*, *Citrullus colocynthis*, *Chenopodium album*, *Opuntia ficus-indica*, *Phoenix dactylifera* and *Ziziphus jujube* expressed potential for the protection of Acetaminophen induced hepatotoxicity. These results pave the way for further *In Vivo* investigations of hepatoprotective drugs for the development of new pharmacological approaches to protect the liver from acetaminophen damage

O-20/ICAZ-2022

**Geospatial Analysis of Reversal of Desertification in Bahawalpur City of Cholistan Desert**

Ghania Khaliq<sup>1\*</sup>, Abdul Ghaffar<sup>1</sup>, Maryam Fatima<sup>1</sup> Umm-e-Ruman<sup>1</sup>

<sup>1</sup>Department of Zoology, Faculty of Bio-Sciences, Cholistan University of Veterinary and Animal Sciences, Bahawalpur, Pakistan

**Abstract:**

The expeditious increase in urbanization leaves a salient outcome on changing land use land cover (LULC) by replacing the areas of desert, and water with built-up, vegetation, thereby changes in ecosystem. The process of urbanization in Bahawalpur city causing different land use land cover changes in recent years. The objective of this study is to calculate and analyze geospatial changes caused by land use land cover classes over a time span of 20 years from 2000 to 2020 in Bahawalpur city of Cholistan desert in the context of population livestock and on basis of data, to predict the land use land cover changes. To compute these land use land cover changes during the time span of 20 years from 2000 to 2020, the supervised maximum likelihood method, Iso cluster unsupervised classification to classify the satellite imagery from the Enhanced Thematic Mapper Plus (ETM+) and Land operational imager (OLI) is used. Supervised change detection is performed to get the numerical number of changes in land use land cover classes to detect the interconversion of classes. Moreover, for a better understanding of geospatial changes with livestock and population various indices are derived from Landsat imagery. These indices are the Normalized vegetative index and the Normalized built-up index (NDVI and NDBI). The findings show that there has been an 18% rise in the built-up area,  $\approx$  100% decrease in the desert, a 15% drop in water bodies, 35% increase in population, 12.7% decrease in livestock, and a 6% increase in vegetation, with variable patterns of agriculture in these classes. This research finding will assist the policymakers for the sustainable development and to conserve the natural resources of the study area.

O-23/ICAZ-2022

**Molecular Detection and Occurrence of Virulence genes, *esrB* and *gadB*, and 16S rRNA gene of *Edwardsiella tarda* and its Phylogenetic Tree Analysis and Histopathological Impact on Cultured *Oreochromis niloticus*, *O. mossambicus* and *O. aureus* of Fish Farms of Punjab Pakistan**

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**Abstract:**

*Edwardsiella tarda* is an emerging major fish pathogen which spreads a serious infectious disease *Edwardsiella septicemia* and causes mass mortality due to its virulence genes in wide variety of fish species worldwide. This study was performed to detect virulence genes in *E. tarda* by PCR using species specific primers and their histopathological impact on infected fish. *E. tarda* was isolated from *Oreochromis niloticus*, *O. mossambicus* and *O. aureus*. *E. tarda* isolates were characterized by phenotypic, biochemical tests and molecular detection. Infected fish showed hemorrhages, skin depigmentation, scale loss, exophthalmia, congested gills, hernia, swollen abdomen, enlarged liver and white, bacteria-filled nodules in kidney, spleen and liver. Phenotypic characterization showed circular with grayish white colonies on TSA media plates while opaque, large irregular, translucent, and whitish colonies on BHIA media plates. Microscopic examination revealed *E. tarda* as motile and rod-shaped. Biochemical identification showed positive results in motility, H<sub>2</sub>S, indole, methyl red, and glucose tests while negative results in Gram-staining, citrate, lactose, amylase, and arginine tests. Overall 27.2% prevalence of *E. tarda* was recorded in fish of selected fish farms. Results concluded intestine, as the most infected organ, showing maximum 18.15% prevalence of *E. tarda*, maximum in male (32%) *O. niloticus* (38.8%) at 37°C in July of summer season (38.97%). Results of molecular detected 69.39% occurrence of *gadB* gene and that of *esrB* gene, was 57.82%. Histopathological examination showed artefactual changes in intestine and stomach, mild cellular swelling in the hepatocytes, sloughing and necrosis of gastric epithelial cells and some mononuclear inflammatory cells, were observed in infected fish.



*E. tarda* caused overall 7.69% mortality. Phylogenetic tree analysis of our isolated *E. tarda* strain KSHF742 (ON524407) showed 100% similarity with *E. tarda* strain FC2954 (MH532497) isolated in China. Chi-square test of independence showed insignificant difference ( $P > 0.05$ ) with respect to fish species, season and sex while significant difference ( $P < 0.05$ ) was recorded with respect to sampling sites. Increase in organic content, temperature, in association with presence of virulent genes, also increases prevalence of *E. tarda*.

**Keywords:** Necrosis, Skin depigmentation, Occurrence, Trypticase soy agar (TSA), Polymerase chain reaction (PCR), Brain heart infusion agar (BHIA), Phylogenetic tree analysis

O-27/ICAZ-2022

#### Anti-oxidant and Anti-hyperthyroidism Potential of *Withania somnifera* and *Alhagi maurorum* Plant Extracts

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#### Abstract:

The recent research has done to explore the potential therapy medicinal plants against the thyroid hormones. Biological activities are screened by methanolic extracts of medicinal plants. The selected medicinal plants for study are *Withania somnifera* and *Alhagi maurorum*. Phytochemical analysis FTIR spectroscopy results revealed the presence of wide range of phenolic compounds and functional groups, respectively. Further, *Withania somnifera* and *Alhagi maurorum* extract have significant exhibited the DPPH ( $47.41 \pm 3.13$ ,  $71.90 \pm 4.21$ ) scavenging, TPC ( $179.51 \pm 5.63$ ,  $50.39 \pm 2.67$ ) scavenging, TFC ( $35.76 \pm 0.53$ ,  $39.24 \pm 1.54$ ) scavenging respectively, antioxidant and reducing power activities. In vivo experimentation in albino rats' intoxicated with thyroxin that administration of different doses (50,100,150 mg/kg body weight) of extract orally for 42 days after thyroxin intoxication significantly ( $P < 0.05$ ) restore the selected parameters including, renal profiles, stress markers and liver enzymes and significantly ( $P < 0.05$ ) decreased the thyroid hormones like Triiodothyronine (T3) and thyroxine (T4) while significantly ( $P < 0.05$ ) increased the production of Thyroid- stimulating hormone (TSH) as compare to the control group. The extracts of selected medicinal plants can also albumin in the serum, significantly ( $p < 0.05$ ) reduce the enzymes of liver and also control the triglyceride and cholesterol level. On the basis of results of the present study and as leaned by earlier reports, it may be concluded that our plants not only help in reducing psychological stress, but also improves the regulation of hormones as it restores antioxidant levels and reduces lipid peroxide content. Therefore, this investigation is useful for clarifying of pharmacological activities of our plants and present new benefit of this plant in thyroid hormones.

**Keywords:** Chemical constituents, Therapeutic response, Antioxidant potential, Thyroid hormones, Plants



O-30/ICAZ-2022

**Knowledge, Attitudes and Practices of Pharmacogenomics Among Senior Pharmacy Students: A Cross Sectional Study from Punjab, Pakistan**

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**Abstract:**

Pharmacogenomics (PGx) is essential for optimizing drug therapy and reducing unwanted drug side effects. Our aim was to determine the knowledge, attitude and practice of senior pharmacy students in Punjab, Pakistan towards PGx. A cross-sectional study was conducted among 511 undergraduate pharmacy students from different universities in Punjab, Pakistan. Descriptive statistics and multivariate logistic regression model were used to describe the results of the study. Most (87.7%) of the students knew that the drug response could be affected by genetic variations. Good basic knowledge positively and significantly ( $p=0.01$ ) affected students' PGx test knowledge and attitudes. The majority of students (>92%) wanted to learn more about PGx and thought it could help them choose the right drug. Students' knowledge was positively and significantly ( $p=0.01$ ) affected by a good attitude. When trying to solve a drug-related case study question, about 31.5% of students implemented the idea of human genetic variation. Only 28.8% of students attended a lecture related to the effects of genetic variations on drug therapy. Good practice positively and significantly ( $p=0.01$ ) affected students' knowledge of PGx tests. The practice of PGx needs to be improved to facilitate the application of PGx in clinical practice in Pakistan.

O-31/ICAZ-2022

**Assessing the Heavy Metal Content and Antioxidant Activity in Silver Carp Populations of River Jhelum**

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**Abstract:**

Aquatic environment has been badly polluted due to heavy metal pollutants with rapid urbanization and industrialization. Heavy metal pollutants alter the activity of antioxidant enzymes and cause oxidative stress which lead to undesirable changes. The present study is designed to check the effect of heavy metals on antioxidant activity of Silver Carp. The specimens of Silver Carp were collected from three selective sites of River Jhelum as well as from pond for purpose of comparison. The selected organs were dissected on-site and preserved in ice-box for the transportation towards lab for further analysis. To study the physico-chemical parameters as well as metal detection, the samples of water were also collected from sampling sites. The extracted organs were divided into three parts in laboratory. Two parts were used for the measurement of enzymatic activity of peroxidase and catalase with the usage of spectrophotometer while third part was used for the detection of metals by digestion method. The statistical differences among catalase and peroxidase activity of organs at different sites were measured at  $p<0.05$ . The inference of current study showed higher catalase and peroxidase activity in riverine samples as compared to the pond fish. The activity of catalase and peroxidase in different tissues was noted as liver>gill>muscle tissues in riverine and cultured Silver Carp. The order of selected metals was observed as Ni>Cu in liver, gills and muscles tissues. The study will be helpful in biomonitoring the pollution status of the aquatic ecosystems.



O-32/ICAZ-2022

**Genetic Assessment of Silver Carp Populations in River Chenab as Revealed by Ssr Markers**

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**Abstract :**

Freshwater fish stocks are being exposed to increasing threats as a result of fisheries and aquaculture practices. Integrating genetic knowledge into fisheries and aquaculture management is becoming increasingly important in order to ensure the sustainability of species. Here, SSR markers are used to evaluate the pattern of genetic variability in Silver Carp populations. The level of genetic diversity in terms of the average allelic richness ( $Ar$ ), allelic number ( $Na$ ), number of effective alleles ( $Nae$ ) and heterozygosity ( $H$ ) was observed moderate-to-high in the natural populations of Silver Carp. The highest mean values of  $Na$ ,  $Ne$ ,  $Ar$  and  $H$  were found in the Trimmu Headworks populations in comparison to the Marala Headworks, Qadirabad Headworks, Khanki Barrage and Chiniot Bridge populations. The average values of  $Na$ ,  $Ar$ ,  $Ne$ ,  $Ho$  and  $He$  were from 5.8, 5.75, 3.4597, 0.6103 and 0.6833, respectively were observed in the natural populations of *H. molitrix*. The average values of expected heterozygosity ( $He$ ) were higher as compared to the observed heterozygosity ( $Ho$ ). The values of inbreeding coefficient ( $F_{IS}$ ) in natural populations were found approximately near to zero indicating very small inbreeding and some values were negative showing outbreeding. On average, the  $F_{IS}$  values ranged from -0.0452 to 0.3658 in the examined natural populations of *H. molitrix*. Four out of 25 tests in natural populations of *H. molitrix* were found to deviate from Hardy-Weinberg Equilibrium. The pairwise estimates of  $F_{ST}$  revealed low-to-moderate genetic differentiation between studied populations. The AMOVA revealed that most of the variations were within individuals in wild populations. Analysis of genetic relatedness among all the examined natural populations was estimated by constructing UPGMA dendrogram and STRUCTURE admixture model which predicted that the populations in the same clusters had a close genetic relationship. Genetic information collected from present study will be helpful in genetic monitoring of exploited fish stocks in future, which is essential for genetic integrity of wild populations.

O-33/ICAZ-2022

**Genetic Characterization of *Oreochromis Mossambicus* Populations in River Indus by Using Molecular Markers**

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**Abstract:**

Genetic integrity of fish species has been adversely affected by anthropogenic activities, invasive species' introduction and improper fisheries management, thereby attracting the attention of fisheries researchers. Current research was aimed to genetically characterize the populations of *Oreochromis mossambicus* by using microsatellite DNA markers. For this purpose, fish sampling was done from five different sites of River Indus viz. Chashma Barrage, Taunsa Barrage, Jinnah Barrage, Ghazi Ghat and Guddu Barrage using five microsatellite markers. Genomic DNA extraction was done from dorsal muscles by using the proteinase-K and phenol-chloroform methods. The quantity and quality of DNA was analyzed through AGE and nanodrop, respectively. Isolated DNA was genotyped by PCR amplification of targeted loci using five microsatellite loci and amplicons were separated on PAGE after confirmation. Data were analyzed by using different software including TFPGA, FSTAT and POPGENE. The genetic diversity level in terms of the average alleles number ( $Na$ ), allelic richness ( $Ar$ ), number of effective alleles ( $Nae$ ) and heterozygosity ( $H$ ) was observed moderate in all examined populations. The mean values of  $Na$ ,  $Ar$ ,  $Nae$ ,  $Ho$  and  $He$  ranged from 2.000 to 6.000, 3.200 to 3.600, 2.323 to 2.605, 0.573 to 0.713 and 0.562 to 0.607, respectively in all populations of *O. mossambicus*. Out of 25 tests, a total of 3 tests showed significant deviation ( $p < 0.05$ ) from  $HWE$ . The pair-wise estimates of  $F_{ST}$  revealed moderate population differentiation between the populations. The genetic relatedness of all the populations studied was evaluated by constructing dendrogram (UPGMA) and STRUCTURE admixture model which predicted that in the same clusters, populations had a close genetic relationship. The inference of this study will be helpful in defining strategies for effective management of *O. mossambicus* in natural populations.





O-34/ICAZ-2022

**Molecular Marker-Based Assessment of Hybridization between *Labeo Rohita* and *Catla Catla* in River Indus**

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<sup>2</sup>Department of Life Sciences, Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan, Pakistan

**Abstract:**

To meet the increasing demand of fish seed for restocking programs during last several decades, seed quality has been affected due to inbreeding hybridization and introgression. The proposed study was conducted to determine the hybridization between major carps; *Labeo rohita* and *Catla catla* from River Indus by using molecular markers. For this, samples of selected fishes were collected and screened morphologically. The genomic DNA was extracted and its quality and quantity were determined by agarose gel electrophoresis and nanodrop method. The fish specimens were genotyped by using RAPD and SSR marker systems independently. Genotypic data analyses were carried out by using different software (STRUCTRE, FCA and GENETIX) designed for hybridization assessment. Extent of hybridization determined by RAPD was higher in Guddu Barrage (8.92%), followed by Jinnah Barrage (5.17%), Chashma Barrage (3.5%), Taunsa Barrage (3.33%) and Ghazi Ghat (1.72%). Almost 5% (13 of 300) samples showed hybridization events. Analysis through SSR revealed that few morphologically look-alike of parents were actually hybrid species. The study will be helpful in effective assessment of hybridization potential and its impact on genetic resource management of species in question.

O-35/ICAZ-2022

**Detection of Hybridization Between Hatchery-Reared *Labeo Rohita* and *Catla Catla* Using Molecular Markers**

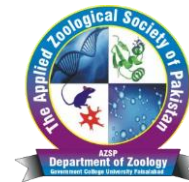
Qurat-ul-Ain<sup>1</sup>, Khalid Abbas<sup>1\*</sup>, Muhammad Sarfraz Ahmed<sup>1</sup>, Taqwa Safdar<sup>1</sup> and Tanveer Ahmed<sup>2</sup>

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**Abstract:**

For biodiversity loss worldwide, human-induced inadvertent hybridization is the major reason from past few decades. Therefore, monitoring methods for identifying hybrids needs to be develop, so that this risk can be minimized. For this purpose, research work was conducted to detect the hybridization between hatchery-reared *Labeo rohita* and *Catla catla* using molecular markers. Samples of *L. rohita* and *C. catla* were collected from various hatcheries of Punjab. Samples were screened morphologically and genomic DNA was extracted by using Proteinase-K and standard phenol/chloroform DNA isolation methods. The agarose gel electrophoresis and nanodrop were used to analyze the quality and quantity of isolated DNA. The fish specimens were genotyped by using RAPD and SSR marker systems independently. The banding profile of each population was examined to find the species-specific unique diagnostic loci utilizing RAPD-based genetic analysis and decamer primers of random sequence. The species-specific fragments were found in two primers: OPA-2 983bp and OPY-10749bp for *L. rohita* and *C. catla*, respectively. These species-specific fragments appeared to be homozygous for the relevant species. In hatchery-reared populations of major carps, 16 hybrid animals were identified based on species-specific fragment patterns. Further, samples displaying signatures of RAPD hybrid were screened with ten microsatellite markers for running PCR amplification. Allelic data obtained was subjected to statistical software. Data was analyzed by using software i.e., GENETIX, STRUCTURE and NEWHYBRID. The results of this study will be helpful in effective genetic management of *L. rohita* and *C. catla* in hatchery stocks.



O-36/ICAZ-2022

**Effect of 50% Replacement of Fishmeal with Plant Protein Mixture on Immune Response, Proximate Body Composition and Digestive Enzyme Profile of *Labeo rohita***

Munwar Hussain<sup>1</sup>, Abdul Mateen<sup>1</sup>, Muhammad Naveed<sup>1\*</sup>, Nudrat Aslam<sup>1</sup>, Irsa Arshad<sup>1</sup>, Andleeb Zahra<sup>1</sup>

<sup>1</sup>Fish Nutrition Lab, Department of Zoology, Wildlife & Fisheries, University of Agriculture, Faisalabad

**Abstract:**

Plant protein mixture is a reliable source of protein and can be utilized for the replacement of fish meal in the diet. This experiment was performed to check the effect of 50% replacement of fish meal with plant protein mixture (15% Cotton seed meal, 20% Soybean meal and 15% Sunflower meal) on proximate body composition, digestive enzymes activity and immune response of *Labeo rohita*. Ten fingerlings were kept in each of the five glass aquaria making groups T0, T1, T2, T3 and T4 with triplicates for period of 4 months. *L. rohita* fingerlings were given 35% crude protein @ 6% of body weight. Group T0 was control group and fingerlings were fed with 100% fish meal, while T1, T2, T3 and T4 were experimental groups in which T1 was given 50% fermented plant protein mixture and 2% probiotics, T2 was given 50% non-fermented plant protein mixture and 2% probiotics, T3 was given 50% fermented plant protein mixture and 4% probiotics and T4 was given 50% non-fermented plant protein mixture and 4% probiotics. The duration of this trial was 4 months. Physico-chemical parameters like pH, DO, total hardness and temperature were measured after every week during the experiment. At the end of trial, samples of the fish meat from experimental group and control group were analyzed to calculate proximate body composition (crude protein, fat, moisture and ash), digestive enzyme activity (lipase, amylase and protease) and immune response (lysozyme activity, total WBCs, immunoglobulin and platelets). Data was analyzed statistically by using ANOVA under completely randomized design (CRD). The results revealed that proximate body composition was significant ( $p < 0.05$ ). In *L. rohita* the level of crude protein for T0 was 16.11%, for T1 it was 16.63% and for T2, T3 and T4 it was 15.65, 16.91 and 15.71% respectively. The level of crude fat for T0 of *L. rohita* was 3.80% and for experimental groups T1, T2, T3 and T4 it was 3.90, 3.75, 3.97 and 3.74 respectively. The level of moisture content for the T0 of *L. rohita* was 77.67%, and for experimental groups T1, T2, T3 and T4 it was 77.91, 77.26, 77.92 and 77.37% respectively. The level of crude ash for the T0 of *L. rohita* was 3.22% and for experimental groups T1, T2, T3 and T4 it was 2.96, 3.17, 3.06 and 3.13% respectively. The results for digestive enzyme activities were significant ( $p < 0.05$ ). Protease activity for the T0 of *L. rohita* was 71.4 U/mg and for experimental groups T1, T2, T3 and T4 it was 69.9, 69.46, 70.0 and 69.96 U/mg respectively. Lipase activity for the T0 of *L. rohita* was 199.13 U/mg and for experimental groups T1, T2, T3 and T4 it was 196.7, 196.5, 198 and 197.26 U/mg respectively. Amylase activity for the T0 of *L. rohita* was 4.76 U/mg and for experimental groups T1, T2, T3 and T4 it was 4.81, 4.28, 4.9 and 4.32 U/mg respectively. The results for immune response were also significant ( $p < 0.05$ ). White blood cells count for the T0 of *L. rohita* was 30.1 10<sup>3</sup>/ml and for experimental groups T1, T2, T3 and T4 it was 32.13, 31.73, 29.76 and 32.26 10<sup>3</sup>/ml respectively. Immunoglobulin (IgM) level for the T0 of *L. rohita* was 10.03 mg/ml and for experimental groups T1, T2, T3 and T4 it was 9.06, 8.26, 10.5 and 9.66 mg/ml respectively. So, it was concluded that 50% replacement of fishmeal with plant protein mixture had significant effect on the proximate body composition, digestive enzyme activity and immune response. And plant protein mixture could be used as a substitute for fishmeal up to 50%.

O-37/ICAZ-2022

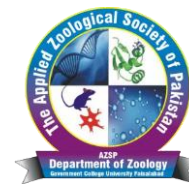
**Effect of 50% Replacement of Fish Meal with Plant Protein Mixture on Immune Response, Proximate Body Analysis and Digestive Enzyme Profile of *Oreochromis niloticus***

Rimsha Athar<sup>1</sup>, Abdul Mateen<sup>1</sup>, Muhammad Naveed<sup>1\*</sup>, Nudrat Aslam<sup>1</sup>, Irsa Arshad<sup>1</sup>, Andleeb Zahra<sup>1</sup>

<sup>1</sup>Fish Nutrition Lab, Department of Zoology, Wildlife & Fisheries, University of Agriculture, Faisalabad

**Abstract:**

Plant protein mixture (soybean, sunflower and cotton meal) can be use in aquaculture because of its great nutritional importance as it is utilized as an appreciable supplementary feed ingredient for fish. This study was carried out to evaluate the effects of replacing 50% fish meal with plant protein mixture made up of cotton, soybean and sunflower meal cakes in feed on various parameters including digestive enzyme profile, immunity and proximate body analysis of *Oreochromis niloticus*. The anti-nutritional factors like phytic acid, tannins and aflatoxins were minimized by inoculating them with *Lactiplantibacillus plantarum* for fermentation. This trial was conducted in five glass aquaria with three replicas for 4 months. Ten fingerlings of Nile tilapia were fed with 35% crude protein at the rate of 6% body weight. To was control group and fed with 100% fish meal diet. Other four groups were fed with 50% fish meal replaced with plant mixture cakes and were called as experimental groups T<sub>1</sub> containing 50% fermented PPM with 2% probiotics, T<sub>2</sub> containing 50% fermented PPM with 4% probiotics, T<sub>3</sub> containing 50% non-fermented PPM with 2% probiotics and T<sub>4</sub> containing 50% non-fermented PPM with 4% probiotics. Water quality parameters were examined throughout the trial on weekly basis. The keen investigation of the



*Oreochromis niloticus* fingerlings' body composition regarding the crude protein%, ash%, fats%, and moisture%, was comparatively better in the Control group with 100% fish meal diet in relation to treatment groups with 50% plant protein mixture meal with slight difference. The digestive enzyme profile viz protease, lipase and amylase activity were comparatively better in the treatment groups T2 and T1 with the fermented diet consisting of 4% and 2% probiotics in relation to the non-fermented treatment groups T4 and T3. The values of the immune response viz WBCs count and total immunoglobulins of *O. niloticus* were highest in the treatment groups T2 and T4 consisting of 4% probiotics in relation to the treatment groups T1 and T3 consisting of 2% probiotics. Keeping in view the statistical analysis of this study, T2 performed better in terms of digestive enzyme profile and immune response whereas the results of T0 were significantly better in terms of body composition. Owing to no adverse effects, it can be inferred that 50% fish meal replacement with plant protein mixture meal cake in feed of *Oreochromis niloticus* can serve as a better and cost-efficient alternative.

O-38/ICAZ-2022

**Growth Performance and Antioxidant Enzyme Profile of Nile Tilapia as Influenced by 25% Fishmeal Replacement with Soybean Meal**

Saif-ur-Rehman<sup>1</sup>, Abdul Mateen<sup>1</sup>, Muhammad Naveed<sup>1\*</sup>, Nudrat Aslam<sup>1</sup>, Irsa Arshad<sup>1</sup>, Andleeb Zahra<sup>1</sup>

<sup>1</sup>Fish Nutrition Lab, Department of Zoology, Wildlife & Fisheries, University of Agriculture, Faisalabad

**Abstract:**

Soybean meal is used greatly in fish diet in the place of fish meal as the main source of protein. This study aimed to replace 25% substitution of fish meal with soybean meal and to check its effects on fish growth and the antioxidant enzyme profile of Nile Tilapia. Ten fingerlings were kept in five glass aquaria-making groups T0, T1, T2, T3 and T4 with three replicates for 4 months. The fingerlings were fed 35% crude protein @ 6% of their body weight per day. T0 was given diet with 100% fishmeal and considered as control group while, T1, T2, T3 and T4 were given diet with 25% fishmeal replaced with fermented soybean meal and 2% probiotics, 25% fishmeal replacing with non-fermented soybean meal and 2% probiotics, 25% fishmeal replacing with fermented soybean meal and 4% probiotics, 25% fishmeal replacing with non-fermented soybean meal and 4% probiotics respectively and considered as experimental groups. Growth parameter in terms of body weight (g), total length (cm), feed conservation ratio (FCR) and specific growth rate (SGR) was observed weekly. At the end of trial antioxidant activity of enzymes as catalase, superoxide dismutase and glutathione peroxidase were examined by using standard methodology. Physicochemical parameters were monitored throughout the experiment. pH, DO (dissolved oxygen) (mg/L), Temperature °C, Total alkalinity (mg/L) and Total hardness (mg/L) were insignificantly different and stable in all groups throughout the experiment. Temperature and DO were inversely related while pH level of each group was due to feed composition differences. Data was analyzed statistically by applying one way ANOVA and Pairwise comparison was done by applying Tukey's Pairwise Comparison test. Average weight gain of fish was higher in experimental group T2 (17.4 g), followed by experimental group T1 (25% FSBM and 2% probiotics) (14.92 g) and T0 (Control group, 100% FM) (14.25g) that show positive results and were highly significant ( $p < 0.000$ ). Similar results were found for length gain. Length gain for T2 was 13.7 cm followed by T1 (25% FSBM and 2% probiotics) with 12.67 cm and T0 (control group) with 12.52 cm. Data showed highly significant results ( $p < 0.000$ ). FCR was slightly higher in control group  $1.88 \pm 0.49$ . SGR and PER for all groups also showed significant results ( $p < 0.000$ ). Antioxidant enzyme analysis (SOD, CAT and GPX) showed slight differences in control and experimental groups. Overall collected values showed significant results for antioxidant enzymes profile of *Oreochromis niloticus*.

O-39/ICAZ-2022

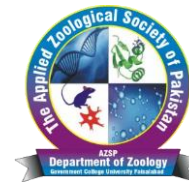
**Digestive enzyme activity, proximate body analysis and immune response of Labeo rohita under 50% replacement of fish meal with fermented soybean meal**

Farah Ali<sup>1</sup>, Abdul Mateen<sup>1</sup>, Muhammad Naveed<sup>1\*</sup>, Nudrat Aslam<sup>1</sup>, Tariq Mahmood<sup>1</sup>

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**Abstract:**

Soybean (*Glycine max*) is a legume and belongs to family Fabaceae (pea family). It contains about 40%-49% crude protein, so it can be used as a substitution of fish meal. This experiment was carried out to determine the digestive enzyme activity, proximate body analysis and immune responses of *Labeo rohita* by replacing 50% fishmeal with soybean meal. For this study, *L. rohita* fingerlings were collected from the Fisheries Research Farm, University of Agriculture, Faisalabad. Ten fingerlings were kept in each of five glass aquaria making groups T0, T1, T2, T3 and T4 with triplicates for the period of 4 months. T0 was control group and fingerlings were provided with 100% fish meal and T1, T2, T3, T4 were experimental groups in which T1 was given 50% fermented soybean and 2% probiotics, T2 was given 50% non-fermented soybean and 2% probiotics, T3 was given 50% fermented soybean and 4% probiotics and T4 was given 50% non-fermented soybean and 4% probiotics. The fingerlings were fed with 35% crude protein @ 6% body weight per day. At the end of experiment the activity of digestive enzymes, the proximate body composition and immune responses in *L. rohita* were checked. The results of the



proximate body composition were statistically significant ( $p < 0.01$ ). The level of crude protein of *L. rohita* was 16.05% for T0, 16.67% for T1, 15.72% for T2, 16.92% for T3 and 15.66% for T4. Moisture content of *L. rohita* was 77.92% for T0, 77.67%, for T1, 77.37% for T2, 77.91% for T3 and 77.25% for T4. Total fats of *L. rohita* were 3.80% for T0, 3.96%, for T1, 3.73% for T2, 3.90% for T3 and 3.74% for T4 and total ash content of *Labeo rohita* was 3.21% for T0, 3.12%, for T1, 3.17% for T2, 3.06% for T3 and 2.96% for T4. The results of the digestive enzyme activity were also statistically significant ( $p < 0.01$ ). Lipase activity of *L. rohita* was 196.5U/mg for T0, 197.3U/mg for T1, 196.7U/mg for T2, 199.1U/mg for T3 and 198.0U/mg for T4. Amylase activity of *L. rohita* was 4.7U/mg for T0, 4.3U/mg for T1, 4.2U/mg for T2, 4.9U/mg for T3 and 4.8U/mg for T4. Protease activity of *L. rohita* was 71.3U/mg for T0, 69.5U/mg for T1, 70.0U/mg for T2, 69.8U/mg for T3 and 69.9U/mg for T4. The results of immune responses were also statistically significant ( $p < 0.01$ ). IgM level of *L. rohita* was 9.97mg/ml for T0, 10.20mg/ml for T1, 9.50mg/ml for T2, 11.50mg/ml for T3 and 10.53mg/ml for T4. WBCs count of *L. rohita* was  $30.06 \times 10^3/\text{ml}$  for T0,  $32.9 \times 10^3/\text{ml}$  for T1,  $31.7 \times 10^3/\text{ml}$  for T2,  $31.26 \times 10^3/\text{ml}$  for T3 and  $32.57 \times 10^3/\text{ml}$  for T4. Physico-chemical parameters like temperature, DO (dissolved oxygen), pH and total hardness were monitored weekly. The data obtained was analyzed statistically by applying Tukey's test. So, it was concluded that 50% fish meal replacement with fermented soybean meal has significant effect on meat quality, digestive enzyme activity and immune response.

O-40/ICAZ-2022

**Assessing the enzymatic activity of catalase in different organs of riverine *Mystus seenghala* in relation to metal accumulation**

Shafaq Rafique<sup>1</sup>, Khalid Abbas<sup>1\*</sup>, Taqwa Safdar<sup>1</sup>, Muhammad Sarfraz Ahmed<sup>1</sup> and Tanveer Ahmed<sup>2</sup>

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

<sup>2</sup>Department of Life Sciences, Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan,

**Abstract:**

Contamination of freshwater bodies with heavy metals is an alarming issue worldwide. These metals are substantial stimulators of producing reactive oxygen species due to oxidative stress and also can trigger activity of antioxidant enzymes in aquatic organisms. The proposed study was planned to analyze the toxic effects of heavy metals on catalase activity in various organs of freshwater catfish *Mystus seenghala* in relation to metal pollution. Samples of *M. seenghala* were taken from the selected sites of River Chenab. Fish were dissected to extract the organs that were preserved in crushed ice bags to facilitate transportation. The activity of catalase enzyme was assayed by Chance and Maehly method. The concentration of selected heavy metals (Pb, Cu, Zn) in various organs was examined by Atomic Absorption Spectrophotometer. Accumulation of selected heavy metals in water samples was analyzed with the help of spectrophotometer. The statistical differences among different sites fish organs catalase activity were measured at  $p < 0.05$ . Results showed the catalase activity in the different tissues of *M. seenghala* in the following order: liver>kidney>gills>heart>muscles. Pb and Cu were highly accumulated in the organs of sampled fish. Among selected heavy metals, Cu exhibited the elevated level in the water samples collected from the selected sites of River Chenab. Trend of heavy metals accumulation in the different sites of River Chenab was observed in the following order: Trimmu Headworks>Khanki Barrage>Marala Headworks. Trimmu Headworks showed the higher level of metal accumulation. Trimmu Headworks was highly polluted due to pollution and direct drain of industrial sewage and disposal of chemicals at this site of River Chenab. Concentration of selected heavy metals were under the permissible limits given by WHO except Pb. The inference of the study would be helpful in understanding how fish could serve as biomarkers to assess the effect of heavy metals on aquatic fauna.

O-41/ICAZ-2022

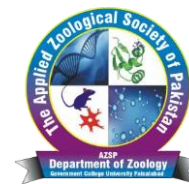
**Effect of Dietary Ginger Extract on Growth and Antioxidant Enzyme Activity of Common Carp**

Asima Parveen<sup>1</sup>, Sajid Abdullah<sup>1</sup>, Dureshahwar<sup>1\*</sup>, Kaynat Saeed<sup>1</sup> and Mumaiza Mumraiz<sup>1</sup>

<sup>1</sup> Fish Toxicology Lab, Department of Zoology, Wildlife & Fisheries, University of Agriculture, Faisalabad

**Abstract:**

The natural feed additive improves fish growth and overall health of fish. Plants and their synthetic product now a days used as a feed additive in aquaculture. The ginger (*Zingiber officinale*) is used as feed supplement in fish diet. The ginger overcome the oxidative stress produced by toxicants in all living organism including fish. The current research determined the effect of dietary ginger extract on growth performance and antioxidant enzyme activity in terms of catalase and superoxide dismutase in organs (gills and liver) of *Cyprinus carpio*. The experimental design was established for two months in which four treatments are formed T1, T2, T3 and T4 with 0%, 0.5%, 2% and 5% ginger supplement respectively. Growth parameters and antioxidant enzyme activity were determined with four treatments and three replicates. Control group receive diet without ginger extract and other three fed with basal diet supplemented 0.5%, 2% and 5% concentrations of ginger. Control group fish fed with basal diet for one week and other three fed with different concentration of ginger extract was added in their diet. The physico-chemical parameters were measured in terms of pH, Temperature, DO and alkalinity during experimental period. The growth activity was determined in terms of FCR, SGR, fork length, total length and weight gain after fifteen days. Fish were



dissected to isolate the liver and gills. The activity of antioxidant enzyme was calculated from sample at the end of trial. All the data related to growth and antioxidant enzymes activity and physico-chemical parameters were statistically measured by using ANCOVA Analysis of Variance and Correlation. The results showed that the dietary ginger extract significantly improved growth activity and antioxidant enzyme activity by increasing their concentration.

O-42/ICAZ-2022

#### Effect of Dietary Aloe vera on Morphometric and Hematological Parameters of Nile Tilapia

Rida Khalid<sup>1</sup>, Sajid Abdullah<sup>1</sup>, Dureshahwar<sup>1\*</sup>, Mumaiza Mumraiz<sup>1</sup>, and Kaynat Saeed<sup>1</sup>

<sup>1</sup>Fish Toxicology Lab, Department of Zoology, Wildlife & Fisheries, University of Agriculture, Faisalabad

#### Abstract:

Aloe vera is utilized as a feed additive to improve the growth performance and hematological indices also act as an immunostimulants in fish. The goal of this research was to estimate how different concentrations of Aloe Vera extract as a feeding supplement, influenced the growth and hematological indices of Nile tilapia. Different experimental diets were prepared in combination with diverse levels of dietary A. Vera extract and will be given to the fingerlings. Fish were randomly assigned into four groups in which T0 act as a control group, T1 (1% of A. vera), T2 (2% of A. vera) and T3 (3% of A. vera). Growth factors such as Specific Growth Rate (SGR), Food Conversion Rate, fork length, weight gain and condition factor were analyzed fortnightly. Blood samples from each of the treatment group were taken at the end of trial and hematological measures such as red blood cells (RBC), WBC counts, hemoglobin (Hb), packed cell volume (PCV) PCV, Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin (MCH) and the Mean Corpuscular Hemoglobin Concentration (MCHC) were measured at the end of the trial. Weight gain and specific growth ratio were recorded highly significant ( $p < 0.05$ ) in T3 (3% of A. vera). Feed conversion ratio and fork length were highly significant in T2 (2% of A. vera). White blood cells did not have significant effects of A. vera. Hemoglobin, red blood cells and MCHC were highly significant ( $P < 0.05$ ) in T3 (3% of A. vera). PCV and MCH were significant in treatment T2. Mean corpuscular volume was significant in T1 (1% of A. vera). Physiochemical parameters like alkalinity, temperature, pH, DO and Co<sub>2</sub> were analyzed every week. Data were analyzed by complete randomized design (CRD) under two-way ANOVA.

O-43/ICAZ-2022

#### Catalase Activity in *Channa punctatus* as Influenced by Metal Pollution in River Jhelum

Alina Zulfiqar<sup>1</sup>, Khalid Abbas<sup>1\*</sup>, Taqwa Safdar<sup>1</sup>, Muhammad Sarfraz Ahmed<sup>1</sup>, Shafaq Rafique<sup>1</sup>, Hina Amjad<sup>1</sup> and Tanveer Ahmed<sup>2</sup>

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

<sup>2</sup>Department of Life Sciences, Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan, Pakistan

#### Abstract:

The compelling issue at present circumstances in freshwater habitat is pollution. In an ecosystem, one can evaluate the existence of pollutants by contemplating the oxidative stress biomarkers. In various organs (gills, kidney, liver, muscles and heart) of *Channa punctatus* determination of catalase (CAT) activity with the respect to metals was the intent of this research. To attain the objectives, fish specimens were sampled from three sites of River Jhelum. The designated organs of model organism were extracted out at sampling stations and preserved in ice boxes after keeping them in tagged polythene bags for transporting to laboratory in order to perform experiment. Water samples from riverine body were also collected to evaluate physico-chemical parameters. To inspect the antioxidant activity, respective organs were assayed at 240nm wavelength and with the help of hot plate, concentration of metals was determined by using atomic absorption spectrophotometer. Results of this research work indicates, increased CAT activity in different organs of *C. punctatus* and following trend of selected metals was recorded at Rasool Barrage (Ni < Cr < Zn), Pind Dadan Khan (Ni < Cr < Zn) and Trimmu Headworks (Ni < Zn < Cr) respectively. Experiential order in water samples at various sites of River Jhelum was: Zn > Ni > Cr. Consequently, current study will be considerable to comprehend that for the detection of metal contamination, how oxidative stress biomarkers can be utilized.



O-45/ICAZ-2022

**Peroxidase Enzyme Activity and Metal Bioaccumulation in Various Body Organs of *Channa punctatus* in River Indus**

Iqra Aslam<sup>1</sup>, Khalid Abbas<sup>1\*</sup>, Aqsa Zafar<sup>1</sup>, Taqwa Safdar<sup>1</sup>, Muhammad Sarfraz Ahmed<sup>1</sup>, Tanveer Ahmed<sup>2</sup> and Hina Amjad<sup>1</sup>

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

<sup>2</sup>Department of Life Sciences, Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan

**Abstract:**

Heavy metals pose a serious threat to the aquatic ecosystems at concentrations over natural levels, due to their non-biodegradability, high toxicity and bioaccumulation. Metals are important inducers of oxidative stress in aquatic organisms, promoting formation of reactive oxygen species. Metal toxicity causes oxidative stress to the fish including lipid peroxidation, protein and DNA oxidation and enzyme inactivation. The study was conducted to monitor the effect of selected heavy metals (Fe, Cr, As) contamination on peroxidase activity in catfish (*Channa punctatus*) collected from the River Indus. Individuals were dissected on the sampling sites to extract the selected organs i.e., gills, liver, kidney, heart and muscle tissues. Selected organs were kept in the crushed ice to prevent degradation and transported to laboratory for further analysis. Peroxidase enzyme was isolated and its activity was checked by its capability to lower the concentration of ROS at 470nm using the Chance and Maehly method. To measure concentration of heavy metals, digestion method was used. To analyze data, STATISTIX software was employed. Metal bioaccumulation in selected sites of River Indus was observed in the following order: Chashma Barrage>Taunsa Barrage>Kalabagh site. The order of peroxidase activity in different organs was observed as liver>kidney>gills>heart>muscles. The order of selected metals in riverine *C. punctatus* was Fe>Cr>As at Chashma Barrage, Taunsa Barrage and Kalabagh site. The study will be potentially helpful in providing important information regarding the impact of heavy metals on antioxidant system of fish.

O-46/ICAZ-2022

**Effects of Ciprofloxacin and Sulphamethazine on the Activity of Antioxidant Enzymes of Mori (*Cirrhinus mrigala*)**

Gul-e-Adan<sup>\*1</sup>, Sajid Abdullah<sup>1</sup>, Mumaiza Mumraiz<sup>1</sup>, Kaynat Saeed<sup>2</sup> and Dureshahwar<sup>2</sup>

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

**Abstract:**

Antibiotics are globally used in human and veterinary medicine and are important group of environmental contaminants. Antibiotics are not completely removed by wastewater treatment plants therefore directly discharged into aquatic environments and are toxic for non-target species. This study was carried out to evaluate the effects of Ciprofloxacin (CIP) and Sulphamethazine (SMZ) on the activity of Glutathione S-transferase (GST) and Catalase (CAT) enzymes of *Cirrhinus mrigala*. Fish were acclimatized for 10 days prior to the commencement of experiment. The Physio-chemical parameters were maintained on the daily basis. There were three experimental groups e.g. one control and two treatment groups and each group had three replicates. Treatment groups were exposed to two sub-lethal concentrations of CIP and SMZ for 96hrs. Fish sampling was done after 24, 48, 72 and 96 hours and target organs were isolated. The activity of GST and CAT enzymes was analyzed in selected organ by visible spectrophotometer at wavelength of 340nm and 240nm respectively. The results indicated that the activity of CAT and GST increased significantly ( $P < 0.05$ ) in liver as compared to gills by increasing the concentration of antibiotics. SMZ showed greater effect on the antioxidant enzymes activity of fish as compared to CIP. It is concluded that fish showed significant variations in the activity of antioxidant enzymes after the exposure to antibiotics. Variations in the activity of antioxidant enzymes are considered as a reliable biomarker for the study of antibiotic toxicity.

**Keywords:** Ciprofloxacin, Sulphamethazine, *Cirrhinus mrigala*, Antioxidant enzymes

O-47/ICAZ-2022

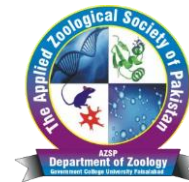
**Effects of Antibiotics on Antioxidant Enzymes Activity in Common Carp (*Cyprinus carpio*)**

Muhammad Arshad<sup>\*1</sup>, Sajid Abdullah<sup>1</sup>, Mumaiza Mumraiz<sup>1</sup>, Dureshahwar<sup>2</sup> and Kaynat Saeed<sup>2</sup>

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

**Abstract:**

Freshwater ecosystems are polluting heavily due to the accumulation of antibiotics. Intentionally, antibiotics are used against the harmful bacterial community, but their excessive accumulation induced oxidative stress in fish. Fish species protects itself from oxidative stress through antioxidant defense system. This experiment was performed to observe the effects of antibiotics e.g. Oxytetracycline (OTC) and Erythromycin (ERY) on antioxidant enzymes activity in common carp (*Cyprinus carpio*). For this purpose, fish samples were brought from fish seed hatchery and acclimatized in glass tanks for 10 days. Experiment was performed for 96 hours, consisting of a control group (No antibiotic) and two treatment groups (with antibiotics). There were three replications for each group with same conditions. Sub-lethal concentrations of antibiotics were given to the treatment groups. The results indicated that a significant decrease in SOD and POD activity at 72 and 96 hours of



exposure was observed. Acute exposure of OTC enhanced reactive oxygen species formation and inhibited antioxidant capacities in the fish. It was observed that the activity of POD and SOD enzyme was decreased significantly ( $p < 0.05$ ) by increasing the concentration of antibiotics (OTC and ERY) as compared to control group. ERY showed great effect on the activity of POD and SOD as compared to OTC. It is concluded that toxicity of antibiotics is a serious concern in fish so further research and strategies are needed to prevent them in different regions of the world.

**Keywords:** *Cyprinus carpio*, Antibiotics, Antioxidant enzymes

O-51/ICAZ-2022

**Effect of Different Levels of Commercial Probiotics on Growth and Survival of Fish Silver Carp (*Hypophthalmichthys Molitrix*) Under Salinity Stress**

Isham Zahra<sup>1</sup>, Sajid Abdullah<sup>1</sup>, Kaynat Saeed<sup>1\*</sup>, Mumaiza Mumraiz<sup>1</sup> and Duressahwar<sup>1</sup>  
<sup>1</sup>Department of Zoology, Wildlife & Fisheries, University of Agriculture, Faisalabad, Pakistan

**Abstract:**

The use of probiotics i.e. live or dead micro-organisms or their products which have the beneficial impacts on their environment and host. They are needed for various biological processes for all animals especially for fish. A mixture of probiotics can have the beneficial effect on fish i.e., elevated health status, improved disease resistance, growth performance, better gut morphology and microbial balance. The present experiment was conducted to determine the effect of different levels of commercial probiotics on the growth and survival rate of fish silver carp (*Hypophthalmichthys molitrix*) under salinity stress. An experiment of 30 days was conducted having three treated groups such as (control group T1, T2, and T3). Before starting the trial, the salinity stress was given (salt concentration; 50ppm-1) for one week. After those different concentrations of commercial probiotics (*Basillus subtilis* and *B. Licheniformis*) was provided i.e., T2 (0.65g of probiotics) and T3 (0.67g of probiotics) respectively. The probiotics were given twice a day. Siphoning was done properly and physio-chemical parameters were also maintained throughout the trial. It was finally concluded that the average increase in weight was significantly higher in T2 ( $72.85 \pm 3.74g$ ) followed by T3 ( $66.84 \pm 2.52g$ ). Whereas, the average increase in fork length was also recorded significantly higher in T2 ( $21.75 \pm 2.13cm$ ) than in T3 ( $17.63 \pm 1.83cm$ ). For total length, similar trend was recorded which was significantly higher in T2 ( $22.75 \pm 2.19cm$ ) but total length was less significant in T3. Feed conversion ratio (FCR) was lower in (1.033-1.678) in T3. The value of SGR was also significantly higher in T3 (3.36-4.65) than T2. The findings concluded that probiotics had a significant effect on growth indices and survival rate of fish despite applying the salt stress, that affected fish to little extent

O-52/ICAZ-2022

**Effect of Waterborne Cadmium on the Glutathione Dependent Antioxidant Activity of Nile tilapia**

Maryam Afzal<sup>1</sup>, Sajid Abdullah<sup>1</sup>, Kaynat Saeed<sup>1\*</sup>, Mumaiza Mumraiz<sup>1</sup> and Duressahwar<sup>1</sup>  
<sup>1</sup>Department of Zoology, Wildlife & Fisheries, University of Agriculture, Faisalabad, Pakistan

**Abstract:**

Aquatic organisms are greatly affected by pollutants such as heavy metals. Cadmium is one of the toxic heavy metals which accumulates in fish organs and produces oxidative stress. Present study was carried out to determine the effect of waterborne cadmium on glutathione dependent antioxidant activity of Nile tilapia. Different doses of cadmium chloride were given to each experimental group for 96-hr LC50 and lethal concentration determination. An acute experiment of 7 days was performed having one control group and two treated groups (T1 and T2), each having 10 fingerlings of *O. niloticus*. Toxicity was induced in treated groups by adding sub-lethal concentrations (1/10th and 1/5th of LC50) of cadmium chloride and control group was unaltered. Glutathione-s-transferase (GST) activity in different organs such as liver and gills of control group fish and cadmium exposed fish were measured by using spectrophotometer at 340nm after 4th and 7th day of experimental duration. GST activity in liver and gills was higher in treatment groups than control group and between treatment groups treatment 2 had more values of GST than treatment 1. The 96-hr LC50 and lethal concentration of cadmium for Nile tilapia was  $17.30 \pm 1.12$  mg/L and  $26.79 \pm 1.90$  mg/L, respectively. Results showed a significant increase of GST activity in liver and gills of Nile tilapia. GST activity was higher in liver than that of gills. 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 metal toxicity.



O-53/ICAZ-2022

**Effects of Different Temperatures on the Body Composition of Common Carp (*Cyprinus carpio*)**

Saddam Hussain<sup>1</sup>, Sajid Abdullah<sup>1</sup>, Kaynat Saeed<sup>1\*</sup>, Mumaiza Mumraiz<sup>1</sup> and Dureshahwar<sup>1</sup>

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

**Abstract:**

Temperature plays a fundamental role in regulating metabolic processes. Physiological mechanisms in fishes are drastically affected by the extreme changes in temperature. Therefore, the main objective of current research work is to estimate the effects of different temperatures on the body composition of common carp (*Cyprinus carpio*). A six-week research study was conducted. There were three different temperatures used such as, 18-20, 24-26, and 28-30°C. Three replicates were used for each treatment. The feed was given twice a day at a rate of 2% of the fish body weight. Final average weight gain of common carp were recorded as 19.67±4.51, 16.34±6.55 and 10.11±2.59 respectively. The body composition of fish was measured for moisture, crude protein, total lipids, and ash. After, the completion of trial body composition analysis was assessed in common carp. The temperature shows significant effects on crude ash and fat contents. Maximum values for crude ash were calculated as 11.012 ±0.438, 12.01±0.512 and 10.8125 ±0.423 respectively and for fats were recorded as 5.68±11, 5.48±17 and 5.26±22 respectively. Crude protein values were calculated as 45.8 ±1.053, 46.95 ±0.99 and 44.537 ±1.308 respectively between the fortnights and shows non-significant among different temperature levels. The water quality parameters were also measure on daily basis. To determine the relationship between the physico-chemical parameters the correlation techniques was used. It was concluded that the different temperature shows the significant effects on crude ash and fats but shows non-significant effects on the body composition of common carp.

O-54/ICAZ-2022

**Microsatellite DNA Markers Revealed Low to Moderate Level of Genetic Diversity in Domestic Stocks of *Catla catla***

Tanveer Ahmed<sup>\*1,2</sup>, Khalid Abbas<sup>1\*</sup>, Huma Naz<sup>3</sup>, Sajid Abdullah<sup>1</sup>, Syed Qaswar Ali Shah<sup>3</sup>, Adnan Khalil<sup>4</sup>, Sarfraz Ahmad<sup>1</sup>, Hina Amjad<sup>1</sup> and Shahbaz Ahmad<sup>1</sup>

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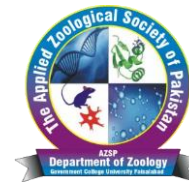
<sup>4</sup>Department of Physics, Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan, Pakistan

**Abstract:**

A total of 15 microsatellite loci in five hatchery populations of *Catla catla* were examined for the analysis of genetic diversity and genetic structure patterns. For genomic DNA isolation, dorsal muscle tissues of the sampled fish were used. In terms of the average number of alleles and observed heterozygosity, low to moderate levels of genetic variation were found in all the hatchery stocks. The total number of alleles was found to range from 2.800 to 4.000. In all the populations analyzed, FIS values were found to be positive on an average basis, although some loci had negative values. No HWE deviation was found. The pairwise estimates of FST showed low genetic differentiation between populations. Among the individuals in the populations, much of the variance was found by applying AMOVA. Major cluster patterns among all the populations were measured by constructing PCA, structure, and neighborhood joining tree. In the same cluster are those populations that share the most genetic identity, while populations with the lowest genetic identity fall into a separate cluster. In solving the genetic problems associated with restocking plan and brood-stock management strategies of *Catla*, the present study inferences will be useful.

**Keywords:** Major carp; Genetic variation; Genetic differentiation; SSR markers; Domestic populations





O-55/ICAZ-2022

**Genotype Environment (G×E) Interaction for Growth Traits of Hatchery Reared Populations of *Cirrhinus mrigala***

Sumbal Afzall, Khalid Abbas<sup>1\*</sup>, Tanveer Ahmed<sup>2</sup>, Sajid Abdullah<sup>1</sup> and Huma Naz<sup>3</sup>

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

<sup>2</sup> Department of Life Sciences, Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan, Pakistan.

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**Abstract:**

Genotype environmental (G×E) interaction with respect to growth traits in hatchery populations of *Cirrhinus mrigala* was evaluated in this study. This study comprises of two phases; in first phase, a total sixty days growth performance trial of sampled acclimatized fish fingerlings was carried out in glass aquarium at uniform physico-chemical conditions. During trial, fish individuals was fed with commercially available diet (@ 3% body weight) twice a day on daily basis. Various growth parameters of growth performance was assessed fortnightly basis. In the second phase of this study, all the fish populations was sacrificed after completion of growth performance trial to examine the genetic diversity and genetic structure. A total of five species-specific microsatellites loci were amplified through PCR for the genotyping. The allelic data obtain was subjected to precise analyses for measuring different parameters of genetic diversity. The final average body weight was recorded as 11.8±0.2g, 13.2±0.1g, 16.5±0.2, 15.3±0.2g and 17.8±10g in LHR, FRQ, FSD, BHL and QBD populations, respectively. Maximum weigh, fork and total length was observed in FRQ population while the minimum in QBD population. All loci were found to be polymorphic with the average number of alleles ranged from 2 to 5. The average observed heterozygosity (Ho) in the QBD population was measured highest (0.6665). For the G×E interaction we found that when different individuals (genotypes) were kept under same environmental conditions, the traits (wet weight) were expressed according to their genotypes. At the same time, individuals obtained from QBD population have shown highest growth in terms of weight gain (11.5g) and highest value of Ho (0.6672) and lowest value of inbreeding co-efficient FIS (0.1183). On the other hand, individuals accessed from LHR hatchery have shown lowest growth in terms of weight gain (6.3g) and lowest value of Ho (0.6665) and lowest value of inbreeding co-efficient FIS (0.08098) as compared to other hatcheries.

**Key words:** Genetic diversity, Genetic Structure, Weight gain, Inbreeding coefficient

O-56/ICAZ-2022

**Response of Hematological Indices of *Oreochromis niloticus* to Acute And Chronic Pb+Cd Metal Mixture Response**

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**Abstract:**

Aquatic habitats have been polluted in recent years by effluents emitted from multiple sources, disrupting aquatic life. The purpose of this study was to investigate the impact of acute and chronic metal mixtures of Pb+Cd on *Oreochromis niloticus* blood indices. To accomplish this, laboratory-reared fish fingerlings were placed in three different glass aquaria (control, acute, and chronic Pb+Cd). Each aquarium was filled with ten different species of fish. The experimental trial was extended for an additional two weeks. On completion of the experimental trial, blood samples from the experimental and control groups were obtained in EDTA tubes and various hematological parameters such as PCT, PDW, MCHC, WBC, MCV, MCH, RBC, PLT, HGB and HCT were determined using standard methods. RBCs 0.2×10<sup>3</sup> μL<sup>-1</sup>, WBCs 145.1×10<sup>3</sup> μL<sup>-1</sup>, HGB 0.6 gdL<sup>-1</sup>, HCT 3.4%, MCHC 10.2 gdL<sup>-1</sup>, MCV 163.2 fL, MCH 29.6 pg, PLT 25×10<sup>3</sup> μL<sup>-1</sup>, PCT 0.02%, and PDW 8.2 fL were calculated as a result of acute Pb+Cd metal mixture stress in *O. niloticus*. Whereas the values of WBCs 152.3×10<sup>3</sup> μL<sup>-1</sup>, RBCs 0.73×10<sup>3</sup> μL<sup>-1</sup>, HGB 2.5 gdL<sup>-1</sup> MCHC 20.8 gdL<sup>-1</sup>, MCV 164.4 fL, HCT 12%, PLT 27×10<sup>3</sup>μL<sup>-1</sup>, PCT 0.03% ,MCH 34.2 pg and PDW 8.7 fL were used to determine chronic Pb+Cd metal mixture stress in *O. niloticus*. The experimental data were analyzed statistically using ANOVA and the "LSD" test. In conclusion, the study's selected hematological parameters showed a substantial difference between the control and metal mixture stressed fish groups. The information gained from this study will aid fishery biologists in assessing fish health and tracking stress responses.



**Keywords:** Heavy metals, Hematology, Freshwater fish, Blood cells

O-57/ICAZ-2022

**Histomorphometric Indices and Catalase Response in Cadmium (Cd) Stressed Silver Carp (*Hypophthalmichthys molitrix*)**

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**Abstract:**

This study was conducted to examine the effects of cadmium (Cd) on histology and antioxidant enzyme (catalase) activity in different tissues (gills, intestine, muscles) of freshwater fish, *Hypophthalmichthys molitrix*. For this purpose, *H. molitrix* was exposed to different concentrations (0, 2.5, 5, 7.5, 10, 12.5, 15, 17.5, 20, 22.5, 25, 27.5, 30, 32.5, 35, 37.5, 40 mgL<sup>-1</sup>) of Cd up to 96-hr. The 96-hr (LC50) and lethal concentration value of Cd was found to be 20.661 mgL<sup>-1</sup> and 42.801 mgL<sup>-1</sup>, respectively at 95% confidence interval. Histological examination of gill tissues showed fusion and curling of secondary lamella, degeneration of epithelium of gills and vasodilation in gill filaments. In intestinal tissues, histological alterations including sloughing and degeneration of epithelial cells of intestinal villi were observed. Moreover, significant (p<0.05) increase in villus height, villus width and muscularis mucosa and the significant decrease in the crypt depth and tunica mucosa in intestinal tissues of treated fish were observed. In muscular tissues of fish histological alterations such as atrophy, degeneration of muscle fibers and reduction in diameter of muscle fibers were observed. Biochemical analysis revealed significant decrease (p<0.05) in catalase activity in order muscles < intestine < gills of Cd treated fish. In conclusion, histopathological changes brought on by exposure to heavy metals are useful for assessing the toxic effects of heavy metals in various species of fish.

**Keywords:** Histology; Antioxidant enzyme; Freshwater fish; Gills; Intestine

O-58/ICAZ-2022

**Assessment of Ampicillin Effects on Behavior, Enzyme Activity and Histology of *Labeo rohita***

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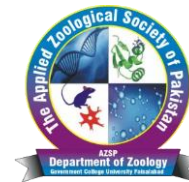
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**Abstract:**

Ampicillin is the most commonly used antibiotic for bacterial treatment in fish farming. However, due to their widespread use, the potential for harm to aquatic organisms exists. This study was assessed the behavioral, enzyme activity and histological responses of *Labeo rohita* after exposure of ampicillin. To assess, the 96-hr LC50 and lethal concentration, fish was treated to various doses of ampicillin. Hyperactivity, pigmentation, and movement disorders were observed for behavioral changes. During chronic exposure enzyme activity and histological changes in *L. rohita* were assessed. 96-hr LC50 and lethal concentration of ampicillin was measured 0.0025 ugL<sup>-1</sup> and 0.004 ugL<sup>-1</sup>, respectively. Inferences of this study showed increase in CAT activity in all organs viz. brain, gills, heart and muscles of *L. rohita* exposed to ampicillin as compared to control group. The ampicillin treated fish also showed significant effects on gills histology in terms of four histomorphometric parameters; primary lamella length, secondary lamella length, primary lamella width and secondary lamella width that were assessed in comparison with control group. Results were found to be significant (P < 0.05) for all four measurements of parameters (primary lamella length, secondary lamella length, primary lamella width and secondary lamella) that were found to be increased in treated group as compared to control group.



O-59/ICAZ-2022

**Ichthyo Fauna of Rani Koat Mountain Stream, Sindh-Pakistan**

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**Abstract:**

The aquatic ecosystem is highly dependent on biological/Fish diversity and water quality. Fishes are the important indicator of aquatic ecosystem and occupy a remarkable position from a socioeconomic point of view. In Pakistan there are 193 fresh water fish species. The mountainous stream of Rani Kot is situated between 25° 53' 47" N, 67° 54' 9" latitude near "San" village adjacent to the famous Ranikot Fort situated more than 90 kilometres (56 mi) to the north of District Jamshoro on the national highway. A total of 291 fish individuals were collected. Out of these samples 16 species were identified. These belong to 3 orders including cypriniformes, Siluriformes and Mastacembeliformes. Cypriniformes has 12 species belong to family Cyprinidae. While, Siluriformes and Mastacembeliformes had only 3 and 1 species, respectively. Furthermore, the *Salmophasia* species contributes 41.4% followed by 6.7% both by *Bata labeo* and *Puntius terio*. While, out of these 16 species 5 species were identified as purely stream water fishes including *L.bata*, *L. pangusia*, *L.barbus*, *L.potail* and *L.porcellus*. Among these species they contribute 6.7%, 6.1%, 5.7%, 5.4%, and 5.1% respectively.

Thus, present results revealed that the Ranikoat Stream was dominant by the Cyprinidae family with *Salmophasia* specie. Hence, the present finding provides useful information for valuable systematics, fisheries management and conservation.

**Keywords:** Rani Kot, Stream, Fish Fauna, Diversity.

O-60/ICAZ-2022

**Assessing the Behavioral, Antioxidant Enzymes, and Genotoxic Responses of *Ctenopharyngodon idella* Subjected to Chromium**

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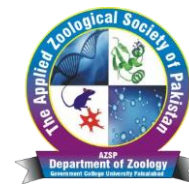
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**Abstract:**

Heavy metals are the most significant pollutants, they are found throughout the environment and can be detected in significant concentrations. Cadmium, mercury, chromium, zinc and copper are some of the most common pollutants that have an impact on the aquatic ecosystem and fish. They are exceedingly hazardous to fish's health. Apart from being an important metal, chromium poses a significant hazard to aquatic organisms. Because of its harmful influence on biota and bioaccumulation in particular organisms, it destabilises the environment. Therefore, this study assessed the acute toxicity, behavioural, antioxidant enzyme (catalase) and the genotoxic responses of *Ctenopharyngodon idella* after 96-hr exposure of chromium. To assess the 96-hour LC50 and lethal concentration, fish was treated to various doses of chromium. Hyperactivity, pigmentation, and movement disorders was observed for behavioural changes. During 4 days exposure of *Ctenopharyngodon idella* to chromium, the antioxidant enzyme (catalase) activity and genotoxicity in erythrocytes was determined. The 96-hr LC50 and lethal concentration of Cr for *Ctenopharyngodon Idella* was calculated as 45mg/L and 70mg/L, respectively. Behavioral alterations due to chromium exposure to *C. Idella* was observed. The alterations were observed in fin movement, mucous secretion, loss of equilibrium, hyperactive, swimming rate, jumping and opercular movements of *C. idella* on exposure to Cr as compare to control group. After acute toxicity test, effect of chromium on catalase enzyme activity in different tissues (gills, brain, liver and muscle) of *C. Idella* was also observed. The result of present study showed reduction in CAT activity in all organs viz. liver, gills, brain and muscle of *C. Idella* exposed to chromium as compared to control group. The genotoxic responses of *Ctenopharyngodon idella* after 96-hr exposure of chromium was determined. In present study, Micronucleus test revealed nuclear abnormalities like higher number of micronuclei, notched and D shaped cells in treated group as compares to control group. To differentiate the frequency of micronuclei and other nuclear anomalies in control as well as exposed fish groups, non-parametric Mann-Whitney U-test was used.



**O-61/ICAZ-2022**

**Determining the Changes in the Histological and Genotoxic Parameters of Fish, *Oreochromis niloticus* Exposed to Lead (Pb)**

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**Abstract:**

The aim of this study was to determine the hazardous effects of lead on the histological and genotoxic parameters of the fish, *Oreochromis niloticus*. This study was conducted in a series of three steps. In the first step, acute toxicity, LC50 and lethal concentration of lead was measured using Probit analysis method. LC50 value and lethal concentration of lead for *O. niloticus* was measured 77.673 mgL<sup>-1</sup> and 150.924 mgL<sup>-1</sup>, respectively. In second step, histological changes were assessed by preparing slides of tissues of gills, liver and kidney of both control and Pb stressed *O. niloticus* and examined the respective tissues under light microscope. The inferences showed significant histological alterations ( $p < 0.05$ ) in gill, liver and kidney tissues of Pb exposed fish including necrosis, edema, vascular congestion, shortening and curling and lifting of epithelium of secondary lamella in gills, cellular degeneration and dilation of sinusoids in liver and loss of hemopoietic tissue, necrosis, and edema in kidney. Histomorphometry of liver showed a decrease in diameter of central vein and hepatocyte along with an increase in width of sinusoids and histomorphometry of kidney showed an increase in the diameter of renal corpuscle, glomerulus, proximal and distal convoluted tubules. The nuclear anomalies were studied in the RBCs of fish. Non-parametric Mann-Whitney U-test was conducted for the comparison of nuclear abnormalities and the frequency of micronuclei among the control and lead treated fish groups. Results declared an increased micronucleus, notched and de-shaped nuclei frequency, in RBCs of fish exposed to lead as compared to the control group.

**Keywords:** Heavy metals; Lethal concentration; Genotoxicity; Probit analysis; Hematology

**O-62/ICAZ-2022**

**Determining the Acute Toxicity of Pb+Cd Metal Mixture, Catalase Activity and Histopathological Changes in *Oreochromis niloticus***

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**Abstract:**

Different concentration of Pb+Cd metal mixture was given to *Oreochromis niloticus* to determine acute toxicity for 96-hrs in the laboratory conditions. For acute toxicity test, a group of ten fishes were placed in aquarium of 100-liter water capacity. Each test was performed with three replicates, started from zero with an increment of 10 mgL<sup>-1</sup>. Observations on fish mortality were made at 12-hours intervals and dead fish were removed from the media. To determine the 96-hours LC 50 with a 95 percent confidence interval, the probit analysis method was used. The 96-hr LC 50 and lethal concentration value of Pb+Cd mixture was calculated as 180.349 and 347.806 mgL<sup>-1</sup>, respectively. After acute toxicity test, effects of Pb+Cd mixture on liver, gills, intestine and brain catalase (CAT) activity was also observed. According to the study's findings, all organs of the metal mixture-stressed *O. niloticus* had lower CAT activity than the control. Histology of brain and intestine was also seen that showed severe damages including vacuoles destruction, necrosis, edema, granular layer degeneration in brain and destruction in villi, mucosa and submucosa structure along with the complete destruction of blood vessels, lymphocytes in intestine.

**Key words:** Acute toxicity; binary metal mixture; Nile Tilapia; Antioxidants; Histopathology



O-63/ICAZ-2022

**Peroxidase Activity in Relation to Metal Bioaccumulation in Liver, Kidney, Gills and Muscle Tissues of *Cirrhinus mrigala* from River Chenab**

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**Abstract:**

The continuous metals caused pollution in the aquatic ecosystem has become a global issue. The purpose of the present study is to examine the peroxidase activity in relation to metal bio-accumulation in liver, kidney, gills and muscle tissues of *Cirrhinus mrigala* captured from River Chenab. Fish samples were also collected from the pond reservoir for the comparison. Organs of the fish viz. liver, kidney, gills and muscle were extracted by sacrificing the fish. For the further analyses, extracted organs were packed in the labeled polythene bags and stored in ice boxes for the transportation to the laboratory. Presence of selected metals viz. Pb, Cd, Co, Ni and Zn were also investigated in studied organs. Water samples were also taken from the fish sampling sites for the analyses of physico-chemical parameters. Activity of peroxidase was measured at 470 nm with the help of spectrophotometer and metal bio-accumulation was studied by automatic absorption spectrophotometer. Peroxidase activity in liver ( $123 \pm 0.47$  UmL<sup>-1</sup>), kidney ( $110 \pm 0.47$  UmL<sup>-1</sup>), gills ( $103 \pm 0.47$  UmL<sup>-1</sup>) and muscle tissues ( $92 \pm 0.47$  UmL<sup>-1</sup>) of *Cirrhinus mrigala* from pond was measured and higher level of peroxidase activity was measured in liver ( $162 \pm 1.24$  UmL<sup>-1</sup>), kidney ( $131 \pm 0.81$  UmL<sup>-1</sup>), gills ( $119 \pm 0.81$  UmL<sup>-1</sup>) and muscle tissues ( $121 \pm 0.81$  UmL<sup>-1</sup>) of fish from Panjnad Barrage as compared to Marala Barrage, Khanki Barrage and Trimmu Barrage. The results of this study showed higher peroxidase activity in riverine fish as compared to pond fish. The concentration of Zn was observed higher in liver, kidney, gills and muscle tissues of *Cirrhinus mrigala*. The present study inferences will be helpful for understanding how oxidative stress biomarkers can be used for the ecotoxicological studies.

O-64/ICAZ-2022

**Phenotypic, Biochemical and Molecular Characterization of *Edwardsiella tarda* and its Prevalence in Cultured Tilapia Species of Fish Farms of Punjab, Pakistan and their Postmortem Examination**

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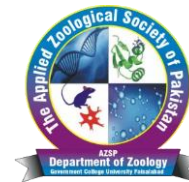
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**Abstract:**

*Edwardsiella tarda* is one of the major fish pathogens which causes a severe infectious disease, Edwardsiellosis in wide variety of marine and freshwater, cultured and wild fish species worldwide. *E. tarda* was isolated, identified by biochemical tests, characterized by phenotypic and molecular detection of its gyrB and 16S rRNA gene which was used to check phylogenetic relationship with other bacterial species. Postmortem examination of infected fish revealed skin depigmentation, exophthalmia, swollen abdomen, enlarged liver, white bacteria filled nodules in liver, kidney and intestine. Biochemical identification of *E. tarda* showed negative results in citrate, lactose, amylase and arginine tests while methyl red, H<sub>2</sub>S, catalase, indole and glucose tests showed positive results. Molecular detection by amplification of gyrB gene by PCR using species-specific primers revealed bands at 415bp and 16S rRNA at 1503bp. *E. tarda* infected 18% intestine of male (32.3% prevalence) *O. niloticus* (38.8%) of fish farm, FMG-10 (37.8%) of Muzaffargarh at 37°C in summer (38.9%) and overall prevalence of *E. tarda* was 27.2% at all fish farms, resulting 4.7% mortality. Chi-square test of independence showed insignificant difference ( $P > 0.05$ ) between seasons, fish sex, organs and fish species while significant ( $P < 0.05$ ) with respect to sites of sampling (fish farms). Phylogenetic tree analysis revealed that all isolated *E. tarda* strains of our study had 99% similarity with each other while our isolated *E. tarda* strain KSHF741 (ON524406) showed 99% similarity with *E. tarda* strain UCD-68E (MN199659) and UCD-86A (MN199640) isolated in USA. Increase in temperature in association with high stocking density and pollutant water, increases prevalence of *E. tarda* and mass mortality in fish. Edwardsiellosis is an emerging fish disease which causes severe infections in tilapia.



**Keywords:** Phylogenetic tree, Edwardsiellosis, Prevalence, Hemorrhages, Mortality

**O-65/ICAZ-2022**

**Microsatellite Marker-Based Population Genetic Structure of Mozambique Tilapia (*Oreochromis mossambicus*) in River Chenab, Pakistan**

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**Abstract:**

A total of four microsatellite loci (PRL-MS01, IGF-II-MS03, ISP-MS01 and PRL-MS02) were amplified to analyze the parameters of genetic variability and genetic structure among five populations of *Oreochromis mossambicus* collected from various fishing sites of River Chenab including Marala Headworks (MH), Qadirabad Headworks (QH), Khanki Headworks (KH), Trimmu Headworks (TH) and Punjnad Headworks (PH) in this study. Overall, moderate level of genetic diversity in terms of allele number, allelic richness and heterozygosity was observed in this study. The FST estimates show low to moderate level of genetic differentiation between examined pairs of populations. For all the screened loci in examined populations, no significant deviations from HWE was observed. Most of the variation was noted within the individuals (70.41%) by applying AMOVA. The UPGMA dendrogram showed two main clusters which further divided into two sub-clusters. Those populations which are genetically similar or having similar parental origin are present in the same cluster while dissimilar in a different cluster. The inferences of the present study would be helpful for the effective management of riverine *O. mossambicus* populations.

**O-69/ICAZ-2022**

**Effect of 0.5% and 1.5% Dietary Supplementation of *Cinnamomum verum* on Growth Performance and Blood Parameters of Grass Carp (*Ctenopharyngodon idella*)**

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**Abstract:**

Feed additives are essential for growth and nutritional value of fish. There is a need to use different feed additives to meet the nutrient requirements and formulate cheaper fish feed. This research was carried out to assess the effect of 0.5% and 1.5% dietary supplementation of *cinnamomum verum* on growth performance and blood parameters of grass carp (*Ctenopharyngodon idella*) for a period of 8 weeks. Fish were stocked in three aquaria with two replicates, one served as control group T0 and other two were the experimental groups T1 (0.5%) and T2 (1.5%) cinnamon supplemented feed. Fish were fed two times a day @ of 6% of their body weight. Growth parameters were measured on weekly basis in terms of body length, weight gain and other parameters like SGR and FCR were measured also measured. Blood parameters including TLC, Hb, Hct and MCV were measured at the end of experimental period. Weight gain in T0 was 17.1g, for T1 20.1g and for T2 14.55g whereas increase in length was 5.6, 7.55 and 5.15 cm in T0, T1 and T2 respectively. Observed WBCs were as 1.15, 1.26 and 1.18 (106/ $\mu$ L) respectively for T0, T1 and T2. Predominantly, it was observed that 0.5% cinnamon level was acquiring the most significant values in terms of weight gain, length gain, SGR and blood parameters. So, it was concluded to be most effective than others as a feed supplement for improvement in growth performance and blood parameters of grass carp.

**O-70/ICAZ-2022**

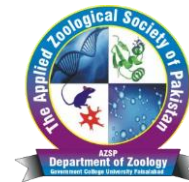
**Proximate Body Composition and Growth Performance of Nile Tilapia under 10% Replacement of Fish Meal with Defatted Sesame Seed Meal in Feed**

Andleeb Zahra<sup>1</sup>, Abdul Mateen<sup>1</sup>, Muhammad Naveed<sup>1\*</sup>, Nudrat Aslam<sup>1</sup>, Tariq Mahmood<sup>1</sup>

<sup>1</sup>Fish Nutrition Lab, Department of Zoology, Wildlife & Fisheries, University of Agriculture, Faisalabad

**Abstract:**

The present research was designed to evaluate the growth performance and proximate body composition of *Oreochromis niloticus* replacing the fish meal with 10% defatted sesame meal in feed. The experiment was conducted for a 60 days period in the fish nutrition Laboratory, Department of Zoology, Wildlife and Fisheries, University of Agriculture, Faisalabad. Diet containing 100% fish meal having 40% crude protein was used as control group diet T0, while 10% fishmeal was replaced by sesame in T1 group diet. The feed was given @ 6% of body weight per day. The results of the growth were



significant ( $p < 0.05$ ). The gain in weight of Nile tilapia in T1 showed mean of  $2.571 \pm 0.895$  (g) which was statistically significant as compared to T0 which was  $2.143 \pm 0.686$  (g). The gain in length of Tilapia in T1 showed mean  $0.543 \pm 0.315$  (cm) which was statistically significant as compared to T0 which was  $0.443 \pm 0.190$  (cm). The FCR of T1 show greater values ( $3.340 \pm 1.246$ ) while T0 showed lower FCR values ( $2.624 \pm 1.220$ ). It was observed that higher SGR was in T1 group ( $1.728 \pm 1.059$ ) and lower in T0 ( $1.429 \pm 0.754$ ). Results of whole body composition were also significant ( $p < 0.05$ ), there were significant differences among treatments. The level of crude protein for the T0 of *Oreochromis niloticus* was 64.28% and for T1 the level of crude protein was 65.40%. The value of fat for T0 was 10.14% and for the T1 it was 12.16%. Crude ash of *Oreochromis niloticus* for T0 was 12.48% and for T1 it was 13.26%. Moisture content of *Oreochromis niloticus* for T0 was 67% and for T1 it was 73%.

O-71/ICAZ-2022

#### Effect of 0.5% and 1% Addition of Aloe Vera (*Aloe Barbadosis*) in Feed on Growth and Hematology of Nile Tilapia (*Oreochromis Niloticus*)

Nudrat Aslam<sup>1\*</sup>, Abdul Mateen<sup>1</sup>, Ahad Hussain<sup>1</sup>, Muhammad Naveed<sup>1</sup>, Irsa Arshad<sup>1</sup>, Andleeb Zahra<sup>1</sup>

<sup>1</sup>Fish Nutrition Lab, Department of Zoology, Wildlife & Fisheries, University of Agriculture, Faisalabad

#### Abstract:

Aloe vera (*Aloe barbadensis*) is quickly developing plant with extraordinary significance in medical industry for growth and nourishment. There is a need to use different feed additives in fish feed to meet the nutrient requirements of fish. This research was carried out to assess the effect of 0.5% and 1% dietary supplementation of aloe vera (*Aloe barbadensis*) on growth and hematology of Nile tilapia (*Oreochromis niloticus*) for a period of 8 weeks. Fish were stocked in three aquaria with two replicates, one served as control group T0 and other two were the experimental groups T1 (0.5%) and T2 (1%) aloe vera supplemented feed. Fish were fed two times a day @ of 6% of their body weight. Growth parameters were measured on weekly basis in terms of body length, weight gain and other parameters like SGR and FCR were measured also measured. Initial average weight of fish was 27g. Weight gain in T0 was  $28.4 \pm 0.37$ g, for T1  $27.8 \pm 0.58$ g and for T2  $25.2 \pm 1.26$ g whereas increase in length was 5.6, 7.55 and 5.15 cm in T0, T1 and T2 respectively. Blood parameters including TLC, Hb, Hct and MCV were measured at the end of experimental period. WBCs count for control group T0 was  $11.79 \times 10^3/\mu\text{L}$ , for T1  $16.1 \times 10^3/\mu\text{L}$  and  $13.55 \times 10^3/\mu\text{L}$  for T2. Hematocrit concentrations in T0 were 30.01%, in T1 was 33.85% and in T2 was 32.25%. The result of this research indicated that use of plant source (aloe vera powder) has beneficial effect on growth and hematology of Nile tilapia.

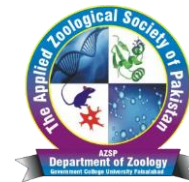
O-72/ICAZ-2022

#### Remedial Role of Ascorbic Acid and A-Tocopherol against Chlorpyrifos Induced Haematotoxicity and Histopathological Alteration in Heart of Adult Albino Rat

Mohsin Ali, Naureen Rana\*, Nazia Ehsan, Imran Ahmed Raja, Amna Hussain, Nusrat Sattar, Saira Aslam, Sobia Kanwal  
University of Agriculture, Faisalabad

#### Abstract:

Chlorpyrifos is still a chlorinated organophosphate (OP) insecticide that is frequently used to control agricultural, veterinary and household pests. Chlorpyrifos has a high likelihood of being deposited in diverse food chains and it has a range of effects on various creatures. The purpose of this research is to explore at the histological effects of Chlorpyrifos on the blood and heart, along with ameliorative effects of ascorbic acid and a-tocopherol. Prior to the start of the exposure, forty albino rats of both sexes were obtained and Acclimatized. A dose of Chlorpyrifos was prepared in corn oil at a rate of 1/20th of the known LD 50. Male and female rats were split into five equal groups and body weight was recorded. Group was kept as a control and treated with corn oil, whereas Group II was given Chlorpyrifos 18 mg/kg for five days. Group III was given Chlorpyrifos for five days and then treated with ascorbic acid 25 mg/kg for three days, Group IV was given Chlorpyrifos for five days and then treated with a-tocopherol 30 mg/kg for three days, and Group V was given Chlorpyrifos for five days and afterwards treated with a mixture of ascorbic acid and a-tocopherol. After the completion of trial, the rats final body weights were determined. The animals were then be sedated. The rats were thereafter be dissected, with specified organs (heart and blood) extracted and weighed, then washed in saline water and split into little pieces. For roughly 10 days, the fragments were retained in a 10% neutral buffer formaldehyde solution. Organs were dissected into 5m fine small fragments, stained with eosin and hematoxylin and inspected under a microscope to see if Chlorpyrifos has created any alterations. Tukey's test was applied to compare treatment means using repeated measures in a completely randomized approach. Statistical analysis showed significant changes in weight gain of chlorpyrifos treated rats as compared to control group similarly non-significant changes observed in absolute and relative weight of heart. Hematological parameters like RBCs, HGB, HCT, MCH and MCHC showed non-significant changes but WBCs, PLTs, LYM% and MPV showed significant changes in male and female rats. Biochemical parameters like ALT, ALP, AST, bilirubin, cholesterol, urea, uric acid, creatinine and total protein show



non-significant changes as compared to control group. Ascorbic acid and a-tocopherol play remedial role against these changes.

O-78/ICAZ-2022

**First Report Regarding Molecular Epidemiology and Novel Variant Identification of *Anaplasma Centrale* in Cattle from Pakistan**

Sehrish Ashraf<sup>1</sup>, Asia Parveen<sup>1</sup>, Mian Muhammad Awais<sup>2</sup>, Munir Aktas<sup>3</sup>, Sezayi Ozubek<sup>3</sup> and Furhan Iqbal<sup>\*</sup>  
1Ghazi University, DG khan

**Abstract:**

Anaplasmosis also known as gall sickness is a tick-borne disease in cattle, caused by an obligate intraerythrocytic microorganism *Anaplasma*, belonging to family: Anaplasmataceae, order: Rickettsiales, species: *Anaplasma marginale* and *Anaplasma centrale*. Present study is reporting seasonal prevalence, epidemiology and phylogeny of *Anaplasma centrale* in three cattle breeds from District Layyah, Southern Punjab, Pakistan. A total of 844 blood samples (Cross = 300, Friesian = 244, Sahiwal breed = 300) from apparently healthy cattle on seasonal basis were collected along with epidemiological data. Polymerase chain reaction generated 426 base pair amplicon specific for 16S rRNA gene of *Anaplasma centrale* in 14.4% (122/844) of enrolled cattle. Highest prevalence was observed during spring (24%) followed by autumn (12.4%) summer (10%) and winter season (7.1%). Sahiwal breed was most susceptible to *A. centrale* infection (18%) followed by cross (12.3%) and Friesian breed (12.2%). Representative amplified partial gene sequence of *A. centrale* was submitted to Gene Bank (Accession number MN653235). Its phylogenetic analysis had shown similarities with sequences submitted by other countries. 69/844 (8.1%) Giemsa stained blood smears were found positive for *Anaplasma* spp. Analysis of epidemiological factors revealed that female cattle and farm with water supply from pool, farms where other dairy animals and dogs were living with cattle, cattle with and dogs having ticks load on them had significant association with *A. centrale* prevalence. It was observed that white blood cell, lymphocytes (%), red blood cells, hemoglobin, hematocrit, mean corpuscular hemoglobin, mean corpuscular hemoglobin concentration and platelets were significantly disturbed in *A. centrale* positive than negative cattle. We recommend that this PCR protocol should be used for the detection of *A. centrale* in livestock for their proper diagnosis and treatment.

**Key words:** *Anaplasma centrale*; 16S rRNA gene; PCR; Phylogenetic analysis; Cattle

O-80/ICAZ-2022

**Antibiofilm and Antioxidant Potential of Green Synthesized Zinc Oxide Nanoparticles against Foodborne Pathogens**

Saima Muzammil<sup>1\*</sup>, Sumreen Hayat<sup>1</sup>, Muhammad Hussnain Siddique<sup>2</sup>

<sup>1</sup>Department of Microbiology, Government College University Faisalabad (GCUF), Faisalabad.

<sup>2</sup>Department of Bioinformatics and Biotechnology, Government College University Faisalabad (GCUF), Faisalabad.

**Abstract:**

Antibiotics are one of the most excellent discoveries of the twentieth century, but unfortunately, Emergence of multidrug resistant pathogens is increasing globally at an alarming rate. Emergence of multidrug resistant pathogens is increasing globally at an alarming rate. In this context, the identification of new potential antimicrobial targets and effective methods to cope infections due to these pathogens is the need of time. For this, biosynthesized nanoparticles have gained attention to be used as efficient therapeutic agents because of their safety and reliability. In the present study, we prepared zinc oxide nanoparticles (ZnO NPs) from aqueous leaf extract of *Acacia arabica*. Antibacterial activity were evaluated and results revealed that diameter of zones of inhibition against foodborne pathogens was 16–30 nm, whereas the values of MIC and MBC ranged between 31.25–62.5 µg/ml. Growth kinetics revealed nanoparticles bactericidal potential after 3 hours incubation at 2 × MIC for *E. coli* while for *S. aureus* and *S. enterica* reached after 2 hours of incubation at 2 × MIC, 4 × MIC, and 8 × MIC. 32.5–71.0% inhibition was observed for biofilm formation. Almost 50.6–65.1% (wet weight) and 44.6–57.8% (dry weight) of EPS production was decreased after treatment with sub-inhibitory concentrations of nanoparticles.





O-81/ICAZ-2022

***Withania somnifera* (L.) Dunal Helps Regain Earlier Muscle Function Restoration after a Compression Injury to Sciatic Nerve in Mouse Model**

Faiqa Sajid<sup>1</sup>, Rabia Akram<sup>1</sup>, Haseeb Anwar<sup>1</sup>, Azhar Rasul<sup>2</sup>, Nazish Naeem<sup>1</sup>, Tehreem Iman<sup>1</sup>, Zakia Saeed<sup>1</sup> and Ghulam Hussain<sup>1\*</sup>

<sup>1</sup>Neurochemicalbiology and Genetics Laboratory (NGL), Department of Physiology, Faculty of Life Sciences, Government College University Faisalabad, 38000, Pakistan

<sup>2</sup>Department of Zoology, Faculty of Life Sciences, Government College University, Faisalabad, 38000, Pakistan

**Abstract:**

Peripheral nerve injury results in partial or complete compromised physical activity and despite the tremendous efforts, the complete retrieval is still a dream. *Withania somnifera* (L.) Dunal, also known as Ashwagandha and commonly referred to as Indian ginseng, is traditionally used as a medicine. Based on the available data on its neuroprotective activities, the present study was designed to explore the possible effect of the *Withania somnifera* (L.) Dunal (roots) powder on the rate of muscle function regain in a mouse model subjected to an induced mechanical insult to the sciatic nerve. A dose of 25mg/kg of body weight was orally administered from the day of nerve lesion until the termination of the experiment. The motor functions were assessed by measuring hind limbs muscle grip strength, muscle masses, and sciatic functional index; while the restoration of sensory functions was estimated by performing a hotplate test. The hematological and serological analyses were done to evaluate the impact of treatment on oxidative stress and other systemic indexes. Statistically, both motor and sensory functions were significantly improved and prompted in the treatment group. The results highlighted an accelerating tendency. It can be a novel remedial agent for traumatic (particularly peripheral) nerve injuries.

O-82/ICAZ-2022

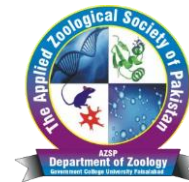
**Effects of Pesticides on Endogenous Digestive Enzyme of Fishes (*Rita rita* and *Oreochromis niloticus*) from the River Chenab**

<sup>1</sup>Waqar Younis, <sup>1</sup>Fariha Latif

<sup>1</sup>Bahauddin Zakariya University, Multan, Pakistan

**Abstract:**

The effect of pesticide on digestive enzyme of fishes was studied by collecting liver and intestine of *Rita rita* and *Oreochromis niloticus* from two locations of river Chenab i.e., Head Muhammad Wala and Sher Shah. All the samples were collected in four durations over the span of two months with the gap of 15 days in each sample during the winter season. Samples were subjected to Gas-chromatography mass spectrometry for detection of pesticides and effect of pesticides on alkaline phosphatase was also evaluated. Three pesticides revealed are carbofuran, Dichlorodiphenyldichloroethylene (DDE) and endosulfan. Dichlorodiphenyldichloroethylene has significantly highest concentration in liver and intestine of both *Rita rita* and *Oreochromis niloticus* at both sampling location. Significantly least pesticide found in tissues was endosulfan. In case of *Rita rita*, samples collected at Sher Shah, pesticides were detected in significantly higher amount than in the sample collected from Head Muhammad Wala region. *Oreochromis niloticus* samples showed similar pesticides concentration except at duration one at both locations. Alkaline Phosphatase activity (UmL<sup>-1</sup>) in the organs of *Rita rita* collected from Hatchery were significantly higher than both sampling locations of natural habitats in intestine and liver. The activities of Alkaline Phosphatase in liver and intestine of *Rita rita* were 568.22 and 602.13 UmL<sup>-1</sup> respectively higher than the activity of the enzyme at Sher Shah i.e., 402.06, 433.76 UmL<sup>-1</sup> for liver and intestine, respectively and at Head Muhammad wala i.e., 402.75, 446.8 UmL<sup>-1</sup> for liver and intestine, respectively. Likewise, in case of *Oreochromis niloticus*, the significantly lowest activity of alkaline phosphatase was observed at Sher Shah i.e., 446.37, 497.97 UmL<sup>-1</sup> for liver, intestine respectively. The activity of alkaline phosphatase in liver and intestine of *Rita rita* were 573.86 and 629.61 UmL<sup>-1</sup> at hatchery respectively. It was observed that with the increase in the concentration of pesticides in the intestinal linings and liver, the activity of digestive enzymes especially alkaline phosphatase badly impaired and this fact can be used as bio-indicator while assessing about fish health.



O-83/ICAZ-2022

**In Vitro Antibacterial Activity of Aseel Date (*Phoenix Dactylifera* L.) Extracts and Solvent Fractions against Human Pathogenic Bacteria**

Sadia Kharal<sup>1</sup>, Farzana Arshad<sup>1</sup>, Khansa Iftikhar<sup>1</sup> and Muhammad Arshad<sup>2</sup>

<sup>1</sup>Institute of Food Science and Nutrition, University of Sargodha, Sargodha, Pakistan

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

**Abstract:**

The existence of antibiotic resistance and emergence of different strains of disease-causing agents, are of major concern to the global health workers. Medicinal plants might be an excellent source of natural drugs to combat this problem. This study is based on evaluating the in vitro antibacterial potential of date fruit which is commonly being used as staple food. Aseel date parts (whole, pit and flesh) with six hydro-ethanol solvent fractions was tested against four food-borne pathogens i.e. *Bacillus subtilis*, *Escherichia coli*, *Klebsella pneumonia* and *Pseudomonas aeruginosa* using disc diffusion method. The results indicated that ethanol 60% exhibited significantly ( $P < 0.05$ ) the highest antibacterial properties i.e. *B. subtilis* (15.07±0.83A), *E. coli* (13.48±1.09A), *K. pneumonia* (14.26±1.29A) and *P. aeruginosa* (12.82±1.25A). Among parts, whole extracts was excellent with the highest antibacterial potential i.e. *B. subtilis* (16.67±A), *E. coli* (13.82±1.66A), *K. pneumonia* (14.56±1.99A) and *P. aeruginosa* (13.7±1.61A) than pit and flesh parts. It was also observed that whole E60%, pit absolute ethanol and flesh aqueous extracts was more effective in suppressing bacterial growth on the basis of phytochemical screening. These outcomes confirmed the efficacy of Aseel date as natural antibacterial agent, suggesting the probability of employing it in medicines for infectious diseases.

O-85/ICAZ-2022

**Production of Gallic Acid under Solid State Fermentation by Utilizing Waste from Food Processing Industries**

Shagufta Saeed\* and Sehrish Firyal

Institute of Biochemistry and Biotechnology, University of Veterinary and Animal Sciences, Lahore

**Abstract:**

Gallic acid (3,4,5-trihydroxybenzoic acid) is an industrially important organic acid that is found in plants as secondary metabolite. It possesses wide range of applications in healthcare, food and pharmaceutical industry, in manufacturing inks, paints, dyes and also in cinematography. The annual consumption of gallic acid in Pakistan is 8000 tons which is mainly met by importing this item from developed countries. This study was planned to assess the potential of various tannin rich bio-wastes [e.g., peels (banana, pomegranate, apple, and mango) and seeds (black plum, mango, apple, and tamarind)] from fruit processing industries to produce gallic acid by using *Aspergillus niger* via solid state fermentation. Different physical and chemical parameters were optimized to get the optimum yield of gallic acid. Among all bio-wastes, black plum seed powder gave highest yield of gallic acid i.e. 13.31 mg/g of substrate; the parameters being: substrate water ratio of 1:3, 72 h of incubation period, 2 mL of inoculum, pH 5 and temperature of 30 °C. Carbon source supplementation i.e., glucose increased the synthesis of gallic acid to 14.5 mg/g of substrate while addition of nitrogen sources had negative effect. Extraction of gallic acid was done by using Soxhlet extraction apparatus while FTIR was used for characterization. The solid-state fermentation protocol for the production of gallic acid from tannin rich biowastes has been developed and proved to be cost-effective method. The results presented can be optimized further on large scale for industrial production of gallic acid.

**Keywords** Gallic acid · Tannin rich · Fruit waste · Black plum seed · *Aspergillus niger* · Solid state fermentation

O-86/ICAZ-2022

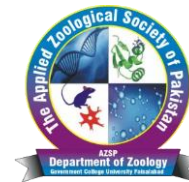
**Aloe vera Supplementation Improves Growth, Nutrient Utilization and Carcass Characteristics *Catla catla* Fingerlings fed Diets with Canola Meal**

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

<sup>1,2</sup>Department of Zoology, Faculty of Life Sciences, Government College University, Faisalabad, 38000, Pakistan

**Abstract:**

The purpose of this particular study was to evaluate and determine the effect of *Aloe vera* supplementation on overall performance of *Catla catla* fingerlings fed with canola meal-based diets. A total of 270 fingerlings (6.50±0.03 g 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%. Feeding rates for fingerlings were 5% of their live wet weight. Analysis revealed that fish fed 3% of supplemented *A. vera* diet enhanced the weight gain (13.46g), weight gain % (206.14%) and feed conversion ratio (1.23) in a significant ( $p < 0.05$ ) manner. Highest apparent digestibility coefficient of nutrients in terms of gross energy (67.44%), crude protein (77.67%) and crude fat (82.20%) were also noted on 3% supplementation level. Carcass analysis showed that maximum crude protein (19.57%) and fat content (3.95%) were found at same level of *A. vera*. It was concluded that *A. vera*, especially at a level of 3% supplementation in the diet, significantly affects the growth, nutrient utilization, and carcass composition *C. catla* fingerlings.



O-88/ICAZ-2022

**Study of Hepatotoxicity and Nephrotoxicity Induced by Sodium Arsenite Nanoparticles in *Mus musculus***

Madeeha Arshad<sup>1\*</sup>, Muhammad Ramzan<sup>1</sup>, Abuzar Mehdi khan<sup>1</sup>, Zeenat Murtaza<sup>1</sup>, Shazia Yousaf<sup>1</sup>

<sup>1</sup>Department of Zoology, Division of Science and Technology, University of Education, Lahore, Faisalabad Campus, 38000, Pakistan

**Abstract:**

Arsenic (As) is a substantial trace metal and the twentieth most prevalent element in the earth's crust, Arsenic is associated with acute and chronic health effects. This research examined effects of arsenic nanoparticles on kidneys and liver. For this purpose, 20 sexually mature mice were used. There was total 4 groups and 5 mice were placed in each group (C, D-I, D-II and D-III). The Control group was kept without any treatment. Dose groups were treated with arsenic nanoparticles: 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 and on the 32<sup>nd</sup> day, the mice were dissected. Blood samples were taken for Liver Functioning Test (LFT) and Renal Functioning Test (RFT); kidney and liver tissues were prepared and processed for histopathological assessments. RFT and LFT parameters were increased significantly ( $p < 0.001$ ) as compared to control. Histopathologically nanoparticles caused necrosis, central vein, fibrosis, binucleated nucleus, and vacuolization, congestion in liver and glomerulonephritis, vacuolation, glomerulosclerosis in kidneys. From this research work, it is concluded that arsenic nanoparticles can also produce toxicity in liver and kidney but the severity of level from inorganic arsenic is less as reported in earlier researches.

O-89/ICAZ-2022

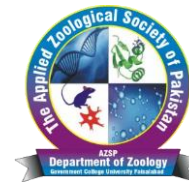
**A Novel Distachionate from *Breynia distachia* Treats Inflammations by Modulating COX-2 and Inflammatory Cytokines in Rat Liver Tissue**

Malik Saadullah<sup>1</sup>, Muhammad Asif<sup>1</sup>, and Sania Arif<sup>1</sup>

<sup>1</sup>Department of Pharmaceutical Chemistry, Government College University, Faisalabad

**Abstract:**

*Breynia distachia* is a plant of genus *Breynia* belonging to family Phyllanthaceae. This study was conducted to isolate and examine the anti-inflammatory attributes of the roots of *Breynia distachia*. Methanol extract from roots were prepared by simple maceration. For phytochemical studies, isolation, purification, structure elucidation, metal analysis, total phenolic content, and solubility test were done by chromatographic and spectroscopic techniques. Anti-inflammatory activity was evaluated by cotton pallet edema model and carrageenan paw edema model, and antioxidant potential was evaluated by DPPH, FRAP, ABTS antioxidants assays. Metal analysis of BD.Me revealed the presence of  $Na > Mg > K > Mn > Fe = Zn$  in respective order. Four phytochemicals such as gallic acid, quercetin, sinapic acid, and *p*-coumaric acid are found in *Breynia distachia*. Quercetin is present in relatively larger quantity, and shows antioxidant activity by reducing the ferric iron to ferrous iron. Novel distachionate shows high antioxidant activity in ABTS assay by reducing reactive oxygen species. Quantitative or qualitative analysis performed by HPLC indicates the ascending peaks or presence of secondary products (metabolites) respectively. Histopathology analysis of liver, spleen, heart, and kidney was done, revealing mild inflammations in spleen and liver, and no cytotoxicity in heart and kidney. Orally administered BD.Me and ditachionate show significantly inhibited effect on carrageenan and cotton pellet-induced paw edema in 1st and 2nd h with ( $ns = p > 0.05$ ) than control. After 3rd, 4th, 5th, and 6th h, BD.Me and ditachionate showed inhibition of paw edema in a highly significant (\*\*\*) manner as compared to control. In cotton-pellet edema model, distachionate shows a %inhibition of 57.3% at a dose level of 5 mg/kg. Docking values obtained from distachionate-Cox2 complex suggest a potent inhibitor evaluated for this protein. The distachionate shows effective anti-inflammatory activity. Methanol extracts of roots showed significant lipoygenase inhibitory activity by IC<sub>50</sub> values of  $155.7 \pm 0.55$  and  $132.9 \pm 0.33$   $\mu$ g/mL. Data from various in vitro and in vivo models suggest that novel distachionate isolated from *Breynia distachia* shows strong antioxidant and anti-inflammatory activities; it should be further studied for the exploration of its medicinal potential.



O-90/ICAZ-2022

**Characterization of *Lactobacillus Spp.* from Tiger and Leopard Feces and Assessment of their Pharmacognostic Properties**

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<sup>1</sup>Department of Zoology, Faculty of Life Sciences, Ghazi University, Dera Ghazi Khan, 32200, Pakistan

<sup>2</sup>Department of Zoology, Faculty of Life Sciences, University of the Punjab, Lahore, 54590, Pakistan

**Abstract:**

Probiotics are live and non-pathogenic microorganisms that improve microbial balance especially in the gastrointestinal tract. *Lactobacillus* strains are major part of the probiotics found in a variety of environments. The aim of this study is to isolate and characterized the *Lactobacillus* from fecal matter of Leopard and Tiger to check their pharmacological properties such as antimicrobial, antioxidant and anti-inflammatory activities. Isolates were characterized morphologically and identified biochemically. Antimicrobial activity of *Lactobacillus spp.* was observed against *E.coli*, *Streptococcus* and *Staphylococcus spp.* Antioxidant activities such as superoxide radical scavenging activity, DPPH scavenging activity and Hydroxyl radical scavenging activity was performed. Inhibition of protein denaturation was also performed to check anti-inflammatory activity of *Lactobacillus spp.* Both isolates were identified as *Lactobacillus brevis* by gene sequencing. Both isolates showed significant anti-oxidant potential at ( $P \leq 0.05$ ) using DPPH 18% and 33%, hydroxyl scavenging 50.6% and 74% and superoxide scavenging showed similar activity. That enhances their status from Probiotic to super bacteria with anti-bacterial, anti-oxidant and anti-inflammatory capabilities. In three ways, this will assist us to cope up and preventing a variety of diseases.

O-91/ICAZ-2022

**Prevalence of Genes Variants Causing Epilepsy in Pakistani Population**

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<sup>1</sup>The Women University Mattital Campus Multan

<sup>2</sup>Comsats Road off GT Road, Sahiwal.

**Abstract:**

Epilepsy is the neurological disorder that indicates abnormal activity in central nervous system. It is caused due to genetic as well as non-genetic factor. Prevalence rate is higher in non-developed countries. In Pakistan the prevalence of epilepsy is about 9.99/1000. Different risk factors such as head trauma, central nervous system infections, poverty and tumors are associated with development of epilepsy in different age groups. **Objective:** This study was performed to identify pathogenic variants by WES in Pakistani Population. **Method:** In the present study patients with epilepsy were sort out from different hospitals of Punjab, Pakistan from 1<sup>st</sup> December 2016 to 31<sup>st</sup> August 2018. We performed next generation sequencing with epilepsy patients. **Result:** We identified three missense pathogenic or likely pathogenic mutation in three genes such as heterozygous c.4442A>G (p.Asp1481Gly) mutation in DMXL2 gene, heterozygous c.1991T>C (p.Val664Ala) mutation in CACNA1H and homozygous c.6695A>G (p.Tyr2232Cys) mutation in GPR98 gene. All patients showed generalized tonic clonic seizure. Different parameters show different frequency. All patients have showed different onset age. Frequency of tonic clonic seizure is higher as compared to other seizure types. Frequency of seizure onset age was higher between 11-20 years of age. In present study disease prevalence is higher in male as compared to females. Patients that used antiepileptic drug showed highest frequency as compared to those that do not use medicines. **Conclusion:** These all are already reported genes and involved in epilepsy. All parameters showed association with reported literature.

**Keywords:** Antiepileptic drugs, Epilepsy, Neurological disorder, Pathogenic variant, Tonic clonic seizure

O-93/ICAZ-2022

**The Combined Effect of Different Irrigation Regimes and Systemic Insecticides on the Biology of Cotton Whitefly, *Bemisia tabaci* (Hemiptera: Aleyrodidae) under Greenhouse Conditions**

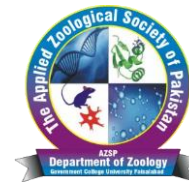
Inzamam Ul Haq<sup>1\*</sup>, Asim Abbasi<sup>2</sup>

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**Abstract:**

In the current study, the combined effect of different irrigation regimes and systemic insecticides was assessed against *Bemisia tabaci* on cotton plants under greenhouse conditions. A factorial experiment involving two levels of irrigation (regular irrigation and deficit irrigation) and two insecticide applications (insecticide application and no insecticide application) was conducted. Results indicated that all the treatments significantly ( $P \leq 0.05$ ) affected the biological parameters of *B. tabaci* and the physiological parameters of the cotton plant. A significantly ( $P \leq 0.05$ ) higher mortality percentage ( $87.36 \pm 7.68$  %), lower oviposition ( $37.42 \pm 3.9$  eggs), lower eggs to nymph ratio ( $64.27 \pm 9.21$  %), and lower nymph to adult



emergence ratio ( $53.89 \pm 8.73$  %) was recorded in regular irrigation and insecticide application treatments as compared to deficit irrigation and no insecticide application. Similarly, increased plant height ( $105 \pm 12.56$  cm), number of branches ( $19 \pm 2.36$  plant<sup>-1</sup>), number of bolls ( $43.73 \pm 5.93$  plant<sup>-1</sup>), and cotton yield ( $138 \pm 16.34$  g plant<sup>-1</sup>) was recorded in plants receiving regular irrigation and insecticide application as compared to those plants with deficit irrigation and no insecticide application. It is clear from the results that systemic insecticides performed better against *B. tabaci* in regular irrigation.

**Keywords:** Irrigation regimens, Systemic insecticides, *Bemisia tabaci*, Cotton

#### O-95/ICAZ-2022

##### Effect of Vitamin D Supplements in Reducing Chronic Inflammation in Human Beings

Muhammad Jahangir<sup>1</sup>, Asma Noureen<sup>1\*</sup>, Khizar Samiullah<sup>1</sup>, Riffat Yasin<sup>2</sup>, Muhammad Majid Ejaz<sup>1</sup> and Asif Nawaz<sup>1</sup>

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<sup>2</sup>Department of Veterinary and Animal Sciences, Muhammad Nawaz Sharif University of Agriculture, Multan, Pakistan

##### Abstract:

Vitamin D is a fat-soluble molecule which is obtained by different sources such as flesh of fatty fish and fish liver oils and it is also synthesized by our body in the presence of sunlight. It helps the body to absorb and retain calcium and phosphorus, reduces inflammation and the growth of cancerous cells. Calcium malnutrition and hypovitaminosis D are predisposing conditions for various chronic diseases such as risk of malignancies and autoimmune diseases. Vitamin D supplements are reported to have strong potential to reduce chronic inflammation, respiratory tract infections, influenza and COVID-19 outbreak by inducing cathelicidins and defensins in the body by lowering the viral replication rates and concentrations of pro-inflammatory cytokines. Because vitamin D is fat soluble it is recommended that it should be taken after breakfast or meal containing lipid content in order to get protection from several diseases and development of inflammatory conditions through its efficient absorption by the body.

#### O-96/ICAZ-2022

##### Smog Induced Cardiovascular, Respiratory and Ophthalmic Diseases in Humans

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##### Abstract:

Smog is a form of air pollution that results from chemical reactions in atmosphere caused by nitrogen oxides and volatile organic compounds in the presence of sunlight. These pollutants are mainly released into the atmosphere due to different anthropogenic activities such as use of gasoline and diesel in vehicles, industrial plants and heating processes. Smog mainly causes irritation in eyes and lacrimal disease in humans. Long term exposures to smog can also induce cardiovascular and respiratory diseases in humans such as asthma, lung cancer and buildup of calcium in coronary artery. There is need for humans to minimize outdoor activities in areas of intense smog to protect their cardiovascular, respiratory, ophthalmic organs from its harmful effects. To overcome the issue of smog serious actions should be taken such as encouraging the use of public transport instead of personal vehicles and their proper maintenance along with effective legislation. Sources that cause smog such as industrial emissions and burning of farms should be strictly monitored. People that are already prone to health issues related to heart, lungs and eyes should follow the preventive measures such as wearing good quality masks and safety goggles.

#### O-97/ICAZ-2022

##### Removal of Chromium (Vi) by Biochar-Zeolite Composite from Contaminated Water

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##### Abstract

**Objectives:** To determine the efficiency of composite of zeolite and biochar derived from rice husk for the removal of Cr (VI) from contaminated water. **Study design:** Batch sorption studies were carried out to evaluate the impact of various factors including initial Cr (VI) concentration, pH, and contact time on Cr (VI) removal. **Materials and Methods:** Chromium (VI) was analyzed using spectrophotometer at 540 nm using DPC method. Microsoft Excel 2010 and Sigma Plot v10 were being used for equilibrium isothermal models and kinetic. From the results, it was revealed that maximum sorption capacity (94%) was observed at pH 3 by zeolite-biochar composite, maximum sorption (92%) was observed after 480 minutes contact time by zeolite-biochar composite while maximum sorption (91%) was observed at 20 mg L<sup>-1</sup> by zeolite-biochar composite. The maximum average daily dose (ADD) for effect of pH, contact time and Cr(VI) initial concentration were 0.019, 0.017 and 0.0167 mg<sup>-1</sup> kg<sup>-1</sup> day<sup>-1</sup> respectively, maximum hazard quotient (HQ) for effect of pH, contact time and Cr(VI) initial concentration were 61.193, 40.066, and 55.989 respectively, and maximum cancer risk (CR) for effect of pH, contact time,



and Cr(VI) initial concentration were 0.0122, 0.0098, and 0.0111 respectively. Results: It was concluded from the study that zeolite-biochar composite had excellent removal efficiency for Cr (VI) from its contaminated water. Conclusion: The study revealed that Cr (VI) could be remedied by eco-friendly methods and by utilizing services that really are inexpensive and easily available. In addition, these sorbents may be utilized to achieve additional economic and environmental benefits.

**O-99/ICAZ-2022**

**Response of Linseed (*Linum usitatissimum* L.) Varieties to Organic Fertilizers and Biostimulant under Water Stress**

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<sup>1</sup>Department of Life Sciences, Khwaja Fareed University of Engineering & Information Technology, Rahimyar Khan 64200, Pakistan

**Abstract:**

**Objectives:** Use of Organic Fertilizers and Bio stimulant Under Water Stress to check response if linseed.  
**Study design:** separate field experiments were conducted during linseed growing seasons (October to April) to determine effects of (a) organic fertilizers and (b) Moringa oleifera leaves aqueous extract (MLAE) on growth, yield and fiber quality of linseed under imposed water stress. Two field experiments were conducted to determine the effect of organic fertilizers on soil fertility, yield and fiber quality of linseed varieties Roshni, BL1 and Chandni under low soil moisture conditions (water stress) Materials and Methods: fertilizers were prepared from seed cake of Eruca sativa (*E. sativa*), leaves of Moringa oleifera (*M. oleifera*) and chicken manure in various combinations by composting method. The various formulations of organic fertilizers included OF1 (1 kg seed cake of *E. sativa*), OF2 (1 kg seed cake of *E. sativa* +1 kg chicken manure), OF3 (1 kg seed cake of *E. sativa* + 0.5 kg chicken manure + 0.25 kg *M. oleifera* leaves) and OF4 (1 kg seed cake of *E. sativa* + 0.25 kg chicken manure + 0.5 kg *M. oleifera* leaves). Compositional analysis of organic fertilizers indicated that OF3 and OF4 had higher and potentially quantities of NPK and organic matter for improving soil fertility and linseed growth. Growth response of linseed varieties to organic fertilizers was evaluated under water stress (40% field capacity of soil) at tillering stage for one month. The organic fertilizers were applied at 3000 kg /ha two weeks before sowing of seeds in the field. Moreover, recommended doses of nitrogen (80 kg/ha), phosphorus (40 kg/ha) and potassium (30 kg/ha) were applied through the broadcast method manually in the field before sowing of seeds. The organic fertilizers OF3 and OF4 significantly improved soil total N, available P, K, Zn, Fe and organic matter contents. Results: MLAE showed the presence of natural phenolics (150 mg GAE/ml extract) and essential nutrients like Ca, Mg, K, Zn, Mn and Fe. It was found that water stress significantly decreased plant height, number of tillers per plant, leaf relative water content (LRWC), chlorophyll and carotenoids content, leaf IAA and GA content, number of capsule per plant, total seed yield, straw yield, seed oil content, fiber length and fiber iv weight of linseed varieties. **CONCLUSION:** studies concluded that MLAE can be a probable approach for maintaining normal growth and fiber quality of linseed plants under short supply of water. Moringa oleifera is a tree achieving a height of 5-10 m commonly found in tropical and sub-tropical regions with abundant green foliage. Producing Biostimulant from leaves of *M. oleifera* has a very little cost due to its ease of availability and production technology

**Key Words:** Broadcast method; MLAE; GA content.

**O-100/ICAZ-2022**

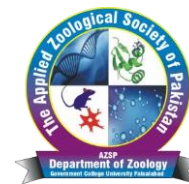
**Bioprotection of *Zea mays* L. from Aflatoxicogenic *Aspergillus flavus* by *Loigolactobacillus coryniformis* BCH-4**

Mahwish Salman<sup>1\*</sup>, and Anam Tariq<sup>1</sup>

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

**Abstract:**

Fungal infection causes deterioration, discoloration, and loss of nutritional values of food products. The use of lactic acid bacteria has diverse applications in agriculture to combat pathogens and to improve the nutritional values of cereal grains. The current research evaluated the potential of *Loigolactobacillus coryniformis* BCH-4 against aflatoxins producing toxigenic *Aspergillus flavus* strain. The cell free supernatant (CFS) of *Loig. coryniformis* was used for the protection of *Zea mays* L. treated with *A. flavus*. No fungal growth was observed even after seven days. The FT-IR spectrum of untreated (T1: without any treatment) and treated maize grains (T2: MRS broth + *A. flavus*; T3: CFS + *A. flavus*) showed variations in peak intensities of functional group regions of lipids, proteins, and carbohydrates. Total phenolics, flavonoid contents, and antioxidant activity of T3 were significantly improved in comparison with T1 and T2. Aflatoxins were not found in T3 while observed in T2 (AFB1 and AFB2 = 487 and 16 ng/g each). HPLC analysis of CFS showed the presence of chlorogenic acid, p-coumaric acid, 4-hydroxybenzoic acid, caffeic acid, sinapic acid, salicylic acid, and benzoic acid. The presence of these acids in the CFS of *Loig. coryniformis* cumulatively increased the antioxidant contents and activity of T3 treated maize grains. Besides, CFS of *Loig. coryniformis* was passed through various treatments (heat, neutral pH, proteolytic enzymes and catalase), to observe its stability. It suggested that the inhibitory potential of CFS against *A. flavus* was due to the presence of organic acids, proteinaceous compounds and hydrogen peroxide. Conclusively, *Loig. coryniformis* BCH-4 could be used as a good



bioprotecting agent for *Zea mays* L. by improving its nutritional and antioxidant contents. Keywords *Loigolactobacillus coryniformis* BCH-4, *Zea mays* L, Aflatoxins, FTIR, HPLC

O-103/ICAZ-2022

**Acute toxicity of Variable Doses of Dietary ZnO Nanoparticles on Blood Chemistry of Mono Sex *Tilapia niloticus***

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**Abstract:**

The study estimates the impact of different doses of ZnO nanoparticles on hemotoxicity and serum analysis of mono sex *Tilapia niloticus*. During experimental work, LC<sub>50</sub> values for mono sex *Tilapia niloticus* were estimated. Nano zinc oxides were synthesized by the co-precipitation method. Characterization of synthesized NPs was determined by SEM and XRD. In these experiments, nano zinc oxides (42nm in size) of 150mg, 300mg, and 450mg were mixed per kg food with a specially prepared diet. Fish were fed at 3% of their body weight for fifteen days in four different groups, one for control and the other three for experimental purposes. Results revealed that RBCs, WBCs, platelets cells, and haemoglobin counts were lowest at high concentration of ZnO NPs (450 mg/kg). But decreasing the concentration of ZnO NPs RBCs, WBCs, platelet cells and haemoglobin counts were found increasing. With increasing the dose of ZnO NPs lymphocytes, HCT counts were measured low but the number of monocytes, PCT, and MCV was gradually increased. At a low dose of Zinc oxide nanoparticles, no effects on MCH and MCHC were found, but at high concentration (450mg/Kg of ZnO NPs) number of MCH was found to be increased. Acute toxicity was observed with reference to kidney and liver through serum analysis. With increasing the dose of ZnO NPs cholesterol level, albumin, creatinine, SGPT (ALT), and alkaline phosphate were gradually increased. Triglycerides, proteins, and SGOT (AST) increased with increasing the ZnO NPs concentrations but at high concentration, their levels decreased. The results were statistically found significant (p<0.05). These nanoparticles cause damage to fish growth by increasing their dose in their diet.

**Keywords:** Zinc Oxides NPs, Mono sex *Tilapia niloticus*, Haematology, Serum analysis

O-104/ICAZ-2022

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

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**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-105/ICAZ-2022

**The Evaluation of Growth, Antioxidant Status, Hepatic Enzymes and Immunity of NanoSelenium Fed *Cirrhinus mrigala***

Sobia Nisa<sup>1</sup>, Mahroze Fatima<sup>1\*</sup>, Syed Zakir Hussain Shah<sup>2</sup>, Noor Khan<sup>3</sup>, Wazir Ali<sup>1</sup>, Ayesha Khizar<sup>1</sup>, Amber Fatima<sup>1</sup>, Muhammad Asghar<sup>1</sup>

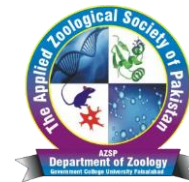
<sup>1</sup> Department of Fisheries and Aquaculture, University of Veterinary and Animal Sciences, Lahore, Pakistan.

<sup>2</sup> Department of Zoology, University of Gujrat, Gujrat

<sup>3</sup> Institute of Zoology, University of Punjab, Lahore, Pakistan.

**Abstract:**

The current study was conducted to investigate the effect of different concentrations of selenium nanoparticles (Se-NPs) on growth performance, carcass composition, antioxidant response, hepatic enzymes activity, and non-specific immunity of *Cirrhinus mrigala*. Five experimental diets were supplemented with Se-NPs at 0, 0.25, 0.5, 1 and 2 mgkg<sup>-1</sup> level and analyzed selenium content were 0.35, 0.64, 0.92, 1.43 and 2.39 mgkg<sup>-1</sup>, respectively. Fish (7.44 ± 0.04 g) were distributed



in each treatment in triplicates (25 fish/aquarium) and fed with experimental diet @ 3% body weight for 90 days. Results revealed that 1.43 mgkg<sup>-1</sup> Se-NPs enhanced (p0.05). Interestingly, no mortality was recorded throughout the feeding trial. Therefore, the present study recommended 0.99 mgkg<sup>-1</sup> supplementation of Se-NPs to enhance growth performance, antioxidant defence system and immunity of *C. mrigala*. Keywords: *C. mrigala*; Selenium nanoparticles; Growth; antioxidant response; immunity, hepatic enzymes

O-106/ICAZ-2022

**Adverse effects of propranolol upon rodent model**

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**Abstract:**

**Objectives:** To determine the teratological effects of propranolol on tissues including kidneys, heart and testis.

**Study design:** Observational study of teratological effects of propranolol on different body tissues. **Materials and Methods:** Swiss albino mice, aged above 6 months were taken. They were divided into 4 groups (control, low, medium, high) with the dosage values of propranolol measured at 15µg/g, 30µg/g, 60µg/g of their body weight, respectively. Mice were fed orally with butterfly needle for 30 days, and their body weights were measured on daily basis. At last mice were slaughtered and the teratological effects of propranolol were observed by Morphometric, Morphological, and Histological analysis. **Results:** It was noticed that increasing the dose of propranolol results in the increased tubular degeneration and vacuolation. The highest dose of propranolol (60µg/g of the body weight) caused enlarged amyloid body because of the poor and degenerated tubular formation. Likewise, high doses of propranolol caused necrosis and vacuolation in liver. High doses of propranolol damage striated strips in heart tissues, medium doses have water accumulation in between the heart tissues and low doses have tissues damage i.e. damaged striated strips and irregular arrangement of nuclei were observed.

**CONCLUSION:** Treatment with this antihypertensive and anti-anxiety drug propranolol (pregnancy category C) causes changes in the serum hormones and histology of the treated mice.

**Key Words:** Antihypertensive; antianxiotic; CNS; β<sub>1</sub> blocker; angina pectoris; subarachnoid haemorrhage; antipsychotic.

O-107/ICAZ-2022

**Biodiversity of Short Horned Grasshoppers from Middle Sindh, Pakistan**

Asif Nazeer Memon<sup>1</sup>, Naheed Baloch<sup>2</sup>, Riffat Sultana<sup>2</sup>, Sidratul Muntaha<sup>2</sup>, Shamshar Unar<sup>2</sup>

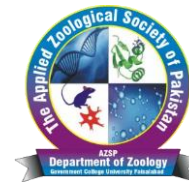
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<sup>2</sup>Department of Zoology, University of Sindh, Jamshoro Sindh, Pakistan

**Abstract:**

Middle Sindh includes three Districts namely District Dadu, Shaheed Benazirabad and Naushero Feroze. These above said Districts possess agriculture field, their temperature is suitable for rapid multiplication of insects, like short horned grasshoppers belonging to family Acrididae and long horned grasshoppers family Tettigonidae. They have economic importance to consider pest of different crops in these districts of Middle Sindh, so that proper diagnosis can be made, because locust is notorious member of the above said family and is a major pest of the various cash crops. We have collected 2416 specimens from different localities of Districts of Middle Sindh, namely village Qazi Arif, Village Ghulam Hussain Gadhi, Village Phaka, Village Muhammad Ibrahim Panhwar and Village M. Bachal Bouk of district Dadu, village walidad Zardari, Bux Ali Dahri, Bandhi, Baharo Khan Mari and village Sardar Khan Rind of District Shaheed Benazirabad and Village Puran, Gh; Hyder Jesar, Ayal Khan Tunio, Halani and Tharu Shah of District Naushero Feroze. We have collected the following 17 species namely *Oxya hyla hyla*, Serville 1831, 7.28% *Oxya fuscovittata*, Marshall 1836 7.98%, *Hieroglyphus perpallida*, Uvarov 1832 7.78%, *Aiolopus thalassinus thalassinus* Fabricius 1781 9.47%, *Aiolopus thalassinus tamulus*, Fabricius 1798 9.97%, *Acrotylus insubricus*, Scopoli 1786 7.16%, *Acrotylus fischeri*, Azam 1901 5.83%, *Locusta migratoria*, Linnaeus 1758 5.75%, *Sphingnostus savingnyi*, Saussure 1884 4.75%, *Trilophidia anulata*, Thunberg 1815 2.11%, *Melanoplus differentialis* Thomas 1865, 2.35% *Acrida exaltata*, Walker 1859 5.54%, *Hilethera aeolopoides* Uvarov 1922 5.50%, *Gonista rotundata* Uvarov 1933 4.51%, *Anacridium rubrispinum* Bie Benkio 1948 4.47%, *Oxya velox*, Fabricius 1787 8.27%, *Oxya japonica*, Thunberg 1815 1.20%





O-108/ICAZ-2022

**Production of Recombinant Therapeutic for the Treatment of Staphylococcal Mastitis in Dairy Animals**

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**Abstract:**

The dairy industry is one of the fast-growing industries in Pakistan. Livestock contributes 55.1 percent in value added GDP of agriculture and has remarkable potentials to expand. There are many economically important livestock diseases in Pakistan. Mastitis is most common infirmity of milking animals resulting in loss of production. Several practices have been adopted to control this havoc playing disease. Despite the implementation of management practices and treatment strategies, mastitis control still continues to be insufficient and requires some inexpensive, effective, efficient and reliable strategy for its control. Major problems faced due to traditional antibiotics include antibiotic resistance and antibiotic rejection of milk. Present study aimed to develop recombinant lysostaphin with high purity as an alternative therapeutic to traditional antibiotics against mastitis pathogens isolated from dairy milk. This strategy will lead to increase the cure rate of staphylococcal mastitis in dairy animals along with the remarkable reduction in the antibiotic residues based milk rejection challenge of dairy herds. This study will help combating dairy losses and achieving improved economic benefits of livestock, food security and nutrition. So, this novel method can be incorporated in national plan of mastitis prevention and control.

O-110/ICAZ-2022

**Therapeutic Potential of Synbiotic Products for Improved Health**

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<sup>1</sup>Department of Food Science, Government College University Faisalabad, Pakistan.

**Abstract:**

As probiotics and prebiotics has been proposed to confer numerous health benefits and provide a better barrier against a range of infectious disorders including irritable bowel syndrome, diarrheal sicknesses etc. However, the safe delivery of probiotics in human gut in adequate amounts is a challenge for food scientists due to unfavorable conditions of gastrointestinal tract, especially stomach, which is highly acidic. Research has been carried out on the modern techniques that can be used for safe delivery of probiotics. Synbiotic food products (food product having both prebiotics and probiotics) is gaining much attention recently due the availability of prebiotics along with probiotics that is able to enhance gut functionality and resulted as a natural cure for various diseases through the synergistic action of probiotic and prebiotics. The synbiotic products enhances the availability of different bioactive compounds and reduces the free radical production in body. As a result, it boosts the immunomodulatory components but also reduces the risk of cancer and tumor formation, cardiovascular diseases, irritable bowel syndrome, respiratory problems etc. For optimized results, Fermented and dairy food products can serve as a best vehicle for this synergistic effect.

**Keywords:** Probiotics, prebiotics, synbiotics, immunomodulatory effect, improved health

O-113/ICAZ-2022

**Effect of *L. Malic Acid* Supplemented Oilseed Meal Based Diet on Overall Performance of Common Carp Fingerlings**

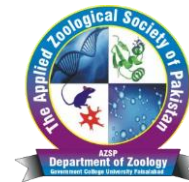
Muhammad Mudassar Shahzad<sup>1\*</sup>, Fatima Khalid<sup>1</sup>, Syed Makhdoom Hussain<sup>2</sup> and Syed Muhammad Khan<sup>1</sup>,

<sup>1</sup>Department of Zoology, Division of Science and Technology, University of Education, Township, Lahore, Pakistan

<sup>2</sup>Department of Zoology, Government College University, Lahore, Pakistan

**Abstract:**

From last few decades human population is growing rapidly with extra needs of food in form of fish as protein source. Use of fish as food source is increasing day by day, but the higher fish feed costs compel the researchers to search various additives as total or partial fishmeal replacer. Locally available plant proteins are considered to be the most suitable substitutes in aqua feeds with low pH of stomach. Acidified diet helps lower pH in fish gut and improves feed intake and nutritional digestibility. This study was aimed to evaluate the potent effects of *L. malic acid* accretion in coconut meal on body composition, nutrients utilization, blood hematologic indices, minerals absorption and growth of *Cyprinus carpio* fingerlings. Six experimental diets were formulated by using coconut meal supplemented with various levels of *L. malic acid* (0, 1, 2, 3, 4 & 5gkg<sup>-1</sup>) and pellets were prepared. Fingerlings were given their basal diets two times in 24 hours at 4% live body wet weight for seventy days; feces and carcass samples were collected and stored for further chemical analysis. The current study indicated that maximum weight gain (23g), weight gain percent (286%), SGR (1.50), and best FCR (1.25) were noted in fish fed on 3gkg<sup>-1</sup> of *L. malic acid* supplementation in coconut meal. Hematological parameters i.e. WBCs (8.56×10<sup>3</sup>mm<sup>-3</sup>), RBC (3.02×10<sup>6</sup>mm<sup>-3</sup>), Ht (36%), and Hb (8.7 g/100ml) had their maximum values at 3gkg<sup>-1</sup> *L. malic acid* in coconut meal (COM). ADC% of nutrients (crude protein 78%, and gross energy 70 kcal/g) was highest at 3gkg<sup>-1</sup> *L. malic acid* level. Highest values of mineral absorption i.e. Ca (77%), K (73%), P (75%), Na (76%) were recorded in group IV at 3gkg<sup>-1</sup> *L. malic acid*



supplemented in coconut meal. On the basis of these results it was concluded that improved hematological parameters, carcass composition, maximum nutrient digestibility, minerals absorption and growth were found in fish that were fed on test diet 4 (supplemented with 3gkg<sup>-1</sup> L. malic acid in coconut meal based diet).

**Keywords:** Nutrients digestibility, Growth, Hematology, Body composition, *C. carpio*

O-114/ICAZ-2022

**Length Weight Relationship (LWR) of Five Cyprinidea Fish species from Ranikoat Stream Water Sindh-Pakistan**

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<sup>1</sup>Department of Zoology, University of Sindh, Jamshoro

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<sup>3</sup>Directorate of Fisheries, Gilgit Baltistan

**Abstract:**

The length weight relationships (LWR) is most important parameters those are applied for the assessment of fish stocks and populations. LWR are presented for five Cyprinidea Fish species (*Labeo bata*, *L.pangusia*, *L.barbus*, *L.potail* and *L.porcellus*) collected from the Ranikoat Stream Water Sindh-Pakistan. The values of the exponent 'b' in the length-weight relationships (LWRs)  $W = aL^b$  ranged from 2.089 to 3.193. A total of 860 specimens were examined during the study. LWR indicated isometric pattern of growth for *L.barbus* and *L.potail*, a little positive allometric growth for *L.pangusia*, while while the negative allometric growth was observed for *Labeo bata* and *L.porcellus*. In further, the regression values shows median correlation ( $r^2 < 0.8$ ) except *L.barbus* ( $r^2 = 0.852$ ) for all other four species. The present findings of LWR will be useful for application in fish biology and fisheries management.

**Key Words:** Length-weight relationships, Cyprinidea Fish, Stream Water, Ranikoat.

O-116/ICAZ-2022

**Interactive Effect of Vitamin C and E on Growth, Lipid Peroxidation, Blood Biochemistry and Survival Rate of Silver Carp**

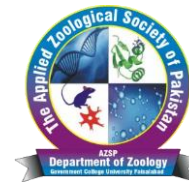
Fatima Khan<sup>1</sup>, Mahroze Fatima<sup>1\*</sup>, Syed Zakir Hussain Shah<sup>2</sup>, Ayesha Khizar<sup>1</sup>, Mehwish Khan<sup>1</sup>, Wazir Ali<sup>1</sup>, Amber Fatima<sup>1</sup>

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**Abstract:**

In the present study, Interactive effect of vitamin C and E on growth, lipid peroxidation, blood biochemistry and survival rate of Silver Carp was checked. Six isonitrogenous and isocaloric experimental diets were formulated by supplementing vitamin C and E at (0, 0), (250, 0), (500, 0), (0, 100), (250, 100) and (500, 100) mg/kg levels, named as D1, D2, D3, D4, D5 and D6 respectively. Feeding trial was conducted for 2 months. At the end of the feeding trial, growth performance, whole body composition, hematology, body indices, vitamin C and E content in liver, antioxidant enzyme activity, serum biochemistry and TBARS assay was monitored. At the end of trial, remaining 15 fish from each treatment exposed to *Aeromonas hydrophilla* and mortality was checked. The best growth performance and vitamin C and E content in liver was observed in D5 diet. Crude fat and crude protein showed significant results. Hematology showed significant increase at high supplementation of vitamin C and E. Hepatosomatic index was higher in the D4 and VSI show non-significant result. The Superoxide dismutase activity was high in D6 while GPx activity was higher in all treatments supplemented with 100 mg/kg of vitamin E along with 0, 250 and 500 mg/kg of vitamin C. The CAT activity was higher in treatment supplemented with high dose of vitamin C and E. The alkaline phosphates (ALP) activity showed better activity in D5 treatment while ALT and AST showed best result in D6. Survival rate after challenge was maximum in the groups treated with high dose of vitamin C and E (D3, D4 and D6). Result of the study showed that vitamin C and E supplementation improved the growth and health of silver carp. **Keywords:** Hypophthalmichthys molitrix; Antioxidant activity; Proximate composition; Vitamins C & E.



O-117/ICAZ-2022

**Population Explosion and Declension of Natural Resources in Pakistan**

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64200, Pakistan

**Abstract**

Human population and environment are related factors. Rapid Growth of population degrades natural resources, is contradicting. This study appraise relationship between population and natural resources. The demographic history of last four decades of Pakistan reveals several facts that, the increasing population is imposing pressure on limited resources. To improve standard of living, human is disturbing biodiversity that causes extinction of species from earth which give rise to agitation of natural cycles and other ecological problems. Uneven distribution of resources results in lusty race among humans. This competition badly effects the lifestyle of people living below poverty line which makes them compulsive to consume and contaminate available resources directly. Industrialization and innovations are of major concern to meet the rising demand for energy and other productions. Depletion of natural resources provoke different environmental problems like land degradation, loss of habitat and pollution. The resulting issues like global warming, water bodies' contamination, soil erosion and deforestation are threat for human beings as well as for other life forms on this planet. We discussed major challenges uprising due to over population and some strategies to overcome these obstacles for a sustainable environment.

**Keywords:** Population Growth, Environmental Problems, Biodiversity, Industrialization, Resources.

O-118/ICAZ-2022

**First Description of the Male of *Tamarixia sheebae* Narendran, 2005 (Chalcidoidea: Eulophidae) Managing *Trioxa hirsuta* (Hemiptera: Psylloidea), A Serious Pest in Pakistan**

Muhammad Tariq Rasheed<sup>1</sup>, Imran Bodlah<sup>2</sup>, Ammara Gull E Fareen<sup>3</sup>, Ansa Majeed<sup>1</sup>, Javairia Akram<sup>1</sup>, Beenish Shakir<sup>1</sup> and Muhammad Qurban<sup>1</sup>

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<sup>2</sup> Department of Entomology, PMAS Arid Agriculture University Rawalpindi, Pakistan

<sup>3</sup> Department Environmental Sciences, PMAS Arid Agriculture University Rawalpindi, Pakistan

**Abstract:**

Members of genus *Tamarixia* Mercet, 1924 are considered as the bio-control agents of the variety of insect pests and many other arthropods. Various species of genus *Tamarixia* have widely been used in several biological control programs against different species of psylloids. Herein male of *Tamarixia sheebae* Narendran, 2005 is described for the first time from Pakistan. Present study was conducted during 2018-2021 for the exploration of natural enemies associated with jumping plant lice in Pothwar Plateau of Pakistan. Specimens of *T. sheebae* were also observed while parasitizing the psyllid species associated with *Terminalia arjuna*. Digital photographs and distributional pattern of studied taxon is also presented. A comprehensive list of synonyms, host name, diagnostic characters of each species and key to Pakistani *Tamarixia* are presented.

O-119/ICAZ-2022

**New Locality Record of *Urentius hystricellus* (Richter, 1870) (Hemiptera: Tingidae) Associated with Egg Plant from Southernmost Region of Punjab, Pakistan**

Muhammad Tariq Rasheed<sup>1</sup>, Imran Bodlah<sup>2</sup>, Muhammad Bilal Khalil<sup>1</sup>, Muhammad Usama Khalil<sup>1</sup>, Muhammad Adnan Bodlah<sup>3</sup>, Muhammad Qurban<sup>1</sup>, Noreen Shazadi<sup>1</sup>, Mehvish Kousar<sup>1</sup> and Aysa Yaseen<sup>1</sup>

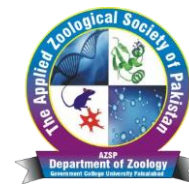
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**Abstract:**

Family Tingidae is mainly distributed in tropical and temperate regions with approximately 2600 described species across the world. Members of this family are also known as Lace bugs and have been reported as pests of various cultivated and ornamentals. Association between plant and lace bugs results in the form of plant injuries such as gall formation and leaves staining which also lead stunting plant growth and significant economic losses. During 2021-2022, as a result of extensive survey; number of individuals of lace bugs was collected from district Rahim Yar Khan. This species was previously



reported from Pothwar region. However, in this study we have added it as a new distributional record along with brief taxonomic note from Southern part of Punjab province. Detailed description, line drawing and images of damaging symptoms are provided. Further future directions have also been given for sufficient management of *Urentius hystricellus*.

O-120/ICAZ-2022

**Impact of Various Physio-Morphic Factors of Different Kabuli Chickpea Genotypes against Gram Pod Borer**

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**Abstract:**

Objectives: Impact of various physio-morphic factors of different kabuli chickpea genotypes against gram pod borer. Study design: Research was conducted in field area of Entomological Research Institute (ERI), AARI, and Faisalabad. Nine (9) kabuli chickpea genotypes i.e. PCK-15001, PCK-15019, PCK-16010, PCK-16027, PCK-17001, PCK-17007, PCK-17018, PCK-17030 and NOOR-2019 were sown under Randomized Complete Block Design (RCBD) consisting of three replications.

Materials and Methods: Data regarding pod borer population and pod borer damage was recorded at weekly intervals from the time of pest appearance till crop maturity. The data collected from all the replications was analyzed by analysis of variance (ANOVA) and mean values between the genotypes were compared by using LSD Test at  $P \leq 0.05$ . Then the data of pod borer percent damage was correlated with different physio-morphic characters and the data of pod borer population was correlated with abiotic factors by correlations (pearson) using statistix software. Results: Results showed that pod wall thickness and pod trichomes density had negative relation with the pod borer damage while chlorophyll contents of leaves had positive relation with pod borer damage. Highest pod borer population was recorded on PCK-17030 (2.22 larvae/plant) while the lowest population was recorded on PCK-16027 (0.97 larvae/plant). Highest pod borer damage was recorded on PCK-17030 (15.28 pods) while the lowest damage was recorded on PCK-16027 (11.05 pods). CONCLUSION: In case of pod wall thickness, the genotype PCK-17007 and PCK-16027 showed highest pod wall thickness (0.29mm) with minimum pod borer damage. The genotype PCK-17001 showed lowest pod wall thickness (0.21mm) followed by PCK-17030 (0.22mm) and exhibited highest pod borer damage.

**Key Words:** physio-morphic; pod borer; pod trichomes

O-122/ICAZ-2022

**Impacts of Anthropogenic Activities on Environment; A Critical Review**

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<sup>1</sup>Department of Biological Sciences, Thal University Bhakkar (University of Sargodha, Ex-Sub-Campus Bhakkar) Bhakkar-30000, Pakistan

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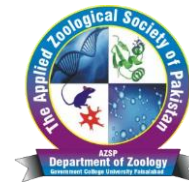
<sup>3</sup>Department of Botany, University of Karachi, Karachi, 75270, Sindh, Pakistan

<sup>4</sup>Department of Zoology, University of Malakand, Lower Dir, Pakistan

**Abstract:**

This critical review annotates current status of pollution and its impacts on environment. As environment creates a suitable situations for existence and growth of living organisms. All organisms are generally affected indirectly or directly due to different types of environmental pollution. It is due to rapid increasing in human population which is continuously resulting an increase in population explosion, urbanization, industrialization, transportation and deforestation activities. It is our main concern to keep our country's environment clean and green as cleanness is a part of our faith. Major different sources of pollution are increasing by anthropogenic activities which are rapidly adding different types of pollutants into our environment. Thus environmental pollution by anthropogenic activities is causing a major threat to plants, animals as well as to human. In recent advances there is a need of the day to expand clean & green spaces (plantation) around and within polluted areas for survival of better environmental conditions. If human population explosion and production of pollution causing structures go on without considering the importance of trees then possibly there will be more critical changes for living organisms in near future on surface of earth. So, green revolution is the best solution to arrest the pollution.

**Key Words:** Anthropogenic activities; Environmental pollution; Green revolution; Plantation.



O-123/ICAZ-2022

**Urinary Excretion and Renal Clearance of the Dimenhydrinate (Gravinate) in Male Volunteers**

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

**Abstract:**

Dimenhydrinate (Gravinate) is commonly used drug for the motion sickness. It is antiemetic drug also used for the prevention of vomiting, nausea, and vertigo and ear conjugation. It is available as liquid and tablets in the markets. The primary route of the drug is kidney. The main purpose of the study projects to observe the urinary excretion and renal clearance of the Dimenhydrinate in male volunteers after oral administration of Dimenhydrinate. All the seven healthy male volunteers of the age greater than 20 were selected for the study from Faisalabad. They all were looked physically fit. Sampling procedure and dosing methods were already clarified to all of the volunteers. Blank blood and urine samples were taken from each volunteer. Each volunteer was given 100 mg tablets of DMH orally. Healthy volunteers were offered similar breakfast after 1 hour of the drug administration. The plasma was separated from blood of each volunteer after centrifuge and plasma samples were stored at -20°C temperature until analysis. HPLC method was used for the analysis of DMH. The data was presented as mean ±SEM. Through regression analysis influence of diuresis and pH on %age dose excretion and renal clearance was analyzed.

O-127/ICAZ-2022

**The Role of Nanotechnology in the Fishing Industry**

**Author(s):**

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<sup>2</sup> Iran National Viral Diseases Strategic Network, Department of Scientific Information and Communication, Iranian Fisheries Science Research Institute (IFSRI), Agricultural Research Education and Extension Organization (AREEO), Tehran, I.R. Iran

**Abstract:**

Nanotechnology has a wide usage potential in the aquaculture and seafood industries. Nanotechnology is able to observe, measure, manipulate, and manufacture things at the nanometer scale. Nanotechnology playing important role in the delivery of nutrients, vaccines and other biological materials to different systems of fish. Another application possibility of nanotechnology is the usage of different conservation and packaging techniques to provide seafood safety by delaying enzymatic and microbial spoilage. Nanostructure magnifies the properties concerning traditional compounds (which are larger), owing to the greater surface area exposed and the small size, facilitating greater access to food. There are many different kinds of nanoparticles and nanostructures; for example, they may use metals, or substances of vegetable or animal origin, such as chitosan structures. Nanostructures such as nanoparticles, Nanoemulsions, and Nano fibers can be used to preserve the color, and flavor of fish, and limit the rapid deterioration of sensory quality. Liposomal encapsulation improves the chemical and physical stability of active compounds, prevents their interaction with other food compounds, and helps their targeted delivery inside the organism. The applications of nanoparticles in aquaculture has promisingly seen in water quality improvement, aquatic animal nutrition, drug delivery, disease diagnosis and management.

**Keywords:** Nanotechnology, aquaculture, seafood, safety, spoilage

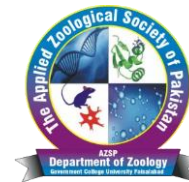
O-132/ICAZ-2022

**Histopathology assessment of 2-(thiophen-2-yl) Benzothiazole on the Rotenone-induced Parkinson's Rat Model**

Nadia Sattar, Rabia Sadiq, Sumaira Kanwal, Dr. Shazia Perveen

**Abstract:**

The aim of this research was to check out the side effect of rotenone and 2-(thiophen-2-yl) benzothiazole on vital tissue like (kidney, lungs, liver and heart) morphology, hypoplasia, hyperplasia, edema and inflammation. *In the methodology* the tissue were stained with hematoxylin and eosin and examine under electron microscope. Results revealed that the kidney is effected by exposure of rotenone and 2-(thiophen-2-yl) benzothiazole, the greater effect occur in parenchyma cell of kidney about 26% distorted parenchyma occur, 21% decreased space in bowman capsule, 16% necrosis, 16% increase in parenchymal space, 10% edema and 10% glomeruli change occurred, and effected the function of kidney. The result which are examine through histopathology of heart tissue showed that rotenone and 2-(thiophen-2-yl) benzothiazole caused the edema in myofibrils cell in heart. The rotenone and 2-(thiophen-2-yl) benzothiazole have the damaging effect on lungs tissue cause the inflammation and edema in parenchymal cell, alveolar duct and alveolus space. There is no effect of rotenone and 2-(thiophen-



2-yl) benzothiazole on liver tissue. *This result show toxic effect of rotenone and 2-(thiophen-2-yl) benzothiazole on vital tissue like (kidney, lungs, liver and heart).*

O-135/ICAZ-2022

**Sex Reversal of Nile Tilapia by using 17  $\alpha$  methyltestosterone Muzaffargarh, Pakistan**

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<sup>1</sup>Department of Zoology, Institute of Pure and Applied Biology, Bahauddin Zakariya University, Multan, Pakistan

**Abstract:**

The Human population continued to grow unabated with the need for food to alleviate the problems of malnutrition and starvation. This steady increase in population clearly indicates that traditional forms of livestock production and fishing will not be enough to solve the problem of high protein demand. Aquaculture is an excellent option that can bridge the wide gap between human protein requirements and local production by raising fish species such as *Oreochromis niloticus*. The tilapia is perhaps the most important aquaculture fish of the 21st century. Tilapia has certain favorable properties, such as tolerating adverse environmental conditions; it can survive low-soluble oxygen, euryhaline, enough fast growth, and efficient dietary change. These characteristics make tilapia one of the best choices for farmers (Yi et al., 1996; Penna-Mendoza et al., 2005). *Oreochromis niloticus* and its hybrids are the most widely cultivated species in the world, contributing to the food and nutrition security of individuals. This species is in great local demand for export as well as Asian local markets (Bhojel, 2013, 2014, 2019; Fitzsimmons, 2016; Pantenella and Bhojel, 2014). Many large hatcheries produce and supply more than 10 million seeds per month. Although they have many good features, but early growth is a major drawback in commercial tilapia production. They reach early sexual maturity and reproduce in the pond every 4-6 weeks. The technique of monosex culture can be used to control the growth of this unwanted tilapia through the culture of all-male tilapia in ponds. To solve this problem, most farmers are cultivating homogeneous tilapia, which has been instrumental in the successful development of the tilapia industry (Bhojeel and Naditrum, 2002). There are four strategies for mono- sex male culture, namely (i) manual operation through visual inspection; (ii) Hybridization (iii) genetic control and (iv) via steroid hormone.

O-136/ICAZ-2022

**Bacterial Biofilms: An Efficient Absorbent Material for Arsenic Remediation**

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<sup>2</sup> Department of Microbiology and Molecular Genetics, The Women University Multan, Multan, Pakistan

**Abstract:**

Arsenic is a very dangerous carcinogenic toxic metalloid that is present in nature enormously and needs to be removed. Due to many drawbacks of chemical and physical methods, biological approach including planktonic and biofilm forming bacteria present an interesting alternative solution to the problem. This study was conducted to explore the role of bacterial biofilms in arsenic bioremediation. Bacterial strains were isolated from industrial effluents of steel mill, tannery treatment plant and main drain of Kasur, Pakistan. Their biofilm formation potential was checked and also for arsenic reduction potential. Those bacterial strains which were capable of biofilm formation were selected for the study and used to form biofilms. Arsenic sorption was measured through different qualitative and quantitative assays. FTIR spectroscopy was also performed to study functional groups involved in the sequestration of arsenic. These bacterial strains exhibited increased EPS production in the presence of arsenic. Arsenic stress caused changes in protein and carbohydrate content of bacterial strains to deal with arsenic present in the surroundings. Scanning electron microscopy was also performed to evaluate morphological variations that occurred in EPS due to the presence of arsenic. Therefore, increased production of bacterial EPS with large number of polyanionic functional groups on its surface having tendency to sequester arsenic through electrostatic or covalent interactions presented EPS an excellent biosorbent material for arsenic bioremediation.

**Key Words:** Biofilms, Bioremediation, Arsenic, Sorption, Bacteria



O-137/ICAZ-2022

**The Effect of Environmental Factors on the Biodiversity and Body Size of Macroinvertebrates in the Tajan and Gorganrud Rivers and the Caspian Sea**

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<sup>1</sup> Urmia University, PhD. Student in Aquaculture Sciences, Urmia, I.R. Iran

<sup>2</sup> Iran National Viral Diseases Strategic Network, Department of Scientific Information and Communication, Iranian Fisheries Science Research Institute (IFSRI), Agricultural Research Education and Extension Organization (AREEO), Tehran, I.R. Iran

**Abstract:**

In this study, the data was taken from brackish and freshwater ecosystems, sampling of macroinvertebrates was performed at two the Caspian Sea stations, three stations in Tajan and three stations on the Gorganrud rivers between June and August 2017 using the leaf pack sampling method and the environment performed factors were measured at each site. Four taxa (Gammaridae, Nereididae, Balanidae and Decapoda) have been identified in the marine ecosystem. Taxa have been identified in the Tajan ecosystem (Lumbricidae, Chironomidae, Glossiphoniidae, Mytilidae, Lumbriculidae, Agriidae, Syrphidae and Tubificidae). Chironomidae, Tabanidae and Agriidae have been identified in the Gorganrud River ecosystem. Among ecosystems, macroinvertebrate body size has been affected by temperature, salinity, and pH. The body size of Gammaridae, Decapoda and Nereididae was affected by temperature and salinity in the marine ecosystem. While Glossiphoniidae, Chironomidae and Lumbricidae are affected by temperature and pH in the Tajan river ecosystem. Among the ecosystems, the species diversity was higher in the Tajan river ecosystem than the other ecosystems, also among the river ecosystems, species diversity of Tajan river was higher than that of the Gorganrud. According to observations among ecosystems, temperature and dissolved oxygen were the most important parameters affecting macrobenthic biodiversity and body size.

**Keywords:** Environmental factors, Body size, The Caspian Sea, Rivers, Biodiversity

O-138/ICAZ-2022

**Asian House Shrew (*Suncus murinus*) Morphometric Analysis & Phylogeny from Lahore, Pakistan**

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<sup>2</sup> Department of Microbiology, University of Central Punjab, Lahore, Pakistan

<sup>3</sup> Institute of Biochemistry and Biotechnology University of Veterinary and Animal Sciences, Lahore, Pakistan

<sup>4</sup> Department of Wildlife & Ecology, University of Veterinary and Animal Sciences, Lahore, Pakistan

<sup>5</sup> Institute of Zoology, University of the Punjab, Lahore, Pakistan

**Abstract:**

Rodents make up the largest group of mammals as they make up more than half of the species in the class Mammalia. More than 5000 living mammal species are belonging to the order Rodentia which possess continually growing upper and lower pairs of rootless incisor teeth. A total of 69 samples of rodents were collected from different localities in Lahore, Pakistan. Their morphometric measurements were recorded and tail samples were collected for phylogenetic analysis. The positive correlations between the various morphometric characteristics in shrews were identified, and they were identified as significant at the 1% level of significance. Body weight ( $r = 0.861$ ), tail length ( $r = 0.682$ ), forelimb length ( $r = 0.865$ ), and hind limb length ( $r = 0.980$ ) all revealed a linear and positive correlation with body length. The findings of this study thus suggest that there is a distinct geographic variation in the size and weight of house shrews. Based on the mitochondrial 16S rRNA gene nucleotide sequences of house shrews (*Suncus murinus*), a phylogenetic tree was created; shrews from Pakistan formed a monophyletic clade with increased genetic diversity. As a result, the shrews in these areas seemed to have originated from a distinct location than those in other areas. Shrews from Pakistan, Sri Lanka, and Myanmar, in contrast, belonged to several haplogroups. This discovery points to immigration trends in these regions. Both genetic and environmental factors, such as temperature, location, and geocological isolation, may have some effect on shrews' bodies. Therefore, further data are required to support this perspective. It is also advised to conduct a comprehensive phylogenetic and systematic review to establish the evolutionary relationship of rodents in Asia.

**Keywords:** Rodents, morphology, phylogeny, 16S rRNA, systematics.



O-139/ICAZ-2022

**Biofabrication of ZnO Nanoparticles using Acacia Arabica Leaf Extract and their Antibiofilm and Antioxidant Potential against Foodborne Pathogens**

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Muhammad Saqalein<sup>1</sup>, Saima Muzammil<sup>1\*</sup>

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**Abstract:**

Emergence of multidrug resistant pathogens is increasing globally at an alarming rate with a need to discover novel and effective methods to cope infections due to these pathogens. Green nanoparticles have gained attention to be used as efficient therapeutic agents because of their safety and reliability. In the present study, we prepared zinc oxide nanoparticles (ZnO NPs) from aqueous leaf extract of *Acacia arabica*. The nanoparticles produced were characterized through UV-Visible spectroscopy, scanning electron microscopy, and X-ray diffraction. *In vitro* antibacterial susceptibility testing against foodborne pathogens was done by agar well diffusion, growth kinetics and broth microdilution assays. Effect of ZnO NPs on biofilm formation (both qualitatively and quantitatively) and exopolysaccharide (EPS) production was also determined. Antioxidant potential of green synthesized nanoparticles was detected by DPPH radical scavenging assay. The cytotoxicity studies of nanoparticles were also performed against HeLa cell lines. The results revealed that diameter of zones of inhibition against foodborne pathogens was found to be 16–30 nm, whereas the values of MIC and MBC ranged between 31.25–62.5 µg/ml. Growth kinetics revealed nanoparticles bactericidal potential after 3 hours incubation at 2 × MIC for *E. coli* while for *S. aureus* and *S. enterica* reached after 2 hours of incubation at 2 × MIC, 4 × MIC, and 8 × MIC. 32.5–71.0% inhibition was observed for biofilm formation. Almost 50.6–65.1% (wet weight) and 44.6–57.8% (dry weight) of EPS production was decreased after treatment with sub-inhibitory concentrations of nanoparticles. Radical scavenging potential of nanoparticles increased in a dose dependent manner and value ranged from 19.25 to 73.15%. Whereas cytotoxicity studies revealed non-toxic nature of nanoparticles at the concentrations tested. The present study suggests that green synthesized ZnO NPs can substitute chemical drugs against antibiotic resistant foodborne pathogens.

O-142/ICAZ-2022

**Antihyperglycemic potential of (2E)-3-Phenyl-1-(3-pyridinyl)-2-propen-1-one in Alloxanized Hyperglycemic Rats**

Ammara Tehreem<sup>1</sup>, Haseeb Anwar<sup>1</sup>, Muhammad Naeem Faisal<sup>2</sup>, Rabia Akram<sup>1</sup>, Faiqa Sajid<sup>1</sup>, Azhar Rasool<sup>3</sup>, Tehreem Imaan<sup>1</sup>, Usra<sup>1</sup>, Sania Waris<sup>1</sup>, Ghulam Hussain\*

<sup>1</sup> Neurochemicalbiology and Genetics, Laboratory (NGL), Department of Physiology, Faculty of Life Sciences, Government College University, Faisalabad, 38000, Pakistan

<sup>2</sup> Institute of Physiology and Pharmacology, Faculty of Veterinary Sciences, University of Agriculture, Faisalabad, 38000, Pakistan

<sup>3</sup> Department of Zoology, Faculty of Life Sciences, Government College University, Faisalabad, 38000, Pakistan

**Abstract:**

Diabetes mellitus is a life threatening disorder due to defects in insulin secretion, action or both. The present study was designed to explore and evaluate the antidiabetic activity of synthetic derivative of chalcone named (2E)-3-Phenyl-1-(3-pyridinyl)-2-propen-1-one. In this study, fifty albino rats were divided into five groups, each containing ten rats. Diabetes was induced by single administration of alloxan monohydrate intraperitoneally (130mg/kg). After induction of diabetes, group 1 was marked as negative control, group 2 as diabetic group, and group 3 was treated with synthetic antidiabetic drug glibenclamide (10mg/kg). Group 4 and group 5 were treated with graded doses (5ml/kg and 10ml/kg) of synthetic research compound respectively. During whole month of treatment, physical parameters were recorded. After four weeks of treatment, all groups were subjected to decapitation. Serum and tissues samples were collected. Serum analysis was performed. Resulting data was investigated and subjected to ANOVA and DMR. Histopathological examination was conducted and photomicrographs were investigated. On the basis of histopathological and biochemical analysis, it is suggested that research compound possess strong antioxidant and antihyperglycemic activity. Statistical report of data confirmed that results are significance (P<0.05).





O-143/ICAZ-2022

**Virtual Screening of Some Selected Compounds of *Artemisia Absinthium* to assess Anti-Inflammatory Effect against Tumor Necrosis Factor, Cyclooxygenase-II Enzyme, and Nuclear Factor Kappa B**

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

<sup>2</sup> Department of Pharmacy, Hazara University, Mansehra, 21300, Pakistan

**Abstract:**

*Artemisia absinthium* has a wide range of therapeutic applications and is used to treat pain, inflammation, muscle ache, reduced fever, and gastrointestinal problems. The present investigation selected 14 compounds of *Artemisia absinthium* (*A. absinthium*) to assess their anti-inflammatory effect by virtual binding interactions against COX 2 (PDB ID: 5KIR), NF- $\kappa$ B (PDB ID: 1A3Q), and TNF- $\alpha$  (PDB ID: 2AZ5). The receptor-ligand interactions were determined by using PyRx 0.8 and Autodock vina 1.1.2. The PDB files of receptors were derived from the protein data bank and SDF files of ligands (compounds) were downloaded from PubChem. All 14 compounds showed interaction with TNF- $\alpha$  and COX 2. The binding affinities were more than -5.0 kcal/mole. Maximum binding affinity was showed by sclareol; -7.7 kcal/mole and  $\beta$ -caryophyllene; -7.3 kcal/mole with TNF- $\alpha$  while the same compounds ( $\beta$ -caryophyllene and sclareol) exerted maximum interaction with COX 2. Fewer compounds interacted with NF- $\kappa$ B and out of 14, only 4 compounds show receptor-ligand interaction, and maximum binding affinity was shown by sclareol -6.0 kcal/mole. Hence, virtual molecular screening revealed *A. asinthium* has anti-inflammatory potential owing to its phytoconstituents, and among 14 compounds  $\beta$ -caryophyllene and sclareol exhibited maximum anti-inflammatory effect owing to good binding affinities with TNF- $\alpha$ , COX 2, and NF- $\kappa$ B. The study also conclude that COX 2 and TNF- $\alpha$  are important receptors that are attributed to inflammation and might be downregulated by compounds of *A. asinthium*.

**Keywords;** Anti-inflammatory, *Artemisia asinthium*, COX, NF- $\kappa$ B, TNF- $\alpha$ , molecular docking, autodock vina

O-150/ICAZ-2022

**Studies on Seroprevalence and Liver Function Test Enzymes of Sheep and Goats Naturally Infected with *Echinococcus granulosus***

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**Abstract:**

Economic fatalities are caused owing to cystic Echinococcus (CE) in the farm animals causes significant losses due to censure of pretentious mammal organs at the slaughterhouse and manufacturing victims and the disadvantages are connected to the management of humans and animals. Seroprevalence of Echinococcus granulosus in small ruminants was studied in area of Cholistan desert, district Bahawalpur from July 2019 to June 2020. Serum samples were collected from sheep (n=101) and goats (n=115) respectively from the cholistan desert, Bahawalpur. A standard questionnaire was designed for collecting the data related the risk factors at the time of survey. Antibodies to Echinococcus granulosus were tested by using enzyme linked immunosorbent assay (ELISA). Overall seroprevalence of Echinococcus granulosus were detected 29(36.57%). Out of 101 sheep, 55 were male and 46 females. Echinococcus granulosus was positive in 14(25.45%) male and 10(21.72%) in female. Higher seroprevalence rate was found in males. Out of 115 goats 55 were male and 72 females. Echinococcus granulosus was positive in 25(58.13) male and 30(41.66) female and higher seroprevalence was found in male. According to age group, 12 month old sheep and goats was found more prevalent(24.39%,49.20%) than more than 12 month old sheep and goats. The age group of sheep and goats (13-24 months) the prevalence was more in goats than sheep. The Mean $\pm$ SEM values of AST, Total bilirubin and GGT higher in infected host (sheep). While on the other hand the values of ALP, ALT, Albumin lower in infected host. In goats Mean $\pm$ SEM values of AST, ALT and GGT was higher in infected host .while the value of ALP Albumin, Total bilirubin was recorded lower values in infected hosts and higher in non-infected hosts. In conclusion the Echinococcus granulosus. seroprevalence was higher in goats than sheep. The male of small ruminant was more prone to the parasite than females. The adult as more resistant to the parasite than younger animals. The biochemical results showed the higher values in infected than non-infected hosts.

**Keywords:** Echinococcus granulosus, sheep goat, AST, ALT and GGT



O-154/ICAZ-2022

**Integrated Control and Prevention of Malaria (*Anopheles Stephensi*) and Dengue (*Aedes Aegypti*) Vectors with Plant Extracts through Water, Insecticides and BTI**

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<sup>2</sup>Institute of Entomological Research, Ayub Agriculture Research Institute, Faisalabad, Pakistan.

**Abstract:**

Mosquitoes act as life threatening disease vectors. Due to non-availability of vaccine and treatment for most of these diseases, the only solution is to control the mosquitoes. The continuous application of synthetic insecticides causes development of resistance (in vector species), biological magnification (of toxic substances through the food chain) and adverse effects (on environmental quality and non-target organisms including human health). So, under the Integrated Mosquito Management (IMM), emphasis is given on the application of alternative strategies in mosquito control such as use of insecticides, plant extracts and Bti. Mosquito larvae were collected from different habitats and brought for identification. After identification, *Anopheles* and *Aedes* mosquitoes were reared separately and treated with different plant extracts, growth regulators and Bti. Plant extracts through water and insecticides and Bti were tested in combination to test their efficacy against *Anopheles* and *Aedes* larvae. Again mortality data was collected and subjected to probit analysis to calculate LC50. The least value of LC50 (162-398 ppm) observed with solution of water extracts, Bti and insecticides for *Anopheles* and *Aedes* larvae. By adopting these techniques we should be able to manage the populations of *Anopheles* and *Aedes* in the environment.

**Keywords:** Larvae; Plant Extracts, Pupae; *Aedes aegypti*; Mortality

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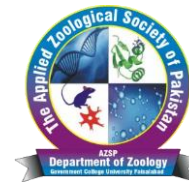
**Gel of Feruloylated Arabinoylans extracted from Maize bran with special reference to its Structural and Antioxidant Potential**

Muhammad Ahtisham Raza<sup>1</sup>, Farhan Saeed<sup>1</sup>, Muhammad Afzaal<sup>1</sup>, Muzzamal Hussain<sup>1</sup>, Amara Rasheed<sup>1</sup>  
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**Abstract:**

Maize bran is a milling by-product of maize kernels, used as animal/poultry feed and reported as an abundant source of nutrients and bioactive moieties which are therapeutically and technologically important due to their unique composition. Current research aimed to evaluate the hydrogels synthesized from maize bran arabinoylans; non-starch polysaccharide. Initially, in this study, maize bran was evaluated for its proximate composition and dietary fiber profile. Then, the extraction of arabinoylans from maize bran was done through alkali digestion and in-vitro gelation of arabinoylans was performed through enzymes (laccase from *Termites versicolor*). After which, the structural characterization of hydrogels was taken place through FTIR and SEM. The phenolic compounds and their activity was assessed through three different assays including DPPH, FRAP and ABTS. The results regarding the chemical composition of maize bran showed that maize bran majorly composed of moisture, ash, crude fat, fiber, crude protein and nitrogen free extract 10.13±0.46, 1.87±0.15, 1.26±0.26, 7.53±1.00, 12.67±0.75 and 66.54±0.82. Further, results regarding dietary fiber profile showed that maize bran comprised 6.97±0.5% and 35.20±4.1% soluble and insoluble fractions of dietary fibers which are esterified with bioactive components. Then, the structural characterization of maize bran through FTIR showed a typical spectra and presented the peaks at different wavelengths which are suitable for the interpretation of chemical structure of typical gel of arabinoylans. Surface morphology of gel through scanning electron microscopy showed micrographs with microparticles, which formed due to laccase activity. However, quantification of polyphenols including TPC and TFC showed the results 6.42±0.18 GAE/g and 1.84±0.66 CE/g and their activity assessed through DPPH, FRAP and ABTS, showed the values including 31.62±0.16, 34.87±0.18 and 14.21±0.18 respectively. Conclusively, the nutritional and functional assessment of maize bran through an in-vitro study showed that maize bran is highly recommended for the development of functional foods due to its superior nutritional and different techniques were used to evaluate the potential of these bioactive moieties.

**Keywords:** Maize bran, Arabinoylans, Hydrogels, antioxidant activity, FTIR, Scanning electron microscopy



O-160/ICAZ-2022

**Livestock Poisoning Neem Seed oil: A Prospective Feedstock for Eco-friendly Biodiesel Production**

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**Abstract:**

An urge to search for alternate sources of fossil fuel has been sparked by energy and environmental challenges. In this case, biodiesel has emerged as a potential renewable alternative to petro-diesel. From an economic standpoint, non-edible plant oils can be an acceptable replacement for edible seed oil in the manufacture of biodiesel in addition to a variety of potential edible feed stocks. Because non-edible seeds are wasted as harmful to both humans and animals. After being consumed by animals, poisonous plants create their harmful consequences, which can include physical discomfort, decreased productivity, and even death. In current study, *Azadirachta indica* or Neem seed oil was selected as feedstock for biodiesel production as it contains the triterpenoids and potent odor. Neem oil consumption has the potential to be toxic and in young children and infants can result in metabolic acidosis, convulsions, kidney failure, encephalopathy, and serious brain ischemia. Additionally, it may be connected to allergic contact dermatitis. Neem trees yield about 40–50 kg of fruits per plant every year, which equates to 25–30 kg of seeds when they are fully grown. Neem has a 2.67 ton/ha average seed output at 400 plants per ha. The seed kernel capacity to produce neem oil ranges from 35 to 45%. The seed oil is 69.40% unsaturated (61.90% oleic acid, 7.50% linoleic acid) and includes 29.30% saturated fatty acids (14.90% palmitic acid, 14.40% stearic acid). The high FFA (6.52 mg/g KOH) of the non-edible oils was decreased to less than 1% by two-step transesterification (pretreatment). The pretreatment process was carried out at 50°C for 1 hour with an acid catalyst (1% w/w H<sub>2</sub>SO<sub>4</sub>) and the mixture was left to settle for two hours. Following esterification, transesterification was carried out using a heterogeneous TiO<sub>2</sub> nanocatalyst at a methanol to oil molar ratio of 6:1, 60°C, 0.1 wt. % catalyst loading and an agitation rate of 600 rpm. The yield of methyl esters (FAME) was 95% under ideal circumstances. A recommended environmentally friendly feed stock for biofuel is *Azadirachta indica* seed oil due to its physicochemical qualities.

O-161/ICAZ-2022

**Improvement in Overall Performance of *Catla catla* Fingerlings Fed *Moringa oleifera* Seed Meal Based Diet Cultured in Earthen Ponds**

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**Abstract**

This experiment was conducted under semi-intensive rearing system to evaluate the efficacy of *Moringa oleifera* seed meal (MOSM) based diet on growth performance and carcass composition of *Catla catla* cultured in 6 earthen ponds. In order to formulate experimental diets, MOSM was used as test ingredients. MOSM 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 diets used during the trial. Fingerlings were placed in a cemented pond for fifteen days under laboratory conditions for acclimatization. Total 270 fingerlings were distributed in 6 earthen ponds and 45 fingerlings were stocked in each pond. Fingerlings were fed at the rate of 3% of their live wet weight. Water quality parameters such as dissolved oxygen (DO), temperature and pH were monitored throughout the trial. Results of growth performance in terms of final weight and weight gain were recorded maximum when fingerlings fed diet with 10% inclusion of MOSM in the diet. It was also noted that values of carcass composition of fingerlings were recorded best when fingerlings fed with 10% replacement of FM with MOSM in the diet. In the current study, it was concluded that 10% replacement of FM with MOSM in the diet of *C. catla* improve the growth performance and carcass composition of fingerlings.



O-164/ICAZ-2022

**Investigating the Microbial Flora of Rainbow Trout after Feeding with Mealworm (*Tenebrio molitor*)**

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**Abstract:**

Mealworms are the larval form of the yellow mealworm beetle, *Tenebrio molitor*, a species of darkling beetle. Insects can open a new world of sustainable and protein-rich foods to the world of farmed fish. Various studies have examined TM as a source of protein in the diet of different species of fish. Researchers in rainbow trout (*Oncorhynchus mykiss*) have performed nutritional experiments using diets with different levels of TM replacement and reported optimal fish performance. Accordingly, the present study aimed to investigate the effects of using different percentages of TM larvae powder in the diet of *Oncorhynchus mykiss* on increasing the number of beneficial bacteria and probiotics *Bacillus safensis*. 240 pieces of rainbow trout were prepared from fish breeding ponds in Sirch region of Kerman province and after 7 days of adaptation period with a density of 20 pieces were transferred to each fiberglass tank with a volume of 50 liters and 3 repetitions were considered for each treatment. The results showed that *Bacillus safensis* bacterium had the highest number of beneficial bacteria and probiotics in the gastrointestinal tract of rainbow trout fed with TM powder, which was identified by culture, PCR and phylogenetic tree drawing. There is relatively little information about fish gut microbiota and its response to nutritional and environmental conditions, even though fish make up almost half of the living vertebrate species and are of global economic importance.

O-165/ICAZ-2022

**Efficacy of different types of biochar on growth performance and body composition of *Ctenopharyngodon idella* fingerlings**

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**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. idella* 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 (15.26%), lowest FCR (1.34), highest SGR (1.98) 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 (16.87%) and crude fat (6.17%). 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. idella* fingerlings.

O-166/ICAZ-2022

**Effects of Aloe Vera Supplemented Canola Meal-Based Diet on Growth Performance and Body Composition of *Labeo rohita* Fingerlings**

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

**Abstract:**

The purpose of this particular study was to evaluate and determine the effect of Aloe vera supplementation on growth performance and body composition of *Labeo rohita* fed with canola meal based diets. For this purpose, six canola meal based diets were prepared including one control diet (without out A. vera supplementation) and five other diets containing 1%, 2%, 3%, 4% and 5% A. vera supplementation. In this study, three replicates of each treatment were used and number of fingerlings was 15 in each replicate and was fed at the rate of 5% of their live wet weight. The results revealed that supplementation of A. vera in canola meal based diets significantly ( $p < 0.05$ ) improved growth performance and body composition. Most optimum values of growth performance parameters were noted at 2% A. vera supplemented diet. *L. rohita* fingerlings fed canola meal based diet supplemented with 2% level of A. vera indicated significant ( $p < 0.05$ ) improvements in crude protein (19.42%) while crude fat (5.41%) was minimum at this level. From these results, it was concluded that 2% A. vera supplementation in canola meal based diet is optimum for improving growth performance and body composition of *L. rohita* fingerlings.



O-167/ICAZ-2022

**Recombinant DNA Technology for the Production of Industrially Important Enzymes**

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<sup>2</sup> School of Biological Sciences, University of The Punjab, Lahore, Pakistan

**Abstract:**

Poultry sector is one of the major established industry of Pakistan that is committed to provide valuable meat to our community. Phytases, cellulases, xylanases and proteases are the main enzymes being added in the poultry feed. The addition of these enzymes is important because their addition in feed put a positive impact on the growth of poultry bird. Phytases are responsible for the availability of free phosphorus while the xylanases and cellulases are responsible for the availability of monomeric absorbable sugars for the growth of bird whereas proteases also involve for the improvement of digestion of proteins. In the absence of these enzymes the phytate, cellulose and xylan are not being digested by the poultry bird and these components of feed simply pass through the digestive track and are removed from the body with manure and contribute in environmental pollution.

Recombinant DNA Technology is a very good tool for the production of industrially important enzymes/proteins. In the current study the phytase, cellulase and xylanase genes from hyper-thermophilic bacterium were amplified by PCR, cloned in pTZ57R/T and the recombinant vector was utilized for the transformation of *E. coli* DH5 $\alpha$  cells. The expression of phytase, cellulase and xylanase genes were analyzed in *E. coli* BL21 cells using pET 21a as expression vector. Recombinant proteins were purified through different chromatographic techniques and their molecular masses were determined through SDS-PAGE and gel filtration methods. The recombinant proteins were characterized and these locally produced recombinant enzymes were utilized for supplementation of poultry feed to examine their effect on the growth of poultry birds. The supplementation of poultry feed with locally produced enzymes showed significant growth enhancing effect on poultry birds and improved the feed uptake and feed conversion ratio.

O-169/ICAZ-2022

**Monkeypox Poses: A Serious Public Health Challenge**

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**Abstract:**

MPXV is a zoonotic disease due to Orthopoxvirus infection that has reemerged after decades of smallpox eradication, raising international concern. MPXV was originally found in West and Central Africa in the 1970s, but it has now crossed the borders of Africa, and Europe and America recorded the most newly infected patients at the time. Common routes of transmission are zoonotic transmission and human-to-human transmission. The most common routes of transmission are direct and prolonged contact with patient bodily fluids, unprotected contact with lesions, and sexual contact. Early symptoms can manifest as headache, fever, lymph node inflammation. It is worth noting that despite the similarity in clinical manifestation between smallpox and monkeypox, swollen lymph nodes can distinguish MPX from smallpox. MPXV has 5 stages based on the clinical manifestation of lesions appearing on skin, macula, papule, vesicle, pustule and scar. There are several methods for detecting, preventing, and treating MPXV. This paper provides a general introduction to Monkeypox disease.

**Keywords:** Monkeypox, Prevention, Transmission, Diagnosis



O-170/ICAZ-2022

**Disaster COVID-19, Past, Present, and Future**

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**Abstract:**

The COVID-19 disease has had a complex and wonderful aspect since it first appeared in December 2019 in the city of Wuhan, China. This global and pandemic disease that has appeared in the world in the form of MERS and SARS in recent years has always had a complex and unknown nature and behavior. From the onset of this disease to this date, 615,665,850 cases of morbidity and 6,523,816 deaths have been reported worldwide due to this viral complication. This lecture will try to present the background and records of this hazardous virus and present the events of the last three years from various dimensions, and discuss the fate and possible approaches of this virus in the coming years and the possibility of repeating similar incidents. Also, the inadequacy of vaccines and their incompleteness on a global scale, the high mutability of the virus, the short period of immunity and the lack of an effective and appropriate treatment policy, and other complex features of this worldwide pandemic complication, there is still has a long way to go before it becomes endemic in different countries. The sum of these factors and characteristics has made dealing with this disease very difficult and ambiguous in all parts of the world.

**Keywords:** COVID-19, Pandemic, Immunity, Prospect

O-171/ICAZ-2022

**Possibility of COVID-19 in Animals and its Control and Prevention**

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**Abstract:**

COVID-19, as pandemic disease, originated in China and spread rapidly around the world, and despite tremendous efforts to control it, the disease is still spreading. Human-to-human transmission of the disease has been confirmed, but views differ on animal disease, animal-to-human, or animal-to-animal transmission. According to studies, here provides some information on the risk of COVID-19 for animals. After the outbreak of COVID-19, reports of infection of some animals such as cats in Hong Kong, New York, Zoo tigers, and mink on Dutch farms prompted researchers to study virus-susceptible species and their possible transmission to humans. The susceptibility of some animals to COVID-19 was also examined. Some reports also indicate that dogs, pigs, chickens, and ducks are less sensitive to COVID-19 than cats and ferrets. According to laboratory experiments, hamsters, rabbits, and common marmosets are also susceptible, but there are no studies on other animals like livestock. To date, there is no evidence that animals play a significant role in the spread of COVID-19, and based on the limited information, the risk of animal-to-human transmission of COVID-19 is rare but despite the non-confirmation of this way, control, and prevention of the spread of



the disease are considered important. Anyhow, it should study more and future research will provide a lot of information about Covid-19 transmission and animal management under its control.

**Keywords:** COVID-19, Animals, Transmission, Prevention

O-174/ICAZ-2022

**Prevalence and Intensity of Gastrointestinal Nematodes Infections among Wild Sheep Kept in Captivity in Faisalabad, Pakistan**

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**Abstract:**

Wildlife parks exhibit wild animals for aesthetic, educational and conservation purposes. Nematodiosis constitute one of the major problem causing morbidity and even mortality in captive wild animals. A total of 120 fecal samples of wild sheep of all ages and sexes was collected from October 2019 to June 2020 at the Wildlife Park Gatwala, Faisalabad, Pakistan from the ground after defecation at morning of the day. Fecal samples were examined with the centrifuge technique, and McMaster counting chamber for egg count per gram feces (EPGF). Copro-culture enabled larval determination of specific ones. Samples were found to be infected with gastrointestinal nematodes and overall prevalence were *Trichostrongylus circumcincta* (58.33%), *Haemonchus contortus* (15%), *Trichuris trichiura* (8.33%) and coccidian (10%). Seasonal prevalence of gastrointestinal nematodes in summer and winter was (53.32%) and (38.32%) in respectively. The nematode infection was higher in summer season as compared to winter. The infection among females (65%) as well as old age animals (54%) was higher ( $p < 0.01$ ) as compared to male (37.49%) among wild sheep. The range of EPG (egg per gram) varied from 100-300 among the nematodes and highest infestation was found of strongylids. The mixed infection *T. circumcincta* and *H. contortus* (2.5%), *T. circumcincta* and *T. trichiura* (1.66%), *T. circumcincta*. The most prevalent nematode was *T. circumcincta* among wild sheep.

**Keywords:** Wild sheep, GI nematodes, season, sex

O-176/ICAZ-2022

**Temporal Assessment of Hepatic Expression ChREBP (Carbohydrate Response Element-Binding Protein) in Alloxan-Induced Hyperglycemic Adult Rats.**

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**Abstract:**

Diabetes mellitus is a metabolic disorder characterized by abnormally high plasma glucose levels and diminishing insulin levels. The experimental rodent models employed for the study of diabetes mellitus commonly include the alloxan and streptozotocin-induced beta cell damage, thus mimicking a hyperglycemic state which can be further characterized as type 1 or type 2 diabetes based on chronicity and hyperinsulinemia/insulin resistance. Carbohydrate response element binding protein (ChREBP) is a transcription factor protein responsible for the upregulation or down-regulation of multiple genes in pancreatic beta cells and hepatocytes in the liver. ChREBP is activated by an increased concentration of glucose in the plasma. Low plasma levels of glucose serve as the negative feedback on the ChREBP activity and result in its inactivation and subsequent cytosolic translocation. ChREBP activation after the increase in the plasma levels of glucose is an important step as ChREBP is responsible for the activation of the antioxidant enzyme thioredoxin (Txn), through the downregulation of the gene expression of thioredoxin interacting protein (Txnip). Txnip binds and inhibits the activity of thioredoxin. Thioredoxin prevents oxidative damage induced by hyperglycemia in the beta cell and hepatocytes. The current study was conducted to assess the gene expression profile of the ChREBP isoforms after the alloxan pretreatment induced hyperglycemia in adult male Wister rats. The secondary aim of the current was to assess the possible correlation between the expression pattern of the two forms of ChREBP (alpha and beta) and the antioxidant response element genes like Nrf2 and NfκB. The Time series analysis model of sampling was used to assess the temporal pattern of ChREBP gene expression in the liver in adult male Wister rats. Total RNA from the liver tissue was extracted by using Trizol and stored at -80 °C. These tissue samples were originally collected, and subsequent total RNA extraction and tissue histology were performed during a previous study (2021). In that previous study, a total of 24 male Wister rats (body weight = 220g ±20) were selected for experimentation. Out of 24 rats, 03 rats were used as control and given no treatment, whereas 21 rats were divided into seven (07) equal groups (n=03) and each group was treated with alloxan. The dosage of alloxan used for the treatment was 130mg/kg b.w. The animals (n=3) were then sacrificed on the 0, 1, 3, 5, 8, 12 and 15th day post-treatment of alloxan and streptozotocin. The blood level of glucose was also observed through tail during the 15-day trial period in both groups. For the assessment of the mRNA levels of the ChREBP α, ChREBP β, Nrf2, and NfκB genes in the liver tissue after the alloxan treatment, the specific primers for each gene were designed and subsequently used in the real-time-PCR procedure. The results of the current reveal that the hyperglycemic state was achieved within 24 hours of the alloxan treatment and lasted for the next 8 days. From the 8th day onwards a downward trend the blood glucose levels were observed. The gene expression profile of the ChREBP isoform



affirms the notion that high glucose concentration is the main trigger for the upregulation of its expression. Interestingly the abnormally high glucose levels, which are observed after alloxan pretreatment also induce reactive oxygen species (ROS) and endoplasmic reticulum stress. The generation of ROS and the subsequent mitochondrial stress induces the expression of antioxidant response element genes. Both Nrf2 and NfκB have shown upregulation of their expression after the alloxan pretreatment and hyperglycemia. Although the increase in the expression pattern of these antioxidant genes was delayed as compared to the ChREBP isoforms. The current study highlights the dual mechanism of cellular antioxidant response after the abnormal increase in blood glucose where carbohydrate response element binding protein isoforms genes seem to represent a swifter transcriptional response towards rising glucose levels as compared to the Nrf2 and NfκB genes. This is understandable as the Nrf2 and NfκB gene transcription have been shown to be induced by the generation of ROS, a phenomenon that follows the initial step of abnormal levels of high blood glucose.

O-177/ICAZ-2022

**Role of Sesame meal in Improvement of Body Composition, Mineral Absorption and Immunological indices of Common Carp (*Cyprinus carpio*)**

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<sup>2</sup> Department of Zoology, Government Collage University, Faisalabad, Pakistan

<sup>3</sup> Department of Zoology, University of Okara, Okara, Pakistan.

**Abstract:**

Fish meal (FM) is the principal component in fish feeding, but the FM prices have increased in the past decade and are expected to increase further to meet the sustained growth. Therefore, plant protein sources are being considered as an alternative source for protein in diet formulation for inexpensive cost and more easily available sustainable source. The present research work was conducted to evaluate the effect of sesame meal based diet on body composition, mineral absorption and immunological indices in *Cyprinus carpio* fingerlings. Six test diets (0%, 10%, 20%, 30%, 40% and 50%) were prepared using alternative plant protein (sesame meal) with fish meal by adding chromic oxide (1%) as an in-digestible marker. Triplicate tanks were used for all treatments and fish were feed at 4% of live body weight. Feces were collected twice a day from each tank to find the mineral absorption. After 70 days trial, blood and whole body samples were collected for analysis. Results manifested that fingerlings fed with test diet III (20% replacement of sesame meal) showed best result in the carcass composition (crude protein; 17% fat; 7% gross energy; 2kcal/g and ash; 6%), immunological indices (WBCs;  $8 \times 10^3 \text{mm}^{-3}$  and monocytes; 4%) and mineral (Ca; 67%, Na; 70%, K; 72% and P; 69%) absorption in the fish body. From results it was observed that, if further increase the replacement levels it may negatively affects the fish performance. So, it was concluded from the results that 20% replacement of fish meal with sesame meal making cost-effective and eco-friendly fish feed as compared to other test diets.

O-179/ICAZ-2022

**Hyperlipidemia; its treatment with *Ajuga bracteosa* using High Fat Diet Animal Model.**

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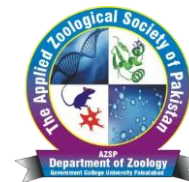
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**Abstract:**

Hyperlipidemia is a result of abnormal fat metabolism or fat transport in the body. It is characterized by elevated levels of lipids in the blood, including total cholesterol (TC), triglycerides (TG), high-density lipoprotein cholesterol (HDL-c) and low-density lipoprotein cholesterol (LDL-c). In this study, we appraise the antihyperlipidemic effect of *Ajuga bracteosa* hydro methanol extract (250 mg/kg and 500 mg/kg) in High Fat Diet induced hyperlipidemia model and confirmation of antihyperlipidemic activity with *in-silico* induced fit molecular docking. Further, antihyperlipidemic activity was evaluated by analyzing blood serum and tissue samples for proinflammatory cytokines, leptin, adiponectin, and oxidative stress. mRNA expression of CYP7A1, HMGCR and PPAR- $\alpha$  genes were also assessed through qPCR. *A. bracteosa* is capable of lowering cholesterol and leptin levels whereas, increase adiponectin. *A. bracteosa* also noticeably decrease the high IL-6 and TNF- $\alpha$  amounts in hyperlipidemic animals. *A. bracteosa* also upgrade the oxidative stress tension markers (CAT, SOD and MDA). These data indicate that *A. bracteosa* has a promising antihyperlipidemic potential and may be useful in reducing some of the pathologies associated with cardiovascular diseases.

**Key words:** Hyperlipidemia, High Fat Diet, leptin, adiponectin





O-180/ICAZ-2022

**Probing the Antidiabetic Effect of *Ocimum sanctum* Linn (Holy Basil) Leaves Extract on Alloxan-Induced Diabetic Rabbits**

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**Abstract:**

Diabetes mellitus is a metabolic disorder that is characterized by elevated blood sugar levels. It is alarming that the number of people having diabetes mellitus is increasing day by day. Medicinal plants had been in use as a remedy for numerous diseases all around the world. Holy Basil (*Ocimum sanctum* Linn) commonly known as Tulsi, is an ayurvedic medicinal plant. It has hypoglycemic, hepatoprotective, and anti-hyperlipidemia properties. Different bioactive components like antioxidants, phenols, and flavonoids in leaf extract play an antidiabetic role in controlling hyperglycemia. The objective of the study was to identify the antidiabetic potential of Holy Basil (*Ocimum sanctum* L.) leaves extract using lab animals. Five groups, with 5 rabbits in each, were made. The first group (T<sub>0</sub>) was healthy while the other four (Treatment groups T<sub>1</sub> to T<sub>4</sub>) were given a single shot of a diabetogenic agent, Alloxan, to induce diabetes. Healthy-T<sub>0</sub> and Diabetic-T<sub>1</sub> groups were fed on a placebo/normal diet while Diabetic-T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub> groups were treated with a daily dose of ethanolic extract of Holy Basil leaves @ 100, 200, and 300 mg/body weight respectively along with a normal diet. All groups were subjected to complete blood Counting (CBC), liver function tests (LFT), and renal function tests (RFT) at the start and end of treatment. Whereas fasting blood glucose (FBG) and weight were assessed on weekly basis (7th, 14th, 21<sup>st</sup>, and 28th day). Results clearly indicated that as the extract dosage increases, there is a decrease in blood glucose levels. A dose of 300 mg/g per body weight of rabbits caused a significant fall in blood glucose levels and weight loss. Post-treatment hematological analysis showed a significant increase in monocytes, and ESR while a decrease in granulocytes, HCT, and platelets. However, serum biochemical tests showed elevated RFT and LFT values at the end of treatment. The current study provides scientific evidence that an appropriate dose of Holy basil leaves may be a good alternative antidiabetic agent with minimum or no side effects. However, the safety profile needs to be verified through further clinical trials.

O-181/ICAZ-2022

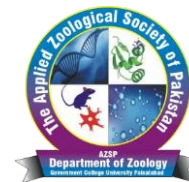
**Ni Oxide Nanoparticles has the Potential to Drastically Affect the Behavior of Albino Mice in a Sex Specific Manner**

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<sup>1</sup>Institute of Pure and Applied Biology, Zoology Division, Bahauddin Zakariya University, Multan, Pakistan

**Abstract:**

Ni oxide nanoparticles (NiO NPs) are extensively used in industries dealing with welding, electroplating and in production of alloys but despite of their large scale uses, it is expected that they might have lot more drawbacks than their bulky counter parts. Present investigation was aimed to document the effect of two different doses of NiO NPs on behavior of albino mice in a sex specific manner. Five weeks old albino mice (N = 48) of both sex were intraperitoneally injected with either low dose (20 mg) or high dose (50mg/ ml saline/ Kg body weight) of NiO NPs (average particle size 43 nm) for 14 days. Control groups were treated with saline solution. A series of behavioral tests were conducted in all subjects. Both low and high dose of NiO NPs treated male mice, during rota rod test, spent significantly less time on rotating rod than controls. Male mice treated with both doses of NiO NPs performed more stretch attend reflex than control. Female mice injected with high dose of NiO NPs had significantly reduced mobile and immobile episodes during open field test than mice exposed to low dose and control group. High dose of NiO NPs treated females had reduced line crossing, stretch attend reflex, number of approaches to familiar and novel objects than low dose NiO NPs and saline treated female mice. No change in body weight was observed when this parameter was compared between NiO NPs and saline injected albino mice of both sexes. In conclusion, we are reporting that NiO NPs can affect the muscular activity, object recognition capacity and exploratory behaviour of albino mice. The effects were more pronounced at higher dose and in female mice.



O-183/ICAZ-2022

**Effectiveness of Citric Acid and Phytase Treated Cottonseed Meal-Based Diet in *Catla catla* Fingerlings to Increase Growth, Nutrient Digestibility and Haematological Indices**

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**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 *Catla catla* (*C. catla*) fingerlings fed cottonseed meal (CSM) based diet. A 12-weeks experiment was conducted to check growth, nutrient digestibility and haematological indices of *C. catla* 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, TD<sub>1</sub> to TD<sub>16</sub> 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 *C. catla* fingerlings.

**Keywords:** Cottonseed, citric acid, phytase, growth, nutrient digestibility, *C. catla*

O-192/ICAZ-2022

**Prevalence of Hepatitis B And C in District Bahawalpur**

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**Abstract:**

Hepatitis causes inflammation of the liver. The present study aimed to study the prevalence of hepatitis B and C among the general population of Bahawalpur. Samples were collected from December 2021 to May 2022 from patients visiting Bahawalpur Victoria Hospital (BVH), Bahawalpur. In total, 263 blood samples were collected from the patients who visited BVH during the study period, including 81 males and 182 females. A questionnaire was filled out by a direct interview of the patients. A rapid diagnostic test (Immunochromatographic technique, ICT) was used to diagnose Hepatitis B surface antigen and anti-HCV, and positive samples were then confirmed by an enzyme-linked immunosorbent assay (ELISA). The Chi-square test was applied to the data using IBM SPSS version 22. Among 263 samples tested, 5.3% (14/263) tested positive for HBV, 25.4% (67/263) tested positive for HCV, and 0.76% (2/263) were co-infected. The study found a significant association of disease with illiteracy (63/263) (24%) versus literacy (20/263) (7.6%) ( $P = 0.001$ ), age (31–40 years) (29/263) (11%) ( $P = 0.027$ ), hospitalized (100/263) (38%) versus non-hospitalized persons (163/263) (62%) ( $P = 0.008$ ) and patients who had received dental treatment (55/263) (20.9%) versus those who had not (208/263) (79.1%) ( $P = 0.057$ ). It seems that either the hospital administration is unable to apply the rules, or visitors to BVH are not following the hospital administration's norms for controlling infectious diseases in hospitals. According to the study, people who visited hospitals frequently, received medical care, including dental treatment, and were unaware of the disease transmission were more susceptible to infection. The study showed that unsanitary conditions made illiterate people more vulnerable to infection. There is a need to implement strict legislative measures to control the increasing infections of hepatitis B and C in the country in general and in Bahawalpur in particular. The results of the current study will help formulate policies and adopt preventive measures to control the increasing incidence of hepatitis.

O-193/ICAZ-2022

**Anti-Inflammatory Role of Peptides Extracted from Venom of Buthid Scorpions**

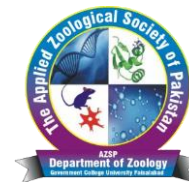
Rabia Yaqoob<sup>1\*</sup>, Hafiz Muhammad Tahir<sup>2</sup>, Sajida Naseem<sup>1</sup>

<sup>1</sup>Department of Zoology, Division of science and technology, University of Education, Lahore

<sup>2</sup>Department of Zoology, GCU, Lahore.

**Abstract:**

Scorpion venom has long been identified for its medicinal importance. Some of its compounds are found to enhance production of various anti-inflammatory cytokines; the mediators of hyperactive immune system. Present study was designed to evaluate potential anti-inflammatory activity of venom from three different scorpion species i.e., *Odontobuthus odonturus* (Pocock, 1897), *Androctonus finitimus* (Pocock, 1897) and *Mesobuthus tamulus* (Fabricius, 1798) of buthidae family. Venom was extracted by electrically stimulating the venom gland (Ozkan & Fillazi, 2004). For separation of bioactive protein fractions of venom, native PAGE was used. Selected protein fractions were eluted from gel in elution buffer by using simple diffusion principle. To determine toxicity of crude venom from different scorpion species, LD<sub>50</sub> was calculated using Probit analysis. For the assessment of inhibition activity of venom and its selected peptide fractions on inflammation, paw edema in *Mus musculus* (Swiss Webster albino mice)



was induced with the help of carrageenan. The degree of swelling at tibio-tarsal joints was recorded after treatment of venom and its protein fractions. After 24 hours of treatment, animals were sacrificed by cervical dislocation and blood was drawn directly from heart. Various blood parameters such as total leukocyte count (TLC), differential leukocyte count (DLC), red blood cell count and hemoglobin were calculated. Serum concentrations of mice anti-inflammatory cytokines i.e., interleukin 4 (IL-4), IL-6, IL-10 and IL-13 were determined by using Qiagen kit (Mouse Inflammatory Cytokines Multi-Analyte ELISArray Kit: MEM-004A). *A. finitimus* crude venom was the most toxic in terms of LD50 (0.019mg/g of mice) while *M. tamulus* venom was found to be least toxic (0.0375mg/g). Generally, separated protein fraction of venom from different species were more potent anti-inflammatory agent as compared to crude venom because animals treated with different fractions showed rapid recovery in paw edema as well as elevated TLC, DLC and concentrations of studied anti-inflammatory cytokines. Present study revealed that among different treatments of protein fractions from *M. tamulus* venom, MF1 was more effective in enhancing TLC. While among protein fractions from *O. odonturus* and *A. finitimus* F3 was more potent in increasing TLC. However, when activity of same fraction from different species was compared MF1, MF2 and OF3 were found to be more efficient in increasing TLC. Likewise, when role of different protein fractions from same species was evaluated for its effect on anti-inflammatory cytokines, F3 fraction from venom of all studied species was found more effective in enhancing levels of IL-6, IL-10 and IL-13. Concentrations of IL-4 were more in F2 fraction treated animals compared to other fractions. Overall different fractions from venom of *A. finitimus* were more effective in enhancing different anti-inflammatory cytokines than protein fractions of other species. As studied peptides are found to be effective in healing of inflammation so, we recommend further study on these peptides to use them for synthesis of new and cheap drugs for curing edema/inflammation related diseases.

O-195/ICAZ-2022

#### **Influence of Selected Metal Resistant *Bacillus Sp.* on the Growth Promotion of Spinach**

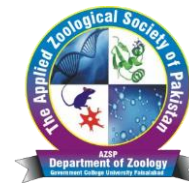
Arsalan Ali<sup>1</sup>, Saima Muzammil<sup>1</sup>, Shafaqat Ali<sup>2</sup>, Muhammad Waseem<sup>2\*</sup>

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<sup>2</sup>Department of Environmental Science, Government College University Faisalabad Pakistan

#### **Abstract:**

As a result of various anthropogenic activities, chromium is being discharged into soil and water bodies as hexavalent chromium (Cr<sup>6+</sup>). It is toxic for living organism due to its higher solubility and mobility; therefore, it should be removed from the environment to overcome its toxic effects. Bacterial-assisted nano-phytoremediation is an emerging and environment friendly technique being used for the detoxification of such pollutants. In current study, the mitigating role of selected strain of *Bacillus sp.* and CuO nanoparticle was evaluated in spinach under chromium (Cr) stress. Seeds were surface sterilized with 2% sodium hypochlorite following priming with bacterial inoculum, which were then sown in pots containing soil with and without chromium. The CuO NP were applied in soil with irrigation after 5<sup>th</sup>, and 7<sup>th</sup> week of sowing. Data related to morphological tests (leaf area, plant fresh and dry weight, root length, plant height, number of leaves, root fresh and dry weight), physiological parameters (chlorophyll and carotenoids contents), biochemical tests (POD, SOD, MDA, H<sub>2</sub>O<sub>2</sub>, free amino acid, total soluble sugar, anthocyanin, total soluble protein, phenolics and catalase) was collected and analyzed using appropriate statistical test. In the presence of chromium, overall levels of chlorophyll and carotenoids were little effected, however with the separate application of CuO NP and *Bacillus sp.*, levels of chlorophyll and carotenoids were decreased. On the other hand, all morphological parameters including (leaf area, plant fresh and dry weight, root length, plant height, number of leaves, root fresh and dry weight), were raised in the presence of chromium with the application of CuO NP and *Bacillus sp.* In the presence of chromium, overall levels of superoxide dismutase (SOD), malondialdehyde (MDA), Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>), catalase (CAT) were raised whereas level of anthocyanin, carotenoid, chlorophyll a, chlorophyll b, and total chlorophyll were decreased. However, with the application of CuO NP and *Bacillus sp.*, levels of carotenoid, anthocyanin, chlorophyll a, chlorophyll b, and total chlorophyll were increased. However, with the separate application of CuO NP total soluble protein, free amino acid, peroxidase (POD), and total phenolics were increased. Whereas with the application of CuO NP and *Bacillus sp.* malondialdehyde (MDA), catalase (CAT), superoxide dismutase (SOD) and Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) contents were negatively affected. From this study it was observed that application of *Bacillus sp.* and CuO NP could alleviate metal stress and might have improved the development and biochemical properties of spinach plants.



O-196/ICAZ-2022

**Efficacy of Substituted Barley Meal Based Diet on Growth Performance, Nutrients Digestibility and Hematological Indices in Common Carp (*Cyprinus carpio*)**

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**Abstract:**

With continuous expansion of human population, fish is a rich protein source used as food all over the world but high cost of fish meal (FM) and its inconsistent supply has entailed researchers to find its substitute. In present experimental work, plant based protein source was used as an alternative of fish meal as it is available at comparably low-cost and effectively accessible. The present research work was conducted to evaluate the effects of barley seed meal by replacing FM on the growth performance, nutrients digestibility and hematological indices in *Cyprinus carpio*. Six test diets (replacing FM at 0, 10, 20, 30, 40 and 50% level) were prepared using barley meal (BM) as an alternative protein source. Three replicates were used for each treatment consisting of 15 fingerlings (of average weight 8.13g) per tank. Fish was fed at the rate of 4% live wet body weight two times a day for 70 days. The results revealed that fingerlings fed Barley seed meal based diets (BSMD) II (having 20% FM replacement) showed best results in growth parameter (weight gain%; 249%, weight gain; 20g, SGR; 1.39 and FCR; 1.31), hematological indices (RBCs;  $2.83 \times 10^6 \text{mm}^{-3}$ , PLT; 68.54 and Hb; 8.15g/100ml) and nutrient digestibility (crude protein; 72% and gross energy; 67%). It was noticed that further increase in BM level decreases the fish performance as compared to above mentioned diet. From results, it was concluded that we can replace FM up to 20% to improve growth performance, nutrients digestibility and hematological indices as well as making eco-friendly and cost effective feed.

**Keywords:** Barley seed meal diets, fish meal, fish performance, alternate protein source, cost effective feed.

O-197/ICAZ-2022

**Characterization of Silver Nanoparticles and Evaluation of their Toxicity on *Labeo rohita***

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<sup>3</sup>Faculty of Veterinary and Animal Sciences, Muhammad Nawaz Sharif University of Agriculture, Multan

**Abstract:**

In the fields of biological sciences with the advancement in nanotechnology, nanoparticles are synthesized and used as drug delivering applications, cancer treatments and delivery of targeted medicines at a large scale in industrial level. The present study was designed to evaluate the toxic effects of Silver nanoparticles on *Labeo rohita*. Ag-NPs were characterized by Scanning electron microscopy (SEM), X-ray diffraction (XRD) and Fourier-transform infrared (FT-IR) techniques which revealed the spherical morphology and size range of 70-90 nm with 99 % purity. Sixty samples of *L. rohita* (70-80g) were divided into four groups having 15 fish in each group and named as control, G1, G2 and G3 treated with Ag-NPs @ 0.7, 1.06 and 1.8 mg/l, respectively for 28 days. Hematological results showed significant ( $p < 0.05$ ) reduction in erythrocytes count, hemoglobin, MCH, MCHC and hematocrit levels as compared to the control group. Antioxidant enzymes (MDA and LPO) were significantly ( $p < 0.05$ ) increased in G3 as compared to the control group. Ag-NPs induced genotoxicity in *L. rohita* as tail length was increased significantly ( $p < 0.05$ ) in G3. The current study revealed that Ag-NPs exposure induced the significant toxicological impacts on aquatic organisms.



O-198/ICAZ-2022

**A Study on Phylogenetic and Morphometric Analysis of *Pteropus giganteus* from Northern Areas of Pakistan**

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**Abstract:**

Fruit bats of the genus *Pteropus* play crucial roles in the pollination and seed dispersal processes that help maintain the ecosystems on islands. The phylogenetic relationship was effectively resolved via amplification of the cytochrome b gene. The goal of the study was to ascertain the evolutionary relationships between the Indian flying Fox (*Pteropus giganteus*) and other species found throughout the world. By examining how effectively the Cytochrome b region explains the phylogenetic relationships, this work can help resolve taxonomic and systematic issues with the Indian flying Fox in Pakistan. The genetic samples came from a variety of places, including Bangladesh, Chakaria, Australia, India, Florida, and the United States of America. The Neighbor-joining (NJ) and Maximum Parsimony (MP) approaches were used to construct the topologies. A 100 percent bootstrap value demonstrated a definite link between the populations in the generated phylogenetic tree. A detailed study is recommended to construct a comprehensive phylogenetic relationship among *Pteropus* species around the world.

**Keywords:** Cytochrome b, Phylogenetic, *Pteropus giganteus*, Pakistan, taxonomy.

O-200/ICAZ-2022

**New Fossil Remains of Suids from the Late Miocene of Markhal, Punjab, Pakistan**

Amara Sadaf<sup>1</sup>, Khizar Samiullah<sup>1</sup>, Riffat Yasin<sup>2</sup>, Rana Mehroz Fazal<sup>1\*</sup>, Farooq Ahmad<sup>1</sup>, Inayat Ullah<sup>1</sup>, Asma Noreen<sup>1</sup>, Irish Atiq<sup>1</sup>, Sehrish Ashraf<sup>1</sup>

<sup>1</sup> Department of Zoology, Ghazi University, Dera Ghazi Khan, South Punjab, Pakistan

<sup>2</sup> Department of Fisheries and Aquaculture, Muhammad Nawaz Sharif, University of Agriculture, Multan, Pakistan

**Abstract:**

New fossil remains of suids are identified and their morphometric analysis has been conducted in the current study. The fossils specimens have been recovered from the fossil site Markhal, Dhok Pathan Formation, District Chakwal, Punjab, Pakistan. The retrieved assemblage consists of six specimens belong to three genera of family Suidae: *Listriodon*, *Propotamochoerus* and *Tetraconodon*. The species are identified as *L. pentapotamiae*, *P. hysudricus* and *T. malensis*. The dental material includes incisors, premolar, right and left upper and lower molars. The size variation and morphometric marks of the teeth are taxonomically very important for the evolution of suids. The specimens of *Listriodon* are homogeneous and assigned to *L. pentapotamiae*, which are fully lophodont and enhance our knowledge about dentitions and palaeoenvironment. *P. hysudricus* is the marker species of suids described in the Late Miocene deposits of Siwaliks. *T. malensis* is a typical basal species characterized by large premolars. The paleo-environmental data revealed that an arid paleoclimate was present during the Late Miocene and fluvial deposits developed in a wet land environment composed of a mosaic land-landscape of waters, meadows of herbs and shrubs, reedy marshes, closed wet to open grassland habitats, woodlands and pockets of forest lands.

O-201/ICAZ-2022

**Fossils of *Gazella lydekkeri* from the Dhok Bun Ameer Khatoon, District Chakwal, Punjab, Pakistan**

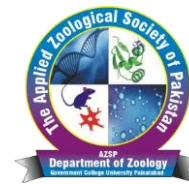
Inayat Ullah<sup>1\*</sup>, Khizar Samiullah<sup>1</sup>, Riffat Yasin<sup>2</sup>, Asma Noreen<sup>1</sup>, Farooq Ahmad<sup>1</sup>, Rana Mehroz Fazal<sup>1\*</sup>, Irish Atiq<sup>1</sup>, Sehrish Ashraf<sup>1</sup>

<sup>1</sup> Department of Zoology, Ghazi University, Dera Ghazi Khan, South Punjab, Pakistan

<sup>2</sup> Department of Fisheries & Aquaculture, Muhammad Nawaz Sharif University of Agriculture, Multan, Pakistan

**Abstract:**

DBAK (Dhok Bun Ameer Khatoon) is a significant fossil site of Lower Siwaliks in district Chakwal, Pakistan which belongs to the Chinji Formation and yields a diverse form of fossil fauna. In this current study, we have collected remains of an important genus *Gazella* belongs to the family Bovidae. The retrieved specimens were identified as lower mandibular fragment as well as upper right and left isolated teeth identified of *Gazella lydekkeri*. All of the fossils discovered during the on-foot transects in the specified stratigraphic intervals between the sandstone. The specimens were morphometrically identified and compared with already studied specimens and their taxonomical features designated as *G. lydekkeri*. The paleo-environmental data indicates that Miocene climate of Pakistan was most likely to be monsoonal, and biogeography suggested the presence of abundant forests, herbaceous, grassy and bushy vegetation in the DBAK and its surroundings during the Late Miocene in Siwalik area. The contribution of these fossil records from the Lower Siwaliks of DBAK is considerably very important to understand the evolution of bovids.



O-204/ICAZ-2022

**Sero-Epidemiological Investigation and Risk Factor Analysis of Human Brucellosis in Punjab, Pakistan**

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<sup>2</sup>College of Conventional Medicine, The Islamia University of Bahawalpur

**Abstract:**

Human brucellosis is a febrile zoonotic problem worldwide responsible for high morbidity in humans and is mostly neglected due to other similar conditions. The present study was designed to detect the sero-prevalence and risk factors of human brucellosis among subjects living in Punjab, Pakistan. This was a cross-sectional study in which human blood samples were collected from seven districts of Punjab. A predesigned closed ended questionnaire was filled prior to sampling to get information regarding personal data, demographic data and potential risk factors. The screening of antibodies to human brucellosis was done using Rose Bengal Plate Test (RBPT) and further confirmation was done by Enzyme Linked Immunosorbent Assay (ELISA). The STATA software was employed for descriptive analysis, Chi square test and Odds ratio. The results revealed sero-prevalence of human brucellosis 13.10% with significantly more percentage in male members 17.20% and age group (25-40 years) 16.51% ( $P < 0.001$ ). In addition, the demographic factors positively associated with human brucellosis were low education ( $P = 0.003$ ; OR = 1.86) and the occupation of farming ( $P < 0.001$ ; OR = 2.52). Similarly, among the risk factors studied, keeping animals at home ( $P < 0.001$ ; OR = 2.05), slaughtering of animals ( $P < 0.001$ ; OR = 15.90) and consuming raw milk/products ( $P < 0.001$ ; OR = 5.45) were the factors strongly linked with human brucellosis. A strong awareness campaign should be needed for livestock farmers and individuals directly associated to animals regarding risk factors and transmission of brucellosis. Furthermore, consumption of unpasteurized milk and its products should be condemned to curtail this neglected disease with zoonotic potential.

**Keywords:** Sero-epidemiology, Human Brucellosis, Risk factors, Punjab

O-205/ICAZ-2022

**Effect of Methanolic Extract *Cannabis sativa* on Muscle Restoration Following an Induced Sciatic Nerve Injury in a Mouse Model.**

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<sup>6</sup>Laboratorio di Neuroimmunologia, Department of Physiology and Pharmacology, Sapienza University, Rome, Italy

**Abstract:**

A life-threatening condition called peripheral nerve damage causes the body to lose its motor, sensory, and autonomic functions. There is currently no effective treatment for perfect and fully functional restoration of the damaged nerve. This study examined the effects of a methanolic extract of *Cannabis sativa* (*C. sativa*) leaves on a mouse model's ability to recover from an induced sciatic nerve lesion. For this purpose, 14 young, healthy mice were split into two groups (control and treatment;  $n=7$  per group). The treatment group received a methanolic extract of *C. sativa* (10 mg/kg daily) from the day of nerve crush until the end of the trial. Different behavioral analyses, muscle mass, and oxidative stress markers were used to evaluate functional retrieval. The antioxidant properties of the *C. sativa* extract were also assessed. We discovered that *C. sativa* leaves significantly increased the restoration of sensorimotor function, decreased total oxidant status, and increased total antioxidant status. Additionally, *C. sativa* leaves had significant levels of total flavonoids and potent 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging properties. As a result, further research is recommended to find the potent compound(s) of *C. sativa* leaves responsible for accelerating functional recovery following nerve damage.

O-206/ICAZ-2022

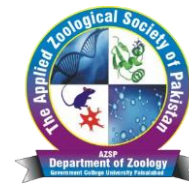
**DNA Damage Caused by Chronic Exposure to Lead in the Fish, *Cirrhinus mrigala***

Fariha Latif\*, Rehana Iqbal, Javeria Khalil, Waqar Younis

Institute of Zoology, Bahauddin Zakariya University, Multan, Pakistan.

**Abstract:**

During chronic exposure of lead, for 84 days, the fish peripheral erythrocytes were collected fortnightly to observe the dose and time dependent DNA damage in the *C. mrigala* through comet assay. DNA damage was measured in terms of damaged nuclei, genetic damage index (GDI), and comet tail lengths (CTL). Peripheral erythrocytes of *C. mrigala* exhibited significantly variable DNA damage after exposure to various concentrations (2/3rd, 1/3rd, 1/4th, and 1/5th LC<sub>50</sub>) of lead, negative and positive controls for 84 days, and sampling was done fortnightly viz. 14-, 28-, 42-, 56-, 70- and 84-days. Percentage of nuclear damage varied significantly with higher damage induced by 2/3<sup>rd</sup> of LC<sub>50</sub> (77.00±6.66%), followed by 1/3<sup>rd</sup> of LC<sub>50</sub> (64.78±7.90%), positive control (55.67±3.15%), 1/4<sup>th</sup> of LC<sub>50</sub> (52.33±11.45%), 1/5<sup>th</sup> of LC<sub>50</sub> (39.22±7.99%) and negative control (1.00±0.07%). However, 14 days exposure of Pb induced significantly lower damage to the erythrocytes nuclei and genetic damage index with the mean



values of  $42.25 \pm 25.36\%$  and  $1.47 \pm 0.85$ , respectively. The exposure of metal for 56 days induced significantly longer tails to the comets while the same remained significantly short after 14 days exposure period

O-207/ICAZ-2022

**Antihyperglycemic Potential of (2E)-3-Phenyl-1-(3-pyridinyl)-2-propen-1-one in Alloxanized Hyperglycemic Rats**

Ammara Tehreem<sup>1</sup>, Haseeb Anwar<sup>1</sup>, Muhammad Naeem Faisal<sup>2</sup>, Rabia Akram<sup>1</sup>, Faiqa Sajid<sup>1</sup>, Azhar Rasul<sup>3</sup>, Tehreem Imaan<sup>1</sup>, Usra<sup>1</sup>, Sania Waris<sup>1</sup>, Ghulam Hussain\*

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<sup>2</sup>Institute of Physiology and Pharmacology, Faculty of Veterinary Sciences, University of Agriculture, Faisalabad, 38000, Pakistan

<sup>3</sup>Department of Zoology, Faculty of Life Sciences, Government College University, Faisalabad, 38000, Pakistan

**Abstract:**

Diabetes mellitus is a life threatening disorder due to defects in insulin secretion, action or both. The present study was designed to explore and evaluate the antidiabetic activity of synthetic derivative of chalcone named (2E)-3-Phenyl-1-(3-pyridinyl)-2-propen-1-one. In this study, fifty albino rats were divided into five groups, each containing ten rats. Diabetes was induced by single administration of alloxan monohydrate intraperitoneally (130mg/kg). After induction of diabetes, group 1 was marked as negative control, group 2 as diabetic group, and group 3 was treated with synthetic antidiabetic drug glibenclamide (10mg/kg). Group 4 and group 5 were treated with graded doses (5ml/kg and 10ml/kg) of synthetic research compound respectively. During whole month of treatment, physical parameters were recorded. After four weeks of treatment, all groups were subjected to decapitation. Serum and tissues samples were collected. Serum analysis was performed. Resulting data was investigated and subjected to ANOVA and DMR. Histopathological examination was conducted and photomicrographs were investigated. On the basis of histopathological and biochemical analysis, it is suggested that research compound possess strong antioxidant and antihyperglycemic activity. Statistical report of data confirmed that results are significance.

O-210/ICAZ-2022

**“Synthesis and Anti-Cancer Activity of Novel 1,2,4-triazole Derivatives”**

Samreen Gul Khan\*, Musrat Shaheen, Azhar Rasul, Dr. Naheed Akhtar,

<sup>1</sup>Department of Chemistry, GC University, Faisalabad-38000, Pakistan.

**Abstract:**

Triazole is reported to have high synthetic potential for synthesis of many biologically active heterocyclic compounds. Triazole can be helpful in the design of novel highly effective pharmaceuticals with a broad spectrum of bio responses. Triazoles constitute two different classes but 1,2,4-Triazole is the most potent one. The different 2,5-disubstituted-1,2,4-triazoles possess a large number of biological activities like anticancer, antifungal, anti-inflammatory and antibacterial. A series of new *N*-substituted derivatives of ibuprofen were synthesized in three phases. The first phase involved the sequentially conversion of ibuprofen acid to ester, hydrazide and 5-benzyl-1,2,4-triazole-2-thiol. In the second phase, *N*-substituted-2-bromoacetamides were prepared by reacting substituted aromatic amines with bromoacetyl bromide in basic media. In the third phase, 5-benzyl-1,2,4-triazol-2-thiol was stirred with *N*-substituted-2-bromoacetamides in the presence of NaH/DMF to get the target compounds. Spectral analysis was used to confirm the structures of synthesized compounds. The synthesized compounds were evaluated for biological activity and were found to have very good anti-cancer activity.

O-211/ICAZ-2022

**Phenotypic Variation among the Snakes of Genus Spalerosophis in Pakistan**

Tayyaba Khan, Zahid Farooq, Warisha Saif, Samina Abbas, Palwasha Saif, Talat Sabtain

Cholistan University of Veterinary and Animal Sciences Bahawalpur

**Abstract:**

The current study was conducting to examine the phenotypic variation in snakes of genus Spalerosophis collected from the Southern Punjab, Pakistan. The total 32 specimens were identified through a standardized key available and their traditional meristic characters as well as morphometric measurements were recorded. The variations in head shields, body scalation and body measurements were recorded. The overall significant variation ( $P < 0.05$ ) in ventral scales and sub-caudals in both sexes of *S. atriceps*. The significantly variation was noted in body circumference (posterior to neck) in male and females of *S. diadema*, and Head width, body circumference (mid body), body circumference (posterior to neck and posterior to vent) in both sexes of *S. atriceps*. The overall specimens of three species were compared with their mean values of different parameters. In *S. arenarias* the dorsal at mid body, dorsal at anterior to vent, sub-caudal, snout vent length, tail length and body weight were differed highly significant ( $P < 0.01$ ), as compared to *S. diadema*. In *S. atriceps* the dorsal at anterior to vent were differ highly significant ( $P < 0.01$ ) as compared to *S. diadema*. The highly significant variations were perceived in male as well as in female of three species when



compared with their mean values of different parameters. Due to large body size and occupies diverse habitat of different species of genus *Spalerosophis* leads to variations among them. The present study provides the true picture of this genus as well as diversity in herpetological fauna of this region.

**Key words:** phenotypic variation, snakes, genus *Spalerosophis*, Southern Punjab, Pakistan

O-212/ICAZ-2022

**New Discovery of *Giraffa priscilla* Skull and Associated Fossil Fauna from the Chinji Formation, Lower Siwaliks of Pakistan**

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<sup>1</sup>Department of Zoology, Ghazi University, Dera Ghazi Khan, Punjab, Pakistan

<sup>2</sup>Department of Zoology, Faculty of Life Sciences, Government College University, Faisalabad, 38000, Pakistan

<sup>3</sup>Faculty of Veterinary and Animal Sciences, Muhammad Nawaz Sharif University of Agriculture, Multan

**Abstract:**

A systematic taxonomic study of fossil giraffids and associated fossil fauna of rhinoceros, bovids and tragulid are described here from the Chinji formation, Lower Siwaliks of Pakistan. The collected specimens belong to the four species: *Giraffa priscilla*, *Gaiotherium vidali*, *Gazella lydekkeri* and *Dorcatherium majus* from the outcrop of Dhok Bun Ameer Khatoon and Chabbar Syedan fossil localities of Chakwal and Jhelum district respectively which belongs to the Late Miocene in age. These localities are very rich due to fossil collection and the skull of *G. priscilla* containing right and left complete series of upper dentition has been reported first time from the outcrops of DBAK. The rhinoceros fossils of *Gaiotherium vidali* were recovered from Chabbar Syedan, Chinji Formation of Lower Siwaliks. The fossil remains of *Gazella lydekkeri* and *Dorcatherium majus* are also recovered from the DBAK. The systematic studies have been conducted by comparison of morphometric characteristics of already studied specimens. Paleoenvironment, biogeography and feeding habits suggested the presence of abundant forests, herbaceous, grassy and bushy vegetation in the outcrops of Chabbar Syedan and DBAK

O-213/ICAZ-2022

**Efficacy of Probiotics Supplementations on Hematology and Carcass Composition of Rohu (*L. rohita*) Fingerlings Fed with Oilseed by-Product-Based Diet**

Wirda Butt

University of Education township Campus Lahore

**Abstract:**

Current research work was carried out to investigate the impacts of probiotics supplemented linseed by-product-based diet on hematology and carcass composition of *Labeo rohita* fingerlings. Probiotics enhance the intestinal microbial balance of the host resulting in higher performance, growth and disease resistance. Linseed meal was used as a basic test ingredient to prepare 6 experimental test diets with the addition of probiotics (0, 1, 2, 3, 4 and 5 g/kg) and 1% indigestible chromic oxide. For each treatment, triplicate tanks were used with 15 fingerlings in each replica. Fingerlings were fed twice a day at a rate of 5 % of their live wet weight. After 70 days of the experiment, the blood (from fish) and carcass samples (Whole body) were taken for hematological and carcass analysis, respectively. From the current result, it was observed that probiotics supplementation had a critical role in the improvement of fingerling's body composition and hematological indices. The highest carcass composition (crude protein 18.72%, crude fat 8.80% and gross energy 2.21 kcal/g) was found at test diet III supplemented with 2g/kg of probiotics. Moreover, maximum numbers of RBCs ( $2.62 \times 10^6 \text{mm}^{-3}$ ), WBCs ( $7.84 \times 10^3 \text{mm}^{-3}$ ), PCV (24.61), PLT (63.85) and Hb (7.87) had been reported in the fish fingerlings fed on the 2g/kg of probiotics supplemented diet. Based on these findings it had been concluded that probiotics supplementation at 2g/kg level in a linseed by-product-based diet was very useful for the enhancement of the overall performance of *L. rohita* fingerlings as compared to fingerlings fed on control and other test diets.

**Keywords:** Linseed meal-based diet, *L. rohita*, Hematology, Probiotics, Carcass composition.

O-214/ICAZ-2022

**New Fossil Remains of Bovids from Dhok Pathan Type Locality of Chakwal, Punjab, Pakistan**

Anila Bakhtawar Seemab<sup>1</sup>, Khizar Samiullah<sup>1\*</sup>, Riffat Yasin<sup>2</sup>, Rana Mehroz Fazal<sup>1</sup>

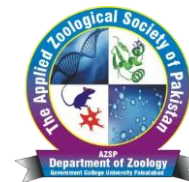
<sup>1</sup>Department of Zoology, Ghazi University, Dera Ghazi Khan, Punjab, Pakistan

<sup>2</sup>Faculty of Veterinary and Animal Sciences, Muhammad Nawaz Sharif, University of Agriculture, Multan

**Abstract:**

New fossil remains of order Artiodactyla have been recovered from Dhok Pathan type locality, Middle Siwaliks, district Chakwal, Punjab Pakistan. Dhok Pathan Formation is generally composed of claystone, sandstone and siltstone beds and age is suggested as Late Miocene to Early Pliocene (7-5 Ma). The type locality is significantly famous for the recovered mammalian fossil fauna belongs to the family Bovidae. Five specimens including fragments of maxilla, mandible and isolated upper and lower molars and premolars have been identified as *Gazella lydekkeri*; two specimens were assigned to *Pachyportax latidens* and two as *Selenoportax vexillarius*. The Palaeoenvironmental data indicates that bovids were grazers and mixed feeder. The dominance of





family Bovidae indicate extreme moist conditions with small but frequent standing water bodies, open habitats and indicate woodland to savannah, abundance of herbaceous vegetation in humid forested areas during the Late Miocene to Early Pliocene in the Siwaliks. Palaeoclimatic analysis of Siwaliks interprets as hot and humid habitat with monsoonal seasons during Middle to Late Miocene. The arid palaeoclimate had been established in the Siwaliks, which supports the pockets of forest, shifting a drier to more seasonal climate formed under water logged, grassy woodlands with the shifting of C3 to C4 grasses throughout the Miocene period.

**O-215/ICAZ-2022**

**New Fossil Remains of Choerolophodon (Proboscidea) from Litra Formation of Suleiman Range: Sakhisarwar, District Dera Ghazi Khan, South Punjab, Pakistan**

Aqsa Noor<sup>1</sup>, Khizar Samiullah<sup>1\*</sup>, Riffat Yasin<sup>2</sup>, Imran Ali<sup>3</sup>, Rana Mehroz Fazal<sup>1</sup>, Tehreem Raza<sup>4</sup>

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<sup>3</sup>Government Post Graduate College, Block No. 17, Dera Ghazi Khan.

<sup>4</sup>Department of Zoology, Government College University, Faisalabad.

**Abstract:**

The mammalian fossil fauna is recovered from the site of Gharbin, Litra Formation, Lower Siwaliks of Suleiman range, Sakhi Sarwar, DG Khan, Punjab, Pakistan. It is still a poorly documented area but with abundant mammalian fossil fauna which belongs to the Late Miocene age. The retrieved specimens of Choerolophodon corrugatus, Family Choerolophodontidae were collected after thorough fieldwork, includes a tusk fragment, deciduous premolar, maxillary and mandibular cheek teeth. Genus Choerolophodon can be differentiated from other representatives of this group by tusk, cranial peculiarity, chevrons, choerodonty, ptychodonty on teeth and no retromolar gap. We have firstly described choerolophodon fossils from the South Punjab area. Paleo-environmental data and the presence of large size mammalian fossil fauna from the Litra Formation in South Punjab, Pakistan suggest that there were extensive rain forests and better vegetated open land ecosystems as it is observed in the Europe and Africa.

**O-217/ICAZ-2022**

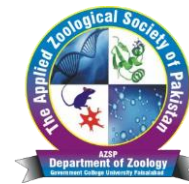
**Natural Product-Based Remedies: A Valuable Strategy for Accelerating Functional Restoration after an Induced Sciatic Nerve Injury**

Ghulam Hussain<sup>1\*</sup>, Haseeb Anwar<sup>1</sup>, Shamaila Zafar<sup>1</sup>, Faiqa Sajid<sup>1</sup>, Rabia Akram<sup>1</sup>, Tehreem Iman<sup>1</sup>, Qammar Abbas<sup>1</sup> and Husnain Mohy Ud Din

<sup>1</sup>Neurochemicalbiology and Genetics Laboratory (NGL), Department of Physiology, Faculty of Life Sciences, Government College University, Faisalabad, 38000 Pakistan.

**Abstract:**

The nervous system communicates with all other systems by sending electrochemical messages through a complex network of nerves. Injury to the peripheral nerves is one of the most serious health concerns of the modern age, and road accidents are a leading cause of this alarming situation. Other factors such as trauma, congenital anomalies, metabolic disorders, infections, mechanical injuries, and chemical agents can also lead to mild to severe injury to the nerves. These injuries may perturb sensory, motor, or both types of functions. Mostly, an everlasting disability is an ultimate fate. The emphasis in such conditions is given to the restoration of functional abilities that occurs once the reinnervation of nerve endings with motor endplates takes place. The rate of rehabilitation depends on both timely and appropriate management. Pharmacological approaches are preferred to surgical procedures due to associated complexities that are also impregnated with side effects. Therefore, the aim of functional restoration always remains unfulfilled. In the present era, natural and herbal products have gained much attention. Several plants are effective against nerve degeneration and help to improve nerve functions. Here, we report the development of an animal model that truly mimics human nerve injury. We investigate the possible effects of our indigenous flora on improving function restoration. In this model, induced nerve injury yields a complete loss of sensorimotor functions. The functional recovery is evaluated at the behavioral, biochemical and molecular levels. Motor and sensory functions were assessed by muscle grip strength, Sciatic Functional Index (SFI), and hot-plate tests. Biochemical analyses were performed to gain insight into the effect of treatment on systemic markers. We are interested in minimizing the time required for the complete and perfect restoration of muscle functions. We have evaluated a large number of our indigenous plants for this purpose. We observe that some of the local plants accelerate the functional retrieval following a peripheral nerve injury in a mouse model. Further investigations are required for the identification of active constituents and their characterization. The present findings provide an initial idea towards affordable and easily accessible remedies against traumatic brain and nerve injuries that have always been incurable.



O-218/ICAZ-2022

**Effect of Organic and Inorganic Arsenic (As<sub>2</sub>O<sub>3</sub>) on Haematological Parameters of Freshwater Air Breathing Fish, *Cirrhinus mrigala* from South Punjab, Pakistan**

Muhammad Farhan Nasir<sup>1\*</sup>, Asma Ashraf<sup>1</sup>, Yusra Samad<sup>2</sup>, Hasrat Moeen<sup>3</sup>, Alia Hussain<sup>1</sup>, Majeeda Rasheed<sup>4</sup>

<sup>1\*</sup>: Department of Zoology, Division of Science and Technology, University of Education Lahore, Pakistan.

<sup>2</sup>: Department of Zoology, The Women University Multan.

<sup>3</sup>: Assistant Director Fisheries, Fisheries Department of Punjab, Pakistan.

<sup>4</sup>: Department of Life Sciences, Khawja Fareed University of Engineering and Information Technology Rahim Yar Khan

**Abstract**

*Cirrhinus mrigala* is the most important fish. It is found in India, Bangladesh and Pakistan. This fish is naturally existed in the Indus River but the concentration of toxic elements especially Arsenic is increasing in the Indus River because of rapid industrialisation. This research was formulated to study the effect of heavy metal arsenic (In Organic and In-organic form) and arsenic oxide on haematology of fresh water *C. mrigala* from ponds of South Punjab, Pakistan. These parameters may include red blood cells (RBC), Hemoglobin (Hb), white blood cells (WBC), MCV, MCHC, RDW, HCV and clotting time (CT). The present study shows the level of RBC and Hb were significantly decreased simultaneously the WBC significantly increased due to arsenic exposure. While the clotting time also increased with exposure. The toxicity of arsenic on the haematological parameters such as Hb, RBC, and WBC were significantly decreased because the arsenic affects the animals and lead to anaemia. The observed amount of MCH and MCHC indicate the hydrochronic microcytic anaemia. Fall in no of lymphocytes was noted due to decrease in nonspecific immunity of fish. Thus the present study concludes that the haematological parameters of fish of *Cirrhinus mrigala* affected by exposure to arsenic. Government of different countries should monitor anthropogenic sources which are contaminating aquatic body and increase public awareness.

O-219/ICAZ-2022

**DNA Barcoding of Spiders of Citrus Orchards from District Sargodha, Punjab, Pakistan**

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**Abstract:**

Spiders were collected from citrus fields of Sargodha District, Punjab, Pakistan and were brought to the Laboratory at the Department of Zoology, University of Sargodha. These were washed with alcohol and preserved in absolute alcohol with the proper labeling of collection site, date of collection and collector name and other notes of importance. Spiders were stored at -20 °C until DNA extraction. Identification was done on the basis of morphological characters of various body parts using available taxonomic keys and catalogues. For molecular study, specimens were first photographed and then further processed. Samples were sent to Canadian Centre for DNA Barcoding, Biodiversity Institute of Ontario, University of Guelph, Canada, for sequencing. A total of 372 individuals were subjected to DNA barcoding but, sequences upto 600 bp were recovered for 334 individuals. Molecular studies confirmed the presence of 11 families, 29 genera and 45 species. Results revealed the presence of clear barcode gap (discontinuity in intra- and interspecific divergences) for all families. Furthermore, the maximum intra-specific divergence was less than from NN (nearest neighbor) distance for all species. This suggested the reliability of DNA barcoding for identification of spiders upto species level.

O-220/ICAZ-2022

**Negative binomial distribution for explain spatial distribution of *Aegla cholchol* Jara & Palacios, 1999 (Crustacea: Decapoda) in a river of northern Chilean Patagonia.**

Patricio R. De los Ríos-Escalante<sup>1,2</sup>

<sup>1</sup>Departamento de Ciencias Biológicas y Químicas, Facultad de Recursos Naturales, Universidad Católica de Temuco, Casilla 15-D, Temuco, Chile

<sup>2</sup>Núcleo de Estudios Ambientales UC Temuco

**Abstract**

The genus *Aegla* is an inland water decapod, endemic of South America, that inhabits in benthos of rivers and lakes, and the habitats are mainly unpolluted waters with high oxygen concentration and low organic pollution. The aim of the present study was analyzing the spatial distribution pattern in an *Aegla cholchol* Jara & Palacios, 1999, using probabilistic models. Data were obtained from former field works in southern summer (January-February) 2007, 2012, and September 2022, using Surber net, in Cautin river (Cajon town, 38°45'S; 72°40'W), individuals were counted and released to the river. For counting data were applied



variance/mean ratio, for in a first step determine if the counting data have random, uniform or aggregated pattern. All obtained data had aggregated pattern, and it corresponds to negative binomial distribution, that was verified in a second step for all included data. The literature revealed that many aggregated patterns correspond to negative binomial distribution or in statistical view point into derived probability models based in negative binomial distribution. The obtained results of negative binomial distribution in *A. cholchol* population, is similar to spatial distribution patterns observed for intertidal decapods and inland water littoral crustaceans.

**Keywords:** *Aegla cholchol*, spatial distribution, negative binomial distribution, decapods

Acknowledgements: Project MECESUP UCT 0804.

O-223/ICAZ-2022

**Bionomics and Molecular Study of *Liposcelis entomophila* (Psocoptera: Liposcelididae) Infesting Museum Insects**

Aneela Jawaid Hussain and Riffat Sultana

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**Abstract:**

Booklice is belonging to order Psocoptera that are causative agent of stored products. Though, this is only just that booklice have occurred as pests of substance in stored products pests. During this study infesting rate of Psocoptera on Orthoptera insect was observed at (SEM) Sindh Entomological Museum University of Sindh, Jamshoro department of Zoology. During the museum survey 10 insect cabinets were found with heavy infestation of *Liposcelis entomophila*. *L. entomophila* is an annoyance pest that cause extremely threatens to stored products. . Certain species are known to feed on dead insects. Beside this, Morphological identity of maximum saved product psocids is tough and hampers effective identification so in order to resolve this problem DNA barcoding of species was also done. BIN assignment. Illustrative Barcode, Nucleotide Sequence, Amino Acid Sequence, Sequences producing significant alignment, Distance distribution graph, Tree reconstruction of bin & nearest neighbor detail of species was provided. This barcoding resolved the many conflicts in authentic identification of cryptic and sibling species on DNA sequencing and phylogenetic relationship.

O-225/ICAZ-2022

**Biodiversity of Grasshopper in Cholistan Desert, Punjab, Pakistan**

Muhammad Younus<sup>1</sup>, Santosh Kumar<sup>1\*</sup> and Riffat Sultana<sup>2</sup>

<sup>1</sup>Department of Zoology, Cholistan University of Veterinary and Animal Sciences, Bahawalpur, Punjab-Pakistan.

<sup>2</sup>Department of Zoology, University of Sindh, Jamshoro, Sindh-Pakistan.

**Abstract:**

The study was planned to estimate diversity, distribution and seasonal variations of grasshoppers in croplands of Cholistan Desert, Punjab, Pakistan. The seasonal variations were assessed by sampling 06 randomly selected sites fortnightly during 2020-2021. And following species were collected i-e *Hilethera balucha*, *Acrotylus patruelis* *Sphingonotus savignyi* Saussure, *S.longipennis* Saussure , *S.balteatus himalayanus* Uvarov and *S.rubescens rubescens* (Walker) were collected and identified their morphology & morphometry was analysis along with detail descriptions and synonymy,. In addition to these a simplified taxonomic key based on the external morphology have been prepared for the separation of tribes, genera, and species of Oedipodinae.

O-226/ICAZ-2022

**First Entry of Darkling Beetle (*Eusattus muricatus*) from Cholistan Desert**

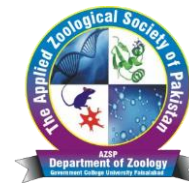
Santosh Kumar \*, Riffat Sultana<sup>1</sup> and Muhammad Waseem

<sup>1</sup>Department of Zoology, Cholistan University of Veterinary and Animal Sciences, Bahawalpur, Punjab-Pakistan.

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**Abstract:**

Cholistan desert is one of the driest and hottest deserts in Pakistan. This desert is locally known as Rohi located in Bahawalpur Division, Punjab Pakistan. Cholistan desert covering an area of 26,000 km<sup>2</sup>, lies South of Bahawalpur in Punjab extending through the Nara and Thar deserts of Sindh between 27°42'N and 29°45'N latitude and 69°52'E and 75°24'E longitude at an altitude of about 112 m above sea level. It presents a typical hot desert scenario and is one of the driest and hottest sandy deserts in Pakistan. This desert has a length of about 480 km while the width varies from 32 to 192 km. Beetles constitute the main component of insect communities in arid landscapes. Extensive surveys were conducted in Cholistan and about 72 specimens were collected and sorted out into different species amongst this fauna *Eusattus muricatus* LeConte, 1851 was reported as a new record for Cholistan desert. This species is apparently smaller in size 9.5.0 to 11.2 mm round black beetle with long golden hairs under it's carapace that show through to appear like gold stripes between the head and thorax and abdomen. It is very interesting to note that they survive in a very harsh environment and can live many days without food and water. Further, research is underway to discover its other amazing facts.



O-227/ICAZ-2022

**Trails of Entomopathogenic Fungi against Orthoptera Pest**

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\*Department of Zoology, University of Sindh, Jamshoro, Sindh-Pakistan.

**Abstract:**

Grasshoppers (Orthoptera: Acrididae) frequently inflict damage on millions of hectares of rangelands and crops. The main method of controlling grasshopper outbreaks consists of covering their infestations with chemical insecticides. Although it is relatively cheap, fast, and ancient, chemical control bears serious risks to human health, non-target organisms, and the environment. To overcome this challenge, biological control is a less environmentally hazardous alternative to traditional, synthetic insecticides. In considering the contributions of biological pest control to a sustainable agriculture, it may be useful first to examine briefly some of the advantages and disadvantages of each of the major methods by which pests can be controlled. During the present study some trials of Entomopathogenic Fungi (EPF) *Beauveria bassiana* was conducted in lab and following observation was noted done i-e behavior of insect, survival, mortality fecal production and food consumption of insects.

O-228/ICAZ-2022

**Explore of Coleoptera Fauna from Cholistan Desert Pakistan**

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**Abstract:**

Almost 40% of described insects and 25% of all known animal life-forms; new species are discovered frequently, with estimates suggesting that there are between 0.9 to 2.1 million total species. Some species are serious agricultural pests, such as the Colorado potato beetle, while others such as Coccinellidae (ladybirds or ladybugs) are important predators of a number of soft-bodied insects and mites, including aphids, scales, and mealybugs. Insect pests are undoubtedly the most adapted form of life as their total numbers far exceed that of any other animal category. Unfortunately, the insect fauna of Cholistan is still untouched. Keeping in view the importance of presence of insect diversity, a faunal survey was carried out at Cholistan desert in order to record the Coleoptera, with about 400,000 described species, is the largest of all orders, constituting the faunal biodiversity in selected habitats along with collection, identification and comparison of species richness, abundance and evenness of insect fauna. For the first time, the insect species diversity of the region is described. Beside this, an introduction is provided to threatened species of insects, and a strategy for conservation of insects are discussed. This study will help in learning a great deal about the behavior and relationships between insects and plants in the fields; it also helps in the management of agro-ecosystems. According to this checklist, Pakistani Tenebrionidae consist of (21) species belonging to 11 genera. It has been found in Cholistan that the most species are present. There were 56 Tenebrionidae species collected by some scientists in the 19th century, led by Fairmaire, who recorded them. In addition to Gebien, Pascoe, and Kszab and Schuste, several other scientists recorded 17 species, and Pascoe recorded eight species. A majority of these scientists collected these specimens themselves during their visits to the area. Most of the scientists covering that area of Pakistan were discovering new species of the family Tenebrionidae, which was why we found the highest number of collections there.

O-229/ICAZ-2022

**Prioritizing Bio-Pesticides Entomopathogenic Fungi (Epfs) against Locust in Sindh**

Muhammad Noman Bashir and Riffat Sultana

Department of Zoology, University of Sindh, Jamshoro, Sindh-Pakistan

**Abstract:**

Recent plague hit Pakistan for the first time in more than two decades and causes million rupees to economy (FAO, 2019). In 2019 and 2020, large swarms of desert locusts again threatened parts of East Africa and huge areas as far as India and Pakistan via the Arabian Peninsula. The Food and Agriculture Organization of the United Nations (FAO) has described this locust situation as the most serious in decades. Although we have already seen classic images of these devastating swarms in the past, their impact is still impressive. It is not so easy to find alternatives to these chemicals and to integrate them into operational campaigns. Many surveys have been conducted all over the world to register Entomopathogenic fungi (EPFs) but nothing is known from Pakistan. No acute adverse effects were observed after oral, dermal or inhalation exposure in vertebrates and, EPFs isolate has no unacceptable adverse effects on terrestrial non-target vertebrates, invertebrates (including beneficial arthropods), and aquatic vertebrates and invertebrates. This problem has led to renewed interest in the development of eco-friendly microbial agents that are now incorporated into IPM strategy. Entomopathogenic fungi are potentially the most versatile bio-control agents due to their wide



host range and natural occurrence, which makes less damaging to environment. Entomopathogenic fungi can be more effective when applied on the soil rather than spray treatment. The desert locust *Schistocerca gregaria* is the most dangerous and notorious pest it effects 400 species of crops and non-crop plants. It exhibits solitary phase with lower population and gregarious phase with higher and disastrous population. Basic information was collected on the behaviour of the adults' insects, especially when that was likely to influence the action of the pathogen or is a result of the action of the pathogen. Following behaviour changing was noted i-e: Insect basking in the sun at unusual times of the day), reduction in speed and coordination with each other, reduction in feeding, increased predation, etc. Very low chance of mating, even no interest of mating, increased predation, etc. in field and cannibalism in lab. *Metarhizium* treatment was found more affected against DL N1-N3, and significant mortality was noted during earlier 1st to 3<sup>rd</sup> day. Similarly in case of adult's maximum mortality was observed on 4<sup>th</sup> day i-e  $6.9 \pm 1.41$  and control was  $1.9 \pm 0.46$ . A detail trials of biopesticides are under way inshallah, will presented in 2nd seminar.

O-230/ICAZ-2022

**The Morphology and Mating Behaviour of *Poeciloceris pictus* (Fabricius, 1775) (Orthoptera: pyrgomorphidae)**

Department of Zoology, University of Sindh, Jamshoro, Sindh-Pakistan

Raheela Shah and Riffat Sultana

**Abstract:**

*Poeciloceris pictus* (Fabricius, 1775) mostly live on bushes, herbage, grasses, sedges, soil and sand. This is a major pest of *Calotropis procera* commonly known as akk plant used typically for medicinal purposes and also damages cotton seedlings, melons, chillies, mango groves, rice, betel creepers, forest trees, and jasmine. Under natural and laboratory conditions, copulation behaviors were noticed mostly during dawn and dusk. Single and multiple-mated and unmated females of various species were dissected to examine the morphological structure of spermatheca and sperm storage by females inside spermatheca, as well as morphology of their genital parts for identification. Length, width of spermatheca, dorsal valve, ventral valve and sub-genital plate of females were calculated. Observation did not occur until 30 mins had been passed into copulation. The effective population size depends strongly on the mating system. As in many animals, sperm competition has been a major selective force in the evolution of mating strategies. For estimation of economic loss, it is necessary to have detailed information of insect pests. Such studies would be instructive in understanding the life parameters and finding weak spots to restrict the damage.

Keywords: *Poeciloceris pictus*, spermatheca, *Calotropis procera*, copulation

O-231/ICAZ-2022

**Systematic Study of Pygmy Grasshopper (Tetrigidae: Orthoptera) of Sindh**

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**Abstract:**

Tetrigidae (pygmy grasshoppers) is a diversified group, they often show morphological crypsis and have adapted predatory avoidance mechanism. Members of Tetrigidae are variously called grouse locusts, pygmy locusts, ground hoppers or pygmy grasshoppers. Tetrigidae has hemimetabolous development in their life, in which eggs are hatched into nymphs. These diminutives are primarily ground dwellers and mostly encountered among the leaf or in wet places, wet meadows, hayfields and along the banks of the rivers, streams or in stagnant water. Dietary divergence in orthopteran species (Tetrigidae) is also an important factor that may depends on structure and development of insect's body parts. Pygmy grasshoppers usually exhibit the typical example of polymorphism. Different species show color-marking polymorphism. Such kind of polymorphism has been adapted to provide a camouflage for the different species towards their natural backgrounds (crypsis) such as grasses, sand and stones. During the present study 02 species i.e., *Hedotettix angustatus* Hancock, 1909, *H. punctatus* Hancock, 1909, of genus *Hedotettix* Bolivar 1887, from Sindh Pakistan.

**Key words:** crypsis, wet meadows, grouse locusts, polymorphism.

O-232/ICAZ-2022

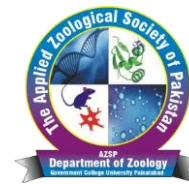
**Review of Genus *Conocephalus* (Conocephalini: Conocephalinae: Tettigoniidae) Species from Sindh, Pakistan**

Suriya Sanam and Riffat Sultana

Department of Zoology, University of Sindh, Jamshoro

**Abstract**

Subfamily Conocephalinae is the second largest subfamily of Tettigoniidae following the Phaneropterinae from Sindh, Pakistan. Conocephalinae was proposed by Kirby & Spence in 1826. Conocephalinae species occur in brown or green forms and are well camouflaged and well adopted to the tropical and subtropical areas of the world. Tettigoniids of the subfamily Conocephalinae are characterized by their pointed or cone shaped head that projects out from the basal segment of the antennae. Conocephalinae species are slender, usually less than 25mm in length (some up to 27mm). Wings are extending beyond the tip of abdomen. Ovipositor slender, straight but slightly curved. *Conocephalus* (Tribe: Conocephalini) members are usually



phytophagous and have strong mandibles which are used for seed eating and sometimes are used for predation. During the present survey 43 specimens of genus *Conocephalus* for 03 species with one new record i.e., *Conocephalus (Anisoptera) fuscus fuscus* (De Geer, 1773), *C. (Anisoptera) maculatus* (Le Guillou, 1841) and *C. (Chloroxiphidion) albescens* (Walker, 1869) were reported from different regions of Sindh, Pakistan. During the field visit economic loss of these species has been noticed so keeping in their complex identification and huge economic loss have been reported from different agricultural areas of Sindh.

O-237/ICAZ-2022

#### Diabetic Nephropathy: Linking Changes in Renal Histomorphometry and Disease Progression

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

#### Abstract

Nephropathy is considered a foremost cause of morbidity and mortality in a patient with type 1 and type 2 diabetes mellitus. Hyperglycemia causes renal injury directly or by hemodynamic alteration and it progresses through different stages such as mild inflammatory processes to chronic inflammation and fibrotic changes. As histological changes provide deeper insight in structural and morphological changes, current study was aimed at evaluating progression of diabetic nephropathy in different stages. For this purpose, adult Wistar albino rats (n=8) were equally and randomly divided into two groups after one week of acclimatization. One group served as negative control and it fed on normal diet. Positive control group received a 30% high-fat diet and 5% sucrose in drinking water daily in surplus amounts. After 8 weeks the rats with blood glucose levels >150 mg/dl were injected with a single i.p dose of streptozotocin (STZ) 35 mg/kg. After confirmation of hyperglycemia, rats with blood glucose levels >250 mg/dl were confirmed as diabetic. Body weight was recorder weekly. Decapitation was carried out at day 7, 14 and 21. Kidneys were weighed and fixed in 10% formalin. Slides were prepared by following a series of dehydration, clearing, mounting and staining. Microscopy was done at 40x magnification. Image J software was used for histomorphometry. Diameter of renal corpuscles, wall thickness, lumen volume and wall to lumen ratio were quantified. Histological findings revealed that at different stages of disease progression there was significant alterations in kidney structure.

**Keywords:** Diabetic nephropathy, Histology.

O-238/ICAZ-2022

#### Study of Indigenously produced varieties of *Moringa oleifera* leaves to monitor its antioxidative and antimicrobial activity

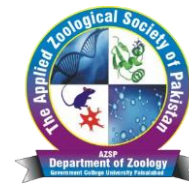
Maheen Ikram<sup>1</sup>, Razia Noreen<sup>1\*</sup>, Sadaf Tariq<sup>1</sup>

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

#### Abstract

*Moringa oleifera* the plant from the family Moringaceae was famous because of presence of bioactive. *Moringa oleifera* leaves were used worldwide for the treatment of different diseases. Indigenously produced Multan and Indian variety of *Moringa oleifera* leaves were taken for experiment. As solvent and extraction method has impact on presence of bioactive so ethanol and methanol was used for preparing extract with ultra-sonication. Phytochemical analysis was done by High Performance Liquid Chromatography (HPLC) and Fourier Transform Infrared Spectrophotometer (FTIR) which show presence of bioactive responsible for antimicrobial and antioxidant activity. HPLC determine the presence of compounds responsible for antioxidative and antimicrobial property. FTIR analysis show the presence of carbohydrates, proteins and amides in both varieties with varied distribution shows that leaves of *Moringa oleifera* used as proper diet. Antioxidative activity of the *Moringa oleifera* leaves (indigenously produced Multan and Indian variety) was checked by DPPH assay, Indian variety of *Moringa oleifera* leaves showed higher radical scavenging activity than Multan variety. Total Phenolic Content (TPC) was higher in Multan variety of *Moringa oleifera* leaves while Total Flavonoid Content (TFC) was higher in Indian variety. Antibacterial activity of the *Moringa oleifera* leaves was check by agar well diffusion method. Four bacteria were used for this purpose. In both varieties of *Moringa oleifera* leaves *Staphylococcus aureus* gave the highest activity than *Escherichia coli*, *Pseudomonas aeruginosa* and *Bacillus subtilis* and the Indian variety gave higher zone of inhibition than Multan variety of *Moringa oleifera* leaves. Presence of active compounds in both varieties of the *Moringa oleifera* leaves show its potential for antioxidant and antimicrobial activity.

**Keywords:** DPPH, FTIR, TPC, TFC, antioxidant, antimicrobial.



O-241/ICAZ-2022

**ELISA Estimation and PCR Analysis of Human B7H1 in Brain Tumor Patients**

Aetsam Bin Masood

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**Abstract:**

Cancer is an uncontrolled growth of cells that have altered cell cycles. Cancer can be benign or metastatic. Among the numerous types of cancers, one of the most lethal one is GBM which is characterized by its aggressiveness and invasive properties. Conventional treatments offered for cancers have side effects and thus a new treatment option should be sought. This option is immunotherapy. A novel immunotherapeutic agent known as B7H1 has been studied in this research. It binds to its receptor and causes immunosuppression. In this study quantitative analysis was carried out at protein and mRNA level. Mean age of the study population was  $37.94 \pm 1.58$  years while controls had a mean age of  $37.70 \pm 0.77$  years. This study included 53.52% males while 46.48% females. The age group having highest incidence of GBM was 30-39 years. Familial GBM cases accounted for 9.85% of all the cases. On ethnic basis, Punjabis constituted 57.74% of the study population followed by Pakhtuns that were 30.98% of all the participants enrolled in the study. Mean B7H1 concentration as quantified via ELISA was  $36.95 \pm 3.50$  pg/ml for GBM patients which was significantly higher ( $P < 0.05$ ) as compared to controls, having a mean concentration of  $28.49 \pm 1.40$  pg/ml. Males had a higher concentration of  $40.52 \pm 5.66$  pg/ml as compared to  $32.90 \pm 3.81$  pg/ml in females. PCR expression analysis showed that B7H1 was 3.7 folds higher in GBM as compared to controls. Relative gene expression and ELISA showed that B7H1 is overexpressed in GBM patients as compared to controls.

O-243/ICAZ-2022

**Embryotoxicity of Fluconazole on Developing Chick Embryos**

Yashal Fatima

University of Okara, Okara, Pakistan.

**Abstract:**

**Background:** Fluconazole is commonly first generation triazole. It is anti-fungal and used for the treatment of fungal infections that disturb your skin hair and nails. **Objective** The present study was tested on chick embryo in order to check the embryotoxicity and teratological effect of fluconazole in them. **Method:** Fertilized eggs were taken and divided into 4 groups. Two groups were experimental groups and treated with different concentration of fluconazole. One group was treated with distilled water while fourth group was untreated and named as control group. Dose was given on 4<sup>th</sup> day of incubation while recovery was made on 9<sup>th</sup> day. **Result:** There were different anomalies observed in them like hydrocephaly, microcephaly shorting of beak, agenesis, Amelia, micromelia, anophthalmia, microphthalmia, and kyphosis. There were also observed the Morphometric measurements with the difference of significant ( $p < 0.001$ ) & ( $p < 0.01$ ) in CR length, body weight, head circumference, Eye circumference, Forelimb and HindLimb. Different vital organ defects were also observed in histological studies. **Conclusion:** It concludes that the Fluconazole in various combinations has been found to cause embryotoxicity and teratological consequences in chick embryos.

**Key word:** Embryotoxicity, Fluconazole, Teratological Effect, Anomalies, Anti fungal.

O-245/ICAZ-2022

**Explorations of histological damages in Labeo rohita induced by Emamection during 96 hrs of LC50 determination.**

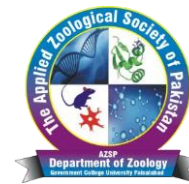
Sobia Abid<sup>1</sup>, Hina Zavar<sup>1</sup>, Asma Shahbaz<sup>2</sup>, Muhammad Asad<sup>2</sup>, Fozia Afzal<sup>1</sup>

<sup>1</sup> Department of Zoology, Islamia University Bahawalpur (Rahim Yar Khan Campus)

<sup>2</sup> Khawaja Fareed University of Engineering and Information Technology, Rahim yar khan

**Abstract:**

This study was conducted to find out LC50 of emamectin benzoate in Labeo rohita. The study was conducted at local government fish farm. The fish  $n=70$  (approx wt 10 grams) were randomly divided into 7 different groups (10 in each) and applied different doses of emamectin benzoate @ 0.15, 0.20, 0.25, 0.30, 0.35, 0.40 and 0.45 mg/L for 96 hrs. The data for mortality was recorded for each group and subjected to probit analysis to find out the estimated value of LC50. The LC50 value of emamectin benzoate for Labeo rohita was 0.37 mg/L after 96 hrs. The fish organs liver, gills and intestine showed severe histological abnormalities in all study included organs at high dose treated groups such as congestion, oedema, dilations and non-uniformity in histo-architecture. This study concluded that emamectin benzoate is highly lethal at high doses 0.35, 0.40 and 0.45 mg/L in Labeo rohita and reported with severe histological damages in major organs.



**Key words;** Emamectin benzoate, *Labeo rohita*, LC50, Liver, Intestine

O-246/ICAZ-2022

**Assessment of Hemato-biochemical and hepato-intestinal abnormalities induced by emamectin benzoate in *Labeo rohita***

Sobia Abid<sup>1</sup>, Nabeela Nadeem<sup>1</sup>, Isha Akram<sup>2</sup>, Muhammad Asad<sup>2</sup>, Fozia Afzal<sup>1</sup>

<sup>1</sup> Department of Zoology, Islamia University Bahawalpur (Rahim Yar Khan Campus)

<sup>2</sup> Khawaja Fareed University of Engineering and Information Technology, Rahim yar khan

**Abstract:**

This study was conducted to explore the toxic effects of emamectin benzoate in *Labeo rohita*. The experiment was conducted local Government fish farm in glass aquariums having 50 liters of water capacity. The experiment ethical permission was granted by Ethical committee of Animal experimentation of IUB-RYK. The fish with no physical abnormalities were selected for experimental purpose. The fish were divided into four groups and applied the different doses of emamectin benzoate @ 0.012, 0.018 and 0.037 mg/L. After 14 days of experiment fish blood was taken out and dissected to analyse the Hemato- biochemical and hepato-intestinal effects. The fish treated with medium and high dose showing the significant abnormalities in hematological and biochemical parameters including histological changes in liver and intestine. This study concluded that emamectin benzoate is highly toxic for *Labeo rohita* at low and high doses.

**Key words;** *Labeo rohita*, Emamectin benzoate , hepato-intestinal , Hemato-biochemical.

O-247/ICAZ-2022

**Curing ability of grape extract against emamectin induced histological abnormalities in gills and brain of *Labeo rohita*.**

Muhammad Asad<sup>2</sup> , Saima mohy ud din<sup>1</sup> , Sobia Abid<sup>1</sup>, Mawra Rasheed<sup>2</sup>, Hina Ali<sup>1</sup>

<sup>1</sup> Department of Zoology, Islamia University Bahawalpur (Rahim Yar Khan Campus)

<sup>2</sup> Khawaja Fareed University of Engineering and Information Technology, Rahim yar khan

**Abstract:**

The remedial effects of grapes in *Labeo rohita* were studied through the induced histological disparities of emamectin in gills and liver. The studied animals were housed at local fish hatchery near Rahim Yar Khan, Punjab Pakistan. Experimental animals were pre-treated with different doses of emamectin @ 0.000, 0.012, 0.018 and 0.037 mg/L for 14 days in four groups. After 14 days different doses of grape extract @ 50, 100 and 200 mg/L were administrated to all emamectin benzoate pre-treated groups. The results of this study revealed that high and medium doses of grape extract combat the toxic effects of emamectin and help in curing the histological abnormalities induced in gills and liver of *Labeo rohita*. Hence it is concluded that the anti-oxidants in grape extracts have potential to cure histological abnormalities induced by emamectin benzoate in *Labeo rohita*.

**Keywords;** Grapes extract, Emamectin benzoate, *Labeo rohita*, Gills

O-248/ICAZ-2022

**Ameliorative study of grape seed extract against emamectin induced histological hepatic and intestinal abnormalities in *Labeo rohita***

Muhammad Asad<sup>2</sup>, Sobia Latif<sup>1</sup>, Sobia Abid<sup>1</sup>, Sadia Aiman<sup>2</sup>, Asma Hassan<sup>1</sup>

<sup>1</sup> Department of Zoology, Islamia University Bahawalpur (Rahim Yar Khan Campus)

<sup>2</sup> Khawaja Fareed University of Engineering and Information Technology, Rahim yar khan

**Abstract:**

This was an ameliorative experiment and performed to evaluate the ameliorative potential of grape seeds extract on *Labeo rohita* toxicated by emamectin benzoate. This experiment was conducted at local fish hatchery near Rahim Yar Khan, Punjab Pakistan with the permission of Ethical committee of Animal experimentation of the University. The fish having normal physical state (without abnormalities) were selected for experimentation. It was a 28 days experiment and fish were divided into four groups. They were treated with different doses of emamectin @ 0.000, 0.012, 0.018 and 0.037 mg/L for 14 days. A 2nd Lapse of 14 days received grapes extract in controlled (no dose), low, moderate and high doses @ 50, 100 and 200 mg/L to observe the ameliorative potential. This experiment indicated well amelioration against emamectin benzoate induced histological abnormalities by using grape seed extract.

**Keywords;** liver, Intestine, Emamectin benzoate, Grape seed extract





O-249/ICAZ-2022

**Evaluation of Antibiotics against Single and Mixed Infection of Bacteria Isolated from Bovine Milk**

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<sup>1</sup>Department of Food Science, Cholistan University of Veterinary and Animal Sciences, 63100, Bahawalpur

<sup>2</sup>Department of Medicine, Cholistan University of Veterinary and Animal Sciences, 63100, Bahawalpur

<sup>3</sup>Department of Zoology, Cholistan University of Veterinary and Animal Sciences, 63100, Bahawalpur

**Abstract:**

Milk contamination by multiple bacteria with increased antibiotic resistance is rising day by day. Commonly, multiple antibiotics evaluated against bacteria that in most of the cases become ineffective when there are multiple bacteria simultaneously contaminating dairy udder. Current study was thus designed to find response of single antibiotic against single and multiple bacteria. For this purpose n=200 milk samples were collected from dairy farms located in Khanewal district using purposive sampling technique. Subclinical mastitis samples were tested by surf field mastitis test that were further put to microbiological examinations for *Staphylococcus aureus*, *E. coli*, *Streptococcus agalactiae*, and *Klebsiella pneumoniae*. A total of n=22 antibiotics were applied on single, double, triple and tetra mixed bacteria. Antibacterial activity was assessed by measuring zone of inhibitions around antibiotic following guidelines of Kirby Bauer. Parametric and non-parametric statistical tests were applied on collected data at 5% probability using SPSS version 22 of statistical computer program. The study found 24.5% (49/200) prevalence of subclinical mastitis while 93.88% (46/49) of these samples was positive for bacterial contamination. *E. coli* stood highest (6.12%) among single bacterial etiology while among double were *S. aureus* and *E. coli* (20.41%), among triple was *S. aureus*-*E. coli*-*Streptococcus* (6.12%), while tetra mixed infection presented 8.16%. Out of twenty-two antibiotics levofloxacin and enrofloxacin show higher microbial resistance against *E. coli* while imipenem was least effective. In case of *Sauers* and *Streptococcus* Clindamycin, Azithromycin and Gentamicin show efficient results while imipenem was least effective. In case of *Klebsiella Pneumoniae* aztreonam, clindamycin and Ampicillin show effective results and imipenem. Study found increased percentages of mixed infections with higher antibiotic resistance to wider ranges of antibiotics which demands stern protocols to control bacterial etiologies and resistance by them.

**Keywords:** Mixed infection, *Klebsiella*, Antibiotics, Mastitis, Dairy udder

O-250/ICAZ-2022

**Application of Nanobiotics in Biomedical Research**

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<sup>1</sup>The Government Sadiq College Women University Bahawalpur, 63100, Pakistan

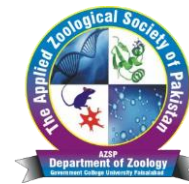
<sup>2</sup>Department of Medicine, Cholistan University of Veterinary and Animal Sciences, 63100, Bahawalpur

<sup>3</sup>Department of Zoology, Cholistan University of Veterinary and Animal Sciences, 63100, Bahawalpur

**Abstract:**

Antimicrobial resistance is a global issue while alternatives to antimicrobial are acknowledged side by side. Nanoparticles are emerging alternatives to antimicrobials with promising activity against drug-resistant microbes. Nanoparticles express different biological activities based on being metallic and nonmetallic and also being synthesized by chemical or green synthesis. Shapes and sizes play a very important role in activity against pathogens. However, their use carries adverse effects like toxicity hence their judicious use is required. Moreover, the use of antibiotics cannot be abandoned at once but reduction or refinement in their use becomes the better option. In such situations, antibiotic-coupled nanoparticles play a significant synergistic role against multiple drug-resistant microbes. Nanoparticles can work as vehicles for drug delivery where the alone drug cannot reach. On the other hand, nanoparticles themselves express antibacterial activity against microbes thus potentiating the antibacterial effect. This way toxicity of antibiotics as well as those of nanoparticles may be reduced. Various metallic oxide nanoparticles coupled with antibiotics have been applied against gram-positive and gram-negative bacteria while their topical application is also being marketed. Further researches are underway to explore their impacts on various biomedical applications. The current review focuses on various aspects of the biological activity of nanoparticles alone and in combination with antibiotics against drug-resistant microbes in animals and humans.

**Keywords:** Antibiotics; nanoparticles; microbes; resistance; antibacterial



O-251/ICAZ-2022

**Mechanical Strength of Novel Dental Restorative Material Incorporating the Titanium Oxide Nanoparticles Synthesized by *Bacillus Subtilis***

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Department of Microbiology, Quaid-i-Azam University, Islamabad

**Abstract:**

Nanotechnology is a multidisciplinary field developed in the past few decades but it plays an important role in enhancing the status of current oral care by utilizing the biocompatible and safe restorative materials. The aim of the study was to synthesize cost effective, bio-safe and bio-compatible titanium oxide nanoparticles by employing *Bacillus Subtilis* culture. The prepared titanium oxide nanoparticles were characterized by utilizing different techniques such as SEM, TEM, AFM, FTIR, XRD, EDX and DRS were carried out to observe the quality of the attained titanium oxide nanoparticles. These nanoparticles were incorporated in dental restorative material to test its mechanical strength. Results concluded that the titanium oxide nanoparticles attained by utilizing *Bacillus Subtilis* were spherical with particle size of about 70nm having anatase phase and band gap energy = 2.8 eV. These nanoparticles were potent enough to enhance the mechanical strength of novel dental restorative material containing titanium oxide nanoparticles. The flexural and compressive strength of novel dental restorative material with titanium oxide nanoparticles was 26.39 +0.26 and 15.51 +0.24 as compared to the conventional dental restorative material without titanium oxide nanoparticles which was 16.11 +0.23 and 7.63 + 0.21 (P value < 0.001). This study concluded that titanium oxide nanoparticles synthesized by *Bacillus Subtilis* are highly bio-compatible and environmentally safe in producing a novel dental restorative material with increased mechanical strength with tooth.

**Keywords:** Titanium oxide, Nanoparticles, *Bacillus Subtilis*, Green Synthesis

O-255/ICAZ-2022

**Optimization of Non-Ribosomal Peptide Producing *Bacillus* strains with Antifungal Activity against Phytopathogens and their Role in Phosphate Solubilization**

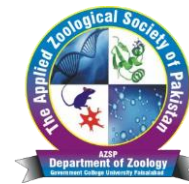
Munira Qudus<sup>1</sup>, Dr. Asif Jamal<sup>1</sup>

<sup>1</sup>Faculty of Biological Sciences, Department of Microbiology, Quaid-i-Azam University, Islamabad, Pakistan

**Abstract:**

The agricultural productivity loss due to the microbial phytopathogens has been a serious global issue. Moreover, the bio-unavailability of phosphorus in soil is the largest limiting factor for plant growth and development leading to a significant decrease in crop yield. The current study intended to opt for the various *Bacillus* species with the potential for biological control against various notorious fungal pathogens and to ensure sufficient and easily available form of phosphorus nutrient for optimal plant growth. *Bacillus* strains isolated from agricultural soil was evaluated for its bio-control potential against catastrophic fungal pathogens including; *Botrytis cinerea*, *Aspergillus flavus* and *Aspergillus niger* and phosphate solubilization capability. Two *Bacillus* strains M24 and M41 were selected based on their antagonist behavior, inhibition of mentioned pathogens and phosphate solubilization activity. Production of antifungal compounds (lipopeptides) or fungal toxin metabolites were evaluated by different in vitro assays. Two strains were optimized at different temperature, pH and inoculum concentrations. Finally in-vivo pilot scale experiment was conducted on chickpea plant, to assess PGPR activity of *Bacillus* strains. Considering the results, strain M41 exhibited the highest anti-fungal activity against *Aspergillus flavus* with the zone of inhibition measuring 45mm (point inoculation method) and 78mm (Well diffusion assay). However, the phosphate solubilization index (PSI) was 1.8mm and 1.67mm in case of M24 and M41, respectively. Based on results, it can be postulated that the *Bacillus* strains have the potential to produce secondary metabolites of commercial importance that can be employed as biological protective agents against plant diseases and as plant growth promoting organisms. Additionally, their potential to have a natural tendency of being pesticides and phosphate solubilizers could be the great alternative of the chemical pesticides and fertilizers to avoid their adverse affects.

**Keywords:** *Bacillus* species, Biological control, Phytopathogens, Biosurfactants, Phosphate solubilization.



O-256/ICAZ-2022

**Isolation, screening, characterization, molecular identification of lignin degrading bacteria and Optimization of lignin degradation in shake flask experiment**

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Department of Microbiology, Quaid-i-Azam University Islamabad, 45320, Pakistan.

**Abstract**

Pulp and paper (P&P) industry is of great economic importance but at the same time it generates huge volumes of lignin containing wastewater known as black liquor. Black liquor possesses serious risk for the ecosystem. Present study was focused to isolate, screen, characterize and optimize the potential bacterial strains having enzymatic abilities to degrade complex lignin, the priority pollutant, in the black liquor. After isolation and screening, three most efficient lignin degrading bacterial strains were identified by sequencing of 16s rRNA genes. Color reduction was monitored by spectrophotometer at 465nm and lignin degradation was estimated at 280nm in shake flask fermentation mode. After initial tests, the process for the biodegradation of lignin by three selected bacterial isolates was optimized. The enzymatic assay for the detection of peroxidases was performed. Molecular identification revealed that bacterial strain E1 identified as *Bacillus cereus*, bacterial strain E2 as *Lysinibacillus* and bacterial strain E3 as *Bacillus thuringiensis*. The optimization of the biodegradation process condition revealed that the lignin degradation and decolorization of lignin was done by bacterial strain E1 50% and 62 %, bacterial strain E2 48%, 63.7% and bacterial strain E3 49.8% and 62% .Whereas the efficiency of the bacterial consortium E1+E2 56% and 63.6%, E1+E3 49.0% and 61%, E2+E3 52% and 63% and E1+E2+E3 59.39% and 62.05% at highly alkaline and slightly thermophilic condition. It can be concluded that these three isolates and their consortium have excellent potential to degrade lignin found in pulp and paper effluent and could be used for developing biological waste treatment system for the industry.

**Keywords:** Lignin biodegradation, Bacteria, Black liquor, 16s rRNA

O-258/ICAZ-2022

**Plant Growth Promoting Rhizobacterium and Lufenuron Induced Growth and Biochemical Modulations in Pea (*Pisum Sativum L.*) under Natural Insect Attack**

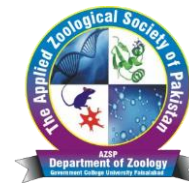
Muhammad Sohail Akram<sup>1</sup>, Asad Ullah Arshad<sup>1</sup>, Humaira Malik<sup>2</sup>

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

<sup>2</sup>Entomological Research Institute, AARI, Faisalabad, Pakistan

**Abstract:**

Pea (*Pisum sativum L.*) is an important vegetable plant. The crop is attacked by various insects, including aphids (*Acyrtosiphon pisum*) and leaf miner (*Chromatomyia horticola*). There are many traditional approaches to minimize insect-associated damages in plants. Plant growth promoting rhizobacteria has the capacity to enhance plant growth as well as reduce pest-associated crop losses. In addition, pesticides are also used to minimize insect attack. Among the various pesticides, insect growth regulators (IGRs) have gained significant attention due to their targeted insect control, environment-friendly nature and no harm to non-target insects. A field experiment was conducted at Ayyub Agricultural Research Institute (AARI) Faisalabad, to record the incidence of insect attack on pea (*Pisum sativum*) plants raised from plant growth promoting rhizobacterium (MUR-3) inoculated seeds under natural conditions. Insect growth regulator (Lufenuron) was applied, at the vegetative stage, on non-inoculated as well as inoculated plants. Plants exhibited increased biomass and total chlorophyll contents when grown from PGPR-inoculated seeds. The foliar spray of lufenuron proved to be very effective for controlling aphids and leaf miner infestation within 7 days after spray. The combined effect of PGPR and lufenuron exhibited increased H<sub>2</sub>O<sub>2</sub> concentrations which assisted plants to repair the defense system against the oxidative damage caused by increased reactive oxygen species under biotic stress. Plants grown from PGPR-treated seeds improved their defense mechanism by enhancing peroxidase (POD), protease activity, phenolics and proline contents. After further field experiments, the application of PGPR could be employed as an environment friendly strategy to reduce insect infestation in agricultural fields.



O-259/ICAZ-2022

**Selection of Heat tolerant and better producing animals; an increasing concern from North to South in Pakistan under Global Climate Change**

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<sup>2</sup>Department of Biotechnology, Baluchistan University of Information Technology, Engineering, and Management Sciences, Quetta, Pakistan

<sup>3</sup>Department of Biotechnology, Virtual University of Pakistan, Lahore

**Abstract:**

The Global Climate Change has become a greater concern throughout the world particularly Pakistan is among the countries badly being affected by GCC which has been evident of extreme weather changes resulting in heaving flood in 2022 in the country. The Livestock being the back bone of food supply chain is also under extreme stress for their heat tolerance and productivity. To mitigate this challenge there is dire need to genetically identify and make future selections based on superior genomics. In this context we sampled the animals from cold (Yak (*Bos grunniens*)) and moderate to hot regions (Cattle (*Bos indicus*), Buffalo (*Bubalus bubalis*) and Camel (*Camelus dromedarius*)) of Pakistan. The mRNA expression pattern of Heat Shock Proteins (HSPs) and immunity-related protein genes were studied through qRT-PCR in the PBMCs of selected local breeds of cattle, buffalo, camel and yak sampled in different seasons in the Molecular Biology and Genomics Lab of the Virtual University of Pakistan. Differential gene expression pattern was detected in the PBMCs of different breeds during the study period. These studies provided an insight into the expression pattern in various genes that may be potentially associated to improve the heat tolerance, adaptability and production under continuously changing environmental patterns in Pakistan.

**Key words:** HSPs, Immunity-related genes, gene expression, cattle, buffalo, camel and yak, Pakistan

O-260/ICAZ-2022

**Effects of Different Farm Made Feed and Commercial Aquafeed on Growth Performance, Survival and Proximate Composition of Grass Carp (*Ctenopharyngodon Idella*) Reared in the Semi-Intensive Composite Culture System**

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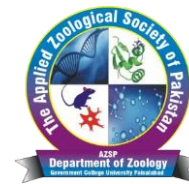
<sup>2</sup>Department of Fisheries and Aquaculture, University of Veterinary and Animal Sciences,

Lahore, Pakistan

**Abstract:**

The objective of the study was to find the effects of different farm made feed and commercial aqua feed on growth performance, survival and proximate composition of Grass carp (*Ctenopharyngodon idella*) reared in the semi-intensive composite culture system. The aqua feeds of various companies (AMG, Supreme, Aqua, Star Floating, Hi-Pro and Punjab feed) used as commercial feed. Farm made feeds were Maize gluten and Rice polish. For confidentiality, these feeds were randomly given code names T1, T2, T3, T4, T5, T6, T7 and T8 which were only known to investigating staffs. There were two replicates for each treatment. In this study, significantly higher growth was found in T3 as compared to other treatments. Lesser weight gain was observed in the T1 (270.30±60.5). The maximum body length (19.25±2.19) was found in T3. Similarly, the minimum body length (5.97±2.94) was seen in T2. FCR ratio (2.36±0.01) was recorded in T3. Simultaneously, FCR (1.86±0.002) was also recorded in T4 which is the best ratio for fish farmers. Higher SGR was recorded in T3 (1.62±0.05). Overall, T4 showed lesser SGR (1.05±0.001). T4 showed the higher Crude protein (28.66±0.24%). T3 showed a higher fat content level (5.46±0.33%) in the body composition. These results also evidenced that the increase in the dietary level of protein and lipid content can enhance the fish's body crude protein and lipids level. Thus, based on growth performance, survival and proximate composition, it is concluded that T3 & T4 may be recommended for commercial culture of *Ctenopharyngodon idella*.

**Keywords:** Commercial aquafeed, traditional feed, Growth, Body composition, Survival rate, Grass Carp.



O-262/ICAZ-2022

**Pancreatic regenerative efficacy of *Moringa oleifera* extract in diabetic rat model**

Rimsha Nausheen<sup>1</sup>, Arslan Iftikhar<sup>1</sup>, Humaira Muzaffar<sup>1</sup>, Aatira Ahmad<sup>1</sup> and Haseeb Anwar<sup>1</sup>

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

**Abstract:**

Restoration of pancreatic islet mass through endogenous stimulation of regeneration in the pancreatic  $\beta$  cells has emerged as a promising strategy to overcome diabetes. *Moringa oleifera* is a rich source of numerous nutritionally and medicinally valuable active ingredients. It is frequently employed as an antidiabetic agent in folk medicine due to presence of an array of polyphenols. In the current study, an extract of *Moringa oleifera* leaves was used to determine the changes in pancreatic histology and levels of transcription factors PDX-1, MAFA, NEUROG3, NKX6.1, and NEUROD. For this purpose, a total of 24 rats were procured from Department of Physiology Government College University, Faisalabad and divided into four groups with six rats in each group. Normal control group contained normal healthy rats which were neither induced diabetes nor received any treatment. Diabetes was induced, in the Negative control, Positive control, and Treatment group, by intraperitoneal injection of alloxan monohydrate 150mg/kg. Rats with a blood glucose level greater than 180mg/dl were considered to be diabetic After confirmation of diabetes, the positive control group received a dose of metformin 10mg/kg while the treatment group received an extract of *Moringa oleifera*. After 28 days of treatment, rats were sacrificed to collect blood and tissue samples. Parameters including biochemical markers (blood glucose and insulin levels), oxidative stress indicators (total oxidant status and total antioxidant capacity), changes in the architecture of pancreatic islets, and expression levels of regeneration-associated transcription factors were measured and statistically analyzed. The statistical analysis of all results demonstrated that treatment with *Moringa oleifera* significantly reversed alloxan induced hyperglycemia, oxidative stress, hypoinsulinemia, necrotic changes in islets with upregulation of transcription factors, such as PDX-1, NEUROG3, MAFA, NEUROD and NKX 6.1, which are well known for their involvement in regeneration of pancreatic islets. Thus, our study strongly advocates the use of *Moringa oleifera* as a potential agent for boosting pancreatic regeneration and overcoming diabetes.

O-264/ICAZ-2022

**New Record of Ground Beetles from Cholistan Desert, Bahawalpur, Pakistan**

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\*Department of Zoology, University of Sindh, Jamshoro, Sindh-Pakistan.

**Abstract:**

The Cholistan desert also locally called Rohi is located in Bahawalpur southern region in Punjab. It creates a scenario of a hot desert and is also considered the hottest and driest desert present in Pakistan. This desert is extended through the Nara as well as Thar desert of the Sindh province between 27°42'N and 29°45'N latitude and 69°52'E and 75°24'E longitude and altitude of approximately 112 m above sea level. Cholistan desert has about 480 km long while its width changes from 32 – 192 km. Desert dunes, which only comprise 5% of the earth's surface, are inhabited by many endemic plants and animals. In dry landscapes, beetles make up the majority of insect groups. They live close to plants in these areas, utilizing them as shelter, and development spots. Carabid also known as Ground beetles is the largest family of beetles which is comprising 40,000 species and 86 tribes. During the survey *Anthia sexguttata* (Fabricius, 1775) was also reported and it's constructed a new record for Cholistan desert. Further, survey is in progress.

O-265/ICAZ-2022

**Evaluation of Amylase on Growth, Digestive Enzyme Activity, Apparent Nutrient Digestibility and Body Composition of *Labeo rohita***

Farkhanda Asad, Ume Habiba, Rafia Jamal, Shabana Naz, Azhar Rafique and Zunaira Shaheen

Department of Zoology, Government College University, Faisalabad

**Abstract:**

A feeding trial was conducted to determine the effect of exogenous enzyme (amylase) supplementation on growth, apparent nutrient digestibility, digestive enzyme activity and body composition of *Labeo rohita* for 90 days. *L.rohita* fingerlings were allocated to two treatments and one control diet along with replica of each. Prior to experiment fingerlings were acclimatized at laboratory conditions with control diet having 32% of crude protein. Diet was given at the rate of 4% of live wet body weight once a day. Physical parameters of water like temperature, dissolved oxygen and pH were monitored by using YSI pro series multipara meter professional plus meter. Dissolved oxygen was maintained at 5-7 ppm by using air pumps through capillary system. Fecal material was collected on daily basis for further digestibility analysis. Then at the end of trial data on growth, nutrients apparent digestibility and body composition was further subjected to statistical analysis for finding out the effect of enzyme



Amylase. The findings of this experimental study revealed that maximum weight gained by AM1 (Amylase 3mg/kg) and maximum length was gained by treatment group AM2 (Amylase 6mg/kg). Results of percentage of nutrients in body meat showed highest value of moisture was in treatment AM1 (5.5%) while ash and dry matter were maximum in treatment AM2. Apparent digestibility for dry matter was higher in control group. Digestibility of crude fat and crude protein was maximum in treatment AM1. The results revealed that supplementation of enzyme amylase play a pivotal role in growth and digestibility of *Labeo rohita*. Different level of enzyme application showed noticeable effect on body composition and enzyme activity of rohu. This study proved that fish production can be enhanced by adding digestible enzymes in fish feed.

**Keywords:** *Labeo rohita*, exogenous enzyme, apparent nutrient digestibility, growth, body composition.

O-266/ICAZ-2022

***Carica papaya* and 17 $\alpha$ -Methyltestosterone as Reproductive Inhibitor in *Oreochromis niloticus***

Farkhanda Asad, Zarsha Hassan, Rafia Jamal, Zunaira Shaheen and Taskeen Fatima

Department of Zoology, Government College University, Faisalabad

**Abstract:**

The study generally aimed to check the effectiveness of Papaya seeds meal and 17 $\alpha$ -methyl on reproductive performance, growth parameters and proximate body composition of *Oreochromis niloticus* (Nile Tilapia). One season experimental trial was designed at Fisheries Lab, Department of Zoology, Government College University Faisalabad. 250 hatchlings (2-3 days old) were acclimatized for few days and then randomly stocked in five aquariums each with one replicate (25 fry/aquarium). Four treatment diets i.e., PSM 6g/kg, PSM 7g/kg, MT 60mg/kg, MT 70mg/Kg and one control (without hormone) were designed to nourish the *Oreochromis niloticus*. Treatment diets (32% CP) were given for 30 days at the rate of 4% live body weight two times in a day. After 30 days, control diet was provided to all groups. PSM 6g/kg treated fish revealed the highest growth rate. While highest protein retention was observed by PSM 7 g/kg. Papaya based diet significantly lower the GSI and HSI in fish. Both PSM 6 g/kg and PSM 7 g/kg produced 55% sterile and 25% and 30% males respectively. By increasing the inclusion of papaya in diet ability to produce sterility also increased. Whereas, MT 60 mg/kg and MT 70 mg/kg produced 75% and 85% males, respectively. *Carica papaya* caused sterility in *Oreochromis niloticus* and significantly increased growth rate and protein retention in fish compared to 17-methyltestosterone. Plant resources are preferable to artificial means of controlling *Oreochromis niloticus*'s uncontrolled proliferation since they are affordable, biodegradable, and readily available.

**Keywords:** *Oreochromis niloticus*, papaya seeds meal, 17 $\alpha$ -methyl testosterone, sex reversal, sperm quality, growth performance.

O-267/ICAZ-2022

**Effect of protease supplementation on growth, digestive enzyme activity, apparent nutrient digestibility and body composition in *Labeo rohita***

Farkhanda Asad, Malja Iman Yousaf, Rafia Jamal, Tayyaba Ali, Asma Ashraf and Zunaira Shaheen

Department of Zoology, Government College University, Faisalabad

**Abstract:**

A feeding trial was conducted to determine the effect of exogenous enzyme (Protease) supplementation on growth, apparent nutrient digestibility and body composition of *Labeo rohita* for 90 days. *Labeo rohita* fingerlings were allotted to two treatments and one control diet along with replica of each. Prior to experiment, fish were acclimatized for a week at laboratory conditions with diet having 32% of crude protein. Diet was given at the rate of 4% of live wet body weight once a day. Physical parameters of water like temperature, dissolved oxygen and pH were monitored by using YSI pro series multipara meter professional plus meter. Dissolved oxygen was maintained at 5-7 ppm by using air pumps through capillary system. Morphometric attributes of fish like length and weight were measured after intervals of every 15 days to assess growth rate of *Labeo rohita*. Fecal material was collected on daily basis for further digestibility analysis. After the completion of 90 days' trial, fish body meat was analyzed for different nutrients. Then at the end of trial data on growth, apparent nutrient digestibility and body composition was further subjected to statistical analysis for finding out the effect of enzyme Protease. The results concluded that protease supplementation played significant role in growth and body composition of fish. Also, different level of enzyme concentration showed pronounced effect on the digestibility and enzymatic activity of *Labeo rohita*.

**Keywords:** *Labeo rohita*, exogenous enzyme, apparent nutrient digestibility, growth, body composition



O-268/ICAZ-2022

**Comparative effect of *Azadirachta indica* and 17 $\alpha$ - Methyltestosterone on the reproductive performance and gonadal history in *Oreochromis niloticus***

Farkhanda Asad, Taskeen Fatima, Rafia Jamal, Asma Ashraf and Shabana Naz  
Department of Zoology, Government College University, Faisalabad

**Abstract:**

A feeding trial of 90 days was carried out to investigate the efficacy of neem (*Azadirachta indica*) leaf powder meal and 17 $\alpha$ -methyltestosterone on the reproductive performance, gonadal history and growth pattern in *Oreochromis niloticus*. For this purpose, two hundred and fifty fry were randomly stocked in five aquaria each with one replicate (25 fry/aquarium). One control and four treatment diets T1 (MT 60 mg/kg), T2 (MT 70mg/kg), T3 (NLM 2g/kg) and T4 (NLM 3g/kg) were fed to five groups of fry for 30 days and for rearing of fry control diet (32% CP) was fed for further 60 days. Diet was given at the rate of 4% live body weight twice a day. Physicochemical parameters of water were monitored by using YSI pro series multipara meter professional plus meter. Body weight and length was measured on fortnight basis. At the end of the trial 10 fish from each aquarium were dissected. The findings of this experiment revealed that maximum weight was gained by the fish in control group and maximum length was gained by the treatment (MT 70). The results of proximate chemical composition of body meat revealed that ash and moisture percentage was maximum in NLM3 group. The dry matter amount was maximum in the control group while the crude protein and fat was maximum in the NLM3. Fish of treatment (MT 70) gave the highest male percentage (85%) as compared to all other treatments and control group. By increasing the dose of neem leaf powder in the diet (NLM 3) increased the percentage of sterile (50%) fish. Furthermore, the synthetic hormones play significant role in the sex reversal ratio and neem leaves act as antifertility agent for controlling the prolific breeding in *Oreochromis niloticus*.

**Keywords:** *Oreochromis niloticus*, 17 $\alpha$ -methyl testosterone, Neem leaves powder, body composition, Sex reversal ratio.

O-271/ICAZ-2022

**Genetic analysis of a Pakistani Family with Retinal Dystrophy**

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<sup>2</sup> IOB-Institute of Molecular and Clinical Ophthalmology, University of Basel, Switzerland

<sup>3</sup> Department of Ophthalmology, KEMU Institute of Medical Sciences KIMS Kohat 26000, Khyber Pakhtunkhwa, Pakistan

**Abstract:**

Retinal dystrophy (RD) is a common cause of visual impairment caused by degeneration of photoreceptor cells in retina of eye that results in night blindness, peripheral vision abnormalities and progressive vision loss to complete blindness in patients. The RD has greater genetic heterogeneity and till date, 280 genes have been reported to cause RD in 1 in 4000 individuals worldwide. In the current study, a multigeneration consanguineous family from Khyber Pakhtunkhwa region was analysed. Clinical examination of affected individuals was performed by an expert clinician and written informed consent was signed by the parents of affected individuals for participation in the current study. Blood samples were collected, pedigree was drawn and family history was recorded. Whole exome sequencing and Sanger sequencing were performed to find the disease causing variant in the family. The pathogenicity of disease causing variant was determined by using bioinformatics tools, such as Human Splicing Finder and SpliceAI. A homozygous splice site mutation (NM\_001286130.2; c.1122-9G>A, p.?) was found in the affected individuals to cause RD. This mutation was found in heterozygous state in phenotypically normal parents and siblings. The bioinformatics analysis confirmed the evolutionary conserved position and pathogenic affect of candidate CNGB1 variant. Molecular genetic analysis precisely established the genetic diagnosis for RD in the investigated consanguineous family that might be helpful for genetic counseling of family members.



O-272/ICAZ-2022

**Some Late Miocene Dental Evidences of Hipparion from the Sakhisarwar, Punjab, Pakistan**

Misbah Faiz, Dr. Khizar Samiullah, Rana Mehroz Fazal, Imran Ali, Aqsa Noor  
Department of Zoology, Ghazi University, Dera Ghazi Khan, Punjab, Pakistan.

**Abstract**

New dental material of *Sivalhippus theobaldi* is collected, described from the type locality of Litra Formation from Late Miocene of the Sakhisarwar, Punjab, Pakistan. Sakhisarwar is situated in Dera Ghazi Khan, Punjab, Pakistan. Sulaiman mountains have parallel ranges they consist mainly clay, shale, conglomerates, limestone and sandstones. The dental material includes isolated premolars and molars. The specimen were examined, compared to referred material and *Sivalhippus theobaldi* was identified. The sample comprises isolated molars and premolars that reflect all of *Sivalhippus theobaldi*' morphological characteristics. The collected *Sivalhippus theobaldi* specimens provided additional information about the recorded species from the different type locality and come up with current work of *Perissodactyla* from Middle Siwaliks of Pakistan. We have described 12 specimens of *Sivalhippus theobaldi* from this type locality. *Sivalhippus theobaldi* is a large specie with less complicated enamel plications. The molars of *Sivalhippus theobaldi* are big than premolars. The *Sivalhippus theobaldi* specie reported from Sakhisarwar, Punjab, Pakistan increases our understanding of the "open area" paleoenvironment by providing strong support for the land of open area. The comparative morphometric traits of fossils show a diversified existence of Hipparions throughout the Sulaiman range.

O-274/ICAZ-2022

**Whole Exome Analysis of a Pakistani Family with Autosomal Recessive Deafness**

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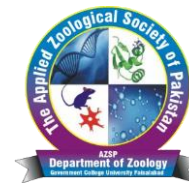
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**Abstract:**

Congenital Deafness is one of the most prevalent birth defects in children that affect their cognitive, speech, and social development, therefore it can have a profound impact on quality of life. Congenital deafness can be classified as syndromic or non-syndromic with autosomal dominant, autosomal recessive and X-linked inheritance patterns. In addition, the estimated prevalence of deafness is 1 in 1000 globally. However, studies have more frequently reported autosomal recessive congenital deafness in Pakistani population. Congenital deafness carries genetic heterogeneity as around 120 genes have been associated with congenital deafness. Therefore, in current study a Pakistani family with autosomal recessive deafness was recruited from Khyber Pakhtunkhwa region of Pakistan and was genetically analyzed via Whole Exome sequencing. Clinical examination of affected individuals was performed by an expert clinician and written informed consent was signed by the parents of affected individuals for participation in the current study. Blood samples were collected, pedigree was drawn and family history was recorded. The pathogenicity of disease-causing variant was determined by using *In silico* tools, such as Mutation Taster, VarSome and SIFT indel. A homozygous frameshift deletion mutation (NM\_004004.6:c.35delG, p.Gly12fs) in GJB2 gene was found to cause autosomal recessive deafness in the affected members. The frameshift leads to the loss of function of the protein. In addition, *In silico* analysis confirmed the pathogenic effect of candidate variant. Whole Exome Sequencing precisely established the genetic diagnosis of autosomal recessive deafness in the family. Sanger sequencing may be performed on the unaffected members for carrier screening and genetic counseling of the family.





O-276/ICAZ-2022

**Toxicopathological Effects of Paraquat on Liver and Digestive System of Albino Rats: Ameliorative Role of Vitamin C and Vitamin E**

Kashif Zahoor, Naureen Rana\*, Nazia Ehsan, Imran Ahmed Raja, Amna Hussain, Nusrat Sattar, Saira Aslam, Urooj Aamir, Shahla Nargis  
University of Agriculture, Faisalabad

**Abstract:**

As paraquat is a widespread and efficient herbicide, still it may cause serious damage in different organs of animals given as the liver, lungs, kidneys and heart. The current research was planned to study paraquat induced alterations in adult albino rats and ameliorative effects of Vitamin C and E versus toxicity of paraquat. Prior to start exposure, forty adult female and male albino rats were acquired and acclimatized. The dose of paraquat was synthesized in distilled water at a rate of 1/10th of known LD50. The dose of vitamin C and E was prepared in distilled water and corn oil at a rate of 30 mg/kg, respectively. Division of rats was into five equal groups, each group contained both males and females, and initial body weight was determined. The group I of rats was kept as controlled and exposed with corn oil, group II was given paraquat for five days, Group III was given paraquat for five days then treated with vitamin C for three days, Group IV was given paraquat for five days then treated with vitamin E for three days and Group V was given paraquat for five days then treated with mixture of vitamin C and E for three days. On the completion of the trial, the final body weight of the rats was determined. To evaluate the biochemical examination to verify the liver function, the animal was then anaesthetized, and blood was extracted in a gel tube. Then rats were dissected and chosen organs (liver and digestive system) were collected and weighed. Findings indicated that paraquat caused the significant reduction in weight gain of all rats. The number of free radicals were increased which induced the oxidative stress. Liver biochemical parameters such as ALP, AST, ALT, bilirubin and cholesterol levels were high in paraquat treated groups. Rats after exposure with Vitamin C and E showed protective effects in ALP, AST, ALT, bilirubin and cholesterol levels. The repeated measures under CRD were used to compare treatment means by Dunnett's test.

O-277/ICAZ-2022

**Paraquat Induced Hemato-Biochemical and Histopathological Changes in Heart of Albino Rats: Remedial Role of Vitamin C and Vitamin E**

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**Abstract:**

Paraquat is a herbicide primarily used to control the growth of weeds and grasses. Exposure to Paraquat has adverse hemato-biochemical and histopathological consequences to humans and animals. The present study has been planned to study Paraquat induced hemato-biochemical and histopathological changes in heart of rats and remedial role of vitamin C and E. 40 adult male and female albino rats were obtained and acclimatized under controlled laboratory conditions. The paraquat dose was prepared in distilled water at a rate of 15 milligram/kilogram of the body weight. The dose of vitamin C and E was prepared in distilled water and corn oil at a rate of 30mg /kg respectively. Rats were separated into five equal groups; each group contained both males and females and initial body weight was recorded. Group I was kept as controlled and treated with corn oil, group II was administrated with Paraquat for five days, Group III was given Paraquat for five days then treated with vitamin C for three days, Group IV was treated Paraquat for five days then treated with vitamin E for three days and Group V was treated with Paraquat for five days then treated with a mixture of vitamin C and vitamin E for three days. On the completion of the trial, the final bodyweight of the rats was recorded. A significant reduction in body weight was recorded in paraquat treated rats in comparison to control group and Vitamin C and Vitamin E showed protective effect in group III and IV against paraquat toxicity and body weight was increased. A significant difference relative weight of heart was recorded in all treated groups. Then rats were anaesthetized and blood was collected in a heparin tube for a complete blood count. Group II showed reduction in RBCs, WBCs, HGB, LYM %, MPV and platelet count in both male and female rats while MCV and MCH was increased in paraquat treated male group but opposite results in female rats were recorded. Non-significant difference in HCT was detected in contrast to control group. Mixture of vitamin C and vitamin E showed ameliorative effect in group V against paraquat intoxication. Then blood was collected in gel tubes for biochemical analysis, and serum was separated. Rats in group II showed increase in all biochemical parameters except total protein in comparison with control group. Mixture of vitamin C and vitamin E in group V showed protective effect and reduced the level of biochemical parameters. Histopathological in paraquat treated group severe inflammation, congestion, vocalization and degeneration in cardiac muscles was observed as compared to group I.



O-278/ICAZ-2022

**Species Diversity and Abundance of Insects in Guava Orchards of District Vehari**

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University of Agriculture, Faisalabad

**Abstract:**

The present study was conducted to elaborate the “Species diversity and abundance of insects in guava orchards of district Vehari. Biodiversity refers to the multidimensional change of different plants and animals at their formation from the genetic makeup to the ecosystem level. Insects are the diverse category of invertebrates found in almost every habitat. This study was conducted to observe the species diversity and abundance of insects in guava orchards of the district, Vehari. Different techniques were used to collect the insect’s fauna such as handpicking, forceps, sweep net and jars containing solution of glycerin and alcohol. The insects were collected during 8:00 am to 10:00 am in the guava orchards. Taxonomic literature, hand lens, microscope, and naked eyes are different techniques which were used to identify collected insect fauna. After identification of collected fauna tabulation was done. Total 1266 specimens were collected from guava orchard belonging to 70 species, 52 genera, 37 families and 7 orders. The highly abundant species were *Drosophila melanogaster* (Drosophilidae: Diptera) 5.85% (N=74) and *Forficula auricularia* (Forficulidae: Dermaptera) 4.19% (N=53). *Bactrocera* genus of diptera order was highly abundant. Least abundant species were *Terix subulata*, *Acrida unguirica*, *Musgrave sulciventris*, *Oxya japonica* and *Sarcophaga haemorrhoidalis*. ANOVA was applied p value was 1.800201, F value was 3.092207 and it indicated that data was significant. Diversity (H) was 0.9763. The value of Evenness was 0.7365 and Dominance was equal to 0.0237.

O-279/ICAZ-2022

**Histopathological Effects of Cyclophosphamide on Brain and Lungs of Albino Rats: Protective Role of Boron and Selenium against Cyclophosphamide**

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University of Agriculture, Faisalabad

**Abstract:**

Cyclophosphamide is an orally active alkylating agent and anticancer drug which commonly use in the medical field for the treatment malignant and nonmalignant disorders. This research sought to ascertain the histopathological effects of cyclophosphamide on the brain and lungs of albino rats, as well as the protective effects of boron and selenium. Total forty (40) adult albino rats of both sexes, male and female were attained and acclimatized prior to administration of dose. The dose of cyclophosphamide was prepared in saline water at a dose level of 100mg/kg. The dose of selenium and boron was prepared in corn oil and water at a dose level of 0.5mg/kg and 100mg/kg respectively. Rats were categorized into five equal groups comprising both male and female rats and body weights were determined. Group I was kept as controlled and treated with saline water, group II was given cyclophosphamide via intra-peritoneal injection for five days, Group III was given cyclophosphamide for five days then treated with selenium for three days, Group IV was given cyclophosphamide for five days then treated with 100mg/kg boron as boric acid for three days and Group V was received cyclophosphamide for five days then treated with a mixture of boron as boric acid and selenium for three days. The final body weights of the rats were determined. By assessing the biochemical analysis to measure the brain and lungs functions, the rats were dissected and blood was obtained in a gel tube for determination of AST, ALT, ALP and cholesterol and also measure the CAT, SOD and POD levels. The findings showed that both male and female albino rats treated with cyclophosphamide had elevated levels of AST, ALT, ALP, and cholesterol, whereas those treated with cyclophosphamide in combination with selenium and boron had decreased intensities of AST, ALP, ALT and cholesterol. CAT, SOD, and POD activities of rats significantly increased in the cotreatment group of cyclophosphamide with B and Se treated groups associated to the CP groups in male and female albino rats. Cyclophosphamide administration caused oxidative stress with an increase in MDA level and a decrease in CAT, SOD, and POD levels. The albino rats' brains and lungs were toxically affected by cyclophosphamide, but cyclophosphamide combined with boron and selenium had better protective effects.



O-280/ICAZ-2022

**Genetic Status of *Bagarius Bagarius* in River Jhelum by Using DNA Markers**

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<sup>2</sup>Department of Life Sciences, Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan, Pakistan

**Abstract:**

Genetic diversity of freshwater fish has been declining due to ecological reasons and various anthropogenic activities, from several years which result in extirpated thousands of fish species. Habitat fragmentation is a leading cause of population decline that threatens ecosystems worldwide. The purpose of the current study is to check the genetic status of *Bagarius bagarius* in River Jhelum with the help of SSR markers. Fish samples were collected from five selective riverine sites. The DNA was extracted from the dorsal muscle tissue by using the proteinase-K and Phenol-chloroform methods. The quality and quantity of extracted DNA were checked through agarose gel electrophoresis and nanodrop, respectively. Five microsatellite loci (Baya157, Baya155, Baya153, Baya160 and Baya161) were used for PCR based genotyping for each specimen. Amplicons were separated on PAGE after confirmation and gel imaging was done by gel documentation system. The allelic bands were scored manually and contrasted with DNA ladder for the purpose of allelic band size. Different genetic diversity parameters i.e., average allelic richness ( $Ar$ ), allele's number ( $Na$ ), number of effective alleles ( $Nae$ ) and heterozygosity ( $H$ ) were moderate in all the natural populations of *B. bagarius*. The average values of  $Na$ ,  $Ar$ ,  $Nae$ ,  $Ho$  and  $He$  ranged from 4.600 to 3.800, 4.600 to 3.800, 3.5171 to 2.9249, 0.7266 to 0.66 and 0.7180 to 0.6663, respectively. The average observed heterozygosity ( $Ho$ ) values were found higher as compared to the  $He$ . The average value of  $F_{ST}$  varied from 0.0207-0.0027 and showed small variation in all populations. UPGMA dendrogram showed clustering pattern based on genetic distance. In wild populations, the AMOVA showed that most of the variation was present within individuals. Genetic knowledge about *B. bagarius* populations will be useful in highlighting the needs for new management regimes to protect native freshwater fish genetic diversity.

O-281/ICAZ-2022

**Growth Performance of Juvenile Bighead Carp Fed with Supplemental Dietary Calcium Under Intensive Culture System**

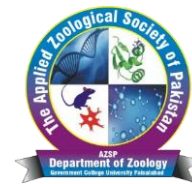
Rimsha Jamil<sup>1</sup>, Khalid Abbas<sup>1\*</sup>, Muhammad Sarfraz Ahmed<sup>1</sup>, Taqwa Safdar<sup>1</sup>, Amna Dua<sup>1</sup>, Um-e-Habiba<sup>1</sup>, Tanveer Ahmed<sup>2</sup> and Sumra Naz<sup>1</sup>

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

<sup>2</sup>Department of Life Sciences, Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan, Pakistan

**Abstract:**

The fish is a major source of animal protein and its consumption is increasing day by day. Mineral deficiencies always lead to stunted growth of fish. The purpose of this research is to evaluate the effects of calcium supplementation in diet on juvenile Bighead Carp under intensive culture system. A 45 days trial was conducted in glass aquaria. Five different diets containing different levels of calcium (viz. 0%, 2%, 4%, 6% and 8%) were used. Initial body length and body weight of the fish recorded at the time of stocking. The survival rate and parameters of growth performance i.e., weight gain, increase in length was determined on weekly basis during the trial period. Digital meter and other electronic meters were used to record dissolved oxygen, pH and temperature. Statistical analysis of data was done by applying two-way ANOVA, using statistical software RCBD. Results showed that fish fed with Ca deficient diet showed poor growth performance while the best growth was observed in feed containing 6% dietary Ca ( $p < 0.05$ ). Higher level of dietary Ca resulted in poor growth performance which indicated that higher level of dietary Ca has adverse effects on growth performance of Bighead Carp. Survival rate were also higher in the tank containing 6% dietary Ca level and lower in control group. The ratios and of SGR and WG% were as: 6% > 8% > 4% > 2% > control. It is observed that the calcium supplementation showed positive effects on growth performance of Bighead Carp.



O-304/ICAZ-2022

**Extraction and optimization of active metabolites from Cluster Bean: An invitro biological and phytochemical investigation**

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**Abstract**

The current study aimed to explore active metabolites of locally recognized and high yielding cultivar cluster bean (BR-99) with a wide range of adaptability having antioxidant, antidiabetic, antimicrobial, and cytotoxic potential. Six solvents were used (crude methanol, n-hexane, chloroform, ethyl acetate, butanol, and aqueous) with escalating polarity for colorimetric determination of antioxidants such as total phenolic contents (TPC), total flavonoid contents (TFC), and free radical scavenging activity (FRSA) by DPPH (2, 2-diphenyl-1-picrylhydrazyl) assay. Moreover, an antidiabetic and anticancer study was conducted by  $\alpha$ -amylase inhibition and MTT (3-(4, 5-dimethyl-2-thiazolyl)-2, 5-diphenyl-tetrazolium bromide) assay. Biological investigations were carried out against the most commonly found infectious microbial strains. The significant results ( $P \leq .001$ ) of each activity were seen among six tested solvent extracts. The ethyl acetate and methanol extract have more antioxidant potential with the highest TPC ( $16.38 \pm .13$  mg GAE/g) and TFC ( $8.15 \pm .24$  mg CE/g), respectively. Similarly, methanol extract presented the highest free radical scavenging activity ( $46.31 \pm .91\%$ ), followed by ethyl acetate, butanol, chloroform, aqueous, and n-hexane extract. However, the maximum  $\alpha$ -amylase inhibition ( $62.54 \pm 1.47\%$ ) and anticancer activity against human lung cancer cells were congregated ( $78.31 \pm 1.46\%$ ) in butanol and chloroform, respectively. A positive correlation was seen between TPC with TFC ( $R^2 = .8356$ ), FRSA ( $R^2 = .8381$ ), and anti-diabetic activity ( $R^2 = .8082$ ), which highlights the phenolic contents as strong anti-oxidant agents especially flavonoids. Each extract of cluster bean (BR-99) showed significant antimicrobial activities for all tested bacterial strains except *B. cereus* and *E. coli*. The profound results of maximum antibacterial activity were witnessed by chloroform extract while ethyl acetate extracts showed great antifungal potential against all tested fungal strains. The HPLC quantitative analysis results of cluster bean (BR-99) revealed the presence of active phytochemicals such as gallic acid, HB acid, vanillic acid, kaempferol, sinapic acid, ferulic acid, salicylic acid, coumarins, quercetin, rutin, p-coumaric acid, and catechin, and the variation in both phytochemical and biological spectrums envisioned the cluster bean (BR-99) used in future as a cheap, safer, and potent source of bioactive drugs.

**Keywords**

cluster bean, anti-oxidants, anti-diabetic potential, cytotoxic assay, anti-bacterial activity, anti-fungal activity



**Diversity and distribution of avian fauna in relation to urban landscape in Faisalabad city**

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**Abstract**

Urbanization affected the birds, by establishing the urban areas, plantation had to be cut that played an important role in decreasing the diversity of birds. In present study Faisalabad city was chosen for sampling. Landscapes of City Faisalabad was classified into two major categories i.e., Open fields included cemeteries, wastelands, along canal and stream banks while Closed areas included business centers, settlements, and residential neighborhoods. Surveying birds was conducted using point count method, from a fixed raising position within a circle of 50 m radius for a specific period of time (10 min) at every point. Each plot visited at dawn and dusk for two hours. Naked eyes, binocular telescope were used to count the birds. The results showed that total number of bird record were 1649, had species 26 belonging to 19 families and 13 orders in Faisalabad. Maximum numbers of species (21) were found at canal site and cemeteries had more vegetation so more bird diversity were founded. Minimum numbers of species (6) were founded at business centers due to less vegetation and human activities and urbanization. We observed 21 plants species during studies. House crow was dominant had percent relative abundance 31.35. The numbers of birds in open areas were higher as compared to closed areas. The Shannon-Wiener Index ( $H'$ ) measured for canal site, cemeteries, wasteland and stream banks was 1.091, 0.964, 0.960, and 1.134 respectively (more diversity of birds) and for business centers, settlements and build-up area were 0.490, 0.676 and 0.639 respectively. The Evenness ( $J'$ ) measured for canal site, cemeteries, wasteland and stream banks was 0.839, 0.729, 0.837 and 0.857 respectively (more evenness sites) and for 0.630, 0.649 and 0.670 respectively. The Simpson diversity ( $D$ ) measured for canal site, cemeteries, wasteland and stream banks were 0.131, 0.159, 0.136 and 0.097 and for business centers, settlements and build-up area were 0.425, 0.341 and 0.297 respectively. Seasonal variation of bird species were observed. A significant increase in the abundance and diversity of birds was observed in the winter season had total numbers of individuals were 513; Shannon-Wiener index and evenness were 1.053 and 0.77. In spring season, total numbers of individuals were 637; Shannon-Wiener index and evenness were 1.006 and evenness was 0.74. In summer 499 birds were observed; Shannon-Wiener index and evenness were 1.055 and 0.76. The association of birds with different landscape were calculated by applying the ANOVA. With the change of site, numbers of bird species also changed.

**Keywords:** Survey, Landscape, Point count method, Diversity Index



P-2/ICAZ-2022

### Comparative Efficacy of Hydroalcoholic Extracts of *Ricinus communis* And *Withania somnifera* in Adjuvant-Induced Arthritis in Wistar Rats

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#### Abstract:

*Ricinus communis* and *Withania somnifera* are being used as a traditional remedy against several inflammatory diseases. The present study was planned to evaluate the anti-arthritis potential of hydroalcoholic extracts of *R. communis* leaves (RCLE) and *W. somnifera* roots (WSRE) in Wistar rats. Post-administration of Complete Freund's adjuvant arthritic rats were treated orally with RCLE and WSRE at 250 and 500 mg/kg from day 8 to 24. Anti-arthritis effect of plants was assessed in experimental groups by paw swelling, arthritic index and hematological and biochemical parameters. Oxidative stress parameters in liver tissue and histopathological study of ankle joint and liver were performed. Modulatory effects on gene expression in paw tissue were determined using qRT-PCR. Results indicated that RCLE and WSRE reduced paw swelling and arthritic score and restored the change in body weight. Both plants markedly improved the hematological parameters as well as reduced the CRP and RF levels. A significant reduction in serum concentration of liver transaminases was observed in extracts treated rats. Both extracts persuasively up-regulated the mRNA expression of IL-4, INF- $\gamma$  and RANKL and down-regulated the IL-1 $\beta$ , IL-17, TNF- $\alpha$  and OPG. Both extracts lowered the oxidative stress by decreasing MDA formation and increasing CAT and SOD activities. Histopathological findings supported the aforementioned results. The findings of the present study supported the evidence of the anti-arthritis potential of *R. communis* and *W. somnifera* extract in chronic arthritis model. However, *R. communis* showed more promising effects than *W. somnifera*.

**Keywords:** Arthritis, Complete Freund's adjuvant, Inflammation, Oxidative stress, *Ricinus communis*, *Withania somnifera*.

P-3/ICAZ-2022

### Polyherbal Mixture Alleviates Hyperglycemia Associated Dyslipidemia and Hepatorenal Damage by Reducing Oxidative Stress in Alloxan-Induced Diabetic Rats

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<sup>1</sup>Institute of Physiology and Pharmacology, University of Agriculture Faisalabad, Faisalabad, Punjab, Pakistan

#### Abstract:

Diabetes mellitus (DM) is one of the incurable diseases that affect the major population worldwide. The persistent hyperglycemic condition triggers the development of secondary complications such as dyslipidemia and hepatorenal injury. Herein, the protective effect of polyherbal mixture (combination of 70% aqueous-methanol extracts of *Cassia absus*, *Gymnema sylvestre*, *Nigella sativa* and *Piper nigrum*) on dyslipidemia and hepatorenal toxicity in alloxan-induced diabetic rats were evaluated. Alloxan monohydrate (150 mg/kg, i.p.) was injected to induce diabetes. Animals were allotted to six groups ( $n=6$ ) and treated for six weeks as normal and diabetic controls (3 mL/kg of normal saline), glibenclamide (0.6 mg/kg) and polyherbal mixture (200, 400 and 600 mg/kg), respectively. Results revealed that alloxan-injected rats showed significant ( $P<0.05$ ) hyperglycemia in addition to elevated levels of total cholesterol, triglycerides and low-density lipoproteins compared to normal control. Rats exhibited significantly ( $P<0.05$ ) raised serum levels of hepatic function (ALT, AST, ALP and total bilirubin) and renal function (creatinine, BUN and uric acid) markers along with reduced albumin and total protein levels. Additionally, alloxan injection caused a reduction in antioxidant markers (superoxide dismutase and catalase activities) and an increase in lipid peroxidation (malondialdehyde) as well as inflammatory marker (TNF- $\alpha$ ) in hepatic and renal tissues. Glibenclamide or polyherbal mixture administration significantly ( $P<0.05$ ) improved the aforementioned biomarkers and the protective potential was higher for polyherbal mixture (600 mg/kg) in comparison to glibenclamide. Histopathological examination supported the biochemical results. Conclusively, the present study findings demonstrated the antihyperglycemic, antihyperlipidemic, antioxidant and anti-inflammatory activities of polyherbal mixture against alloxan-induced hepatorenal damage.

**Keywords:** Diabetes mellitus, Hyperglycemia, Hyperlipidemia, Oxidative stress, Polyherbal mixture, Polyphenols.



P-4/ICAZ-2022

**Synthesis, Characterization, and *In Vitro* Antioxidant Activity of Curcumin and Meloxicam Co-Encapsulated Poly(Lactic-Co-Glycolic) Acid Nanoparticles**

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**Abstract :**

Nanoformulations are suitable for encapsulation and delivery of multiple hydrophobic drugs. Polymers enable higher drug entrapment and sustained drug release profile. In this study, curcumin (Cur) and meloxicam (Mlx) were co-encapsulated in poly(lactic-co-glycolic) acid (PLGA) nanoparticles (NPs) and *in vitro* antioxidant activities were evaluated. The mono- and dual drug-loaded NPs of Cur and Mlx were synthesized using the single-emulsion (o/w) solvent evaporation method. All NPs were characterized for size, zeta potential, polydispersity index (PDI), encapsulation efficiency, *in vitro* drug release and storage stability. *In vitro* antioxidant activity was determined using DPPH and ABTS scavenging assays. Spherical smooth-surfaced mono- and dual-drug loaded NPs showed particle sizes ranging from 104.2 to 195.4 nm, zeta potential of -22.9 to -17.1 mV and PDI below 0.25. High encapsulation efficiency (>75%) of all drug-loaded NPs was found. Nanoformulations exhibited an initial burst and then sustained *in vitro* drug release rates at pH 7.4. *In vitro* antioxidant studies demonstrated superior radical scavenging activity of Cur and Mlx co-loaded NPs compared to pure drugs. Storage stability studies showed the stability of all nanoformulations at 4°C and 27°C for one month. Conclusively, Cur and Mlx co-encapsulated mono- and dual-drug loaded NPs resulted in stable nanoformulations with high drug encapsulation efficiencies, improved drug release profiles, and antioxidant activities.

**Keywords:** Antioxidant, Co-encapsulation, Curcumin, Meloxicam, Nanoparticles, PLGA.

P-10/ICAZ-2022

**Effectiveness of different plants essential oils against Mustard aphid, *Lipaphis erysimi* (Kalt.), in laboratory and field conditions of Rahim Yar Khan, Punjab, Pakistan**

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**Abstract:**

Many biological and chemical factors can influence the chemical makeup of plant essential oils. The use of plant oils as a compared with conventional pesticides requires an understanding of the role of individual components and their relationships in overall pesticidal bioavailability. In the present study, the efficiency of Citrus sinesis (orange peel oil), Eucalyptus oil, Azadirachta indica Juss (neem oil), Calotropis procera (akk oil), Citrus collocynthis (bitter apple oil), Allium sativum (garlic oil) were evaluated against aphids through hydro-distillation methods with Clevenger type apparatus. Most of these oils were effective against destructive pests' aphids. The penetration effect of higher concentrations of essential oils was greater in aphids. These essential oils showed good insect repellency and insecticidal influence against mustard aphid *Lipaphis erysimi* kalt. The mode of action of each essential oil was different due to their different constituents. Moreover, the essential oils are considering green pesticides against destructive pests. They are easily available and environment friendly.

**Keywords:** Mustard aphid, *Lipaphis erysimi* (Kalt), Essential oils, Citrus sinesis, Eucalyptus oil, Azadirachta indica Juss oil, Calotropis procera oil, Citrus collocynthis Oil, Allium sativum Oil.

P-09/ICAZ-2022

**Identification of Predatory Birds through Analysis of Mitochondrial ND2 Gene**

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**Abstract:**

Pakistan is bestowed with diversified avifauna due to wide range of habitats and climatic conditions. Birds of prey or raptors include familiar birds such as hawks, eagles, kites, falcons, vulture etc. They are geographically widespread and the most common of all vertebrates. Being predatory birds, they are found on the top of food chain. Unfortunately, birds of prey are facing serious threats such as loss of habitat, pollution, poaching and injuries. There is very less data available about the taxonomic characterization and evolutionary relationship. The morphological identification systems are not considered much reliable. The current study was designed to genetically characterize the birds of prey belonging to two broad families; *Accipitridae* and *Falconidae*, through the analysis of mitochondrial ND2 gene. The partial sequence of ND2 gene was amplified and sequenced. The novel SNPs were found at various positions in different raptorial species. Phylogenetic analysis depict that there is more diversity among the members of family *Accipitridae* whereas the members of family *Falconidae* are more closely related. The sequence of ND2 gene can serve as identification marker for other avian species which can lead to better conservation planning of endangered species of birds.



P-11/ICAZ-2022

**Protective Effects of *Periploca aphylla* Decne. against Paracetamol Induced Cardiotoxicity in Sprague Dawley Rats**

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**Abstract:**

Paracetamol, which is also recognized as acetaminophen, is one of the most extensively used analgesics/antipyretics worldwide. It belongs to the Para-aminophenol class of the non-steroidal anti-inflammatory drugs (NSAIDs). The overdose of paracetamol can cause severe nephrotoxicity and hepatotoxicity. It is important to search for alternative medicines to reduce the toxicity caused by long-term use of NSAIDs in chronic health problems. In traditional medicine, *Periploca aphylla* Decne. (Asclepiadoideae) is used for the treatment of various ailments including cerebral fever and as stomachic, laxative, diuretic and for wart removal. **Objectives:** In this study, effects of *Periploca aphylla* co-treatment were investigated on Paracetamol induced changes in cardiac markers including CK-MB (U/L) and CPK (U/L). **Methodology:** Rats were equally divided into five groups. Group I was taken as control while Group II was administered with Paracetamol orally (400 mg/kg) for one week. The third group was given Silymarin (50 mg/kg) along with Paracetamol. Fourth and fifth groups were co-administrated (orally) with methanolic extract of *Periploca aphylla* (200 and 400 mg/kg) for seven days. The rats were sacrificed after last dose and blood was collected for analysis. **Results:** Paracetamol administration causes decrease in the levels of CK-MB (U/L) and CPK (U/L) as compared to control rats. Treatment of methanolic extracts of *Periploca aphylla* (200 and 400 mg/kg) increases the levels of both enzymes. **Conclusion:** The findings of this study suggest the protective effects of *Periploca aphylla* against the Paracetamol induced cardio toxicity which can be credited to the presence of various phytochemical constituents in the plant extract.

**Key words:** Paracetamol, Cardiotoxicity, *Periploca aphylla*

P-12/ICAZ-2022

**Post-Traumatic Effects of COVID-19 on Pakistan's General Population**

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**Abstract:**

The World Health Organization (WHO) has declared the Coronavirus disease 2019 (COVID-19), a universal pandemic which is still existing worldwide and no one knows about its end. It already has created a huge disaster and environmental effect around the globe. Pakistan, a developing country in South Asia, can never escape from its effects. We have investigated through an online survey to determine the post effects of COVID-19 on Pakistan's general population. Our findings show that this pandemic has strongly affected physical and mental health along with the decline in financial conditions which created anxiety/depression among the people of Pakistan. Consequently, their trust in immunity to recover from disease was diminished. Such environmental factors can trigger a cascade of genetic alternations that can pass on to new generations. The need of time is to keep tracing the victims of this recent pandemic and this study provides basis for it.

P-14/ICAZ-2022

**Isolation and Partial Molecular Characterization of Bacteriophages for the Therapy of Multidrug-Resistant**

*Staphylococcus aureus* and *Escherichia coli*

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**Abstract:**

Antimicrobial resistance (AMR) stands among the top ten global health threats humanity is currently faced with. If antibacterial resistance, in particular, is not curbed right now by alternative therapies, about 10 million people could die eventually. Bacteriophages, viruses literally named as bacteria eaters, are being currently employed to treat critical infections caused by them. Therefore, we aimed to isolate and characterize bacteriophages against MDR uropathogenic *Escherichia coli* and Methicillin-resistant *Staphylococcus aureus* (MRSA) from biological wastewater. Although the phage isolated against MRSA turned out to be temperate, the phage isolated against UPEC showed characteristics of being strictly lytic, non-transducing, stable in extreme temperatures and average pH, along with a narrow host range which will prevent it from harming any of the gut flora of humans. Characterization by the major capsid protein-based PCR revealed it to either be a Felixo1virus-like phage, or a GJ1-like phage, both of which belong to the Myoviridae family - double-stranded DNA bacteriophages with contractile tails. Further TEM and WGS are necessary for its complete characterization. Future perspectives of the study conducted include: phage cocktails to treat infections caused by MDR pathogens, food pathogens, decontaminating food items and sterilizing hospital equipment where MDR bacteria like strains are rampant.





P-15/ICAZ-2022

**Keto Diet as a Best candidate for the Prevention and Treatment of Metabolic Disorders; Type 2 Diabetes and Obesity among other Nutritional Therapies.**

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**Abstract:**

Obesity and diabetes are most common metabolic disorders now a days. Studies shows that 90% of all diabetes cases are type 2 diabetes mellites T2DM and speculation for the future look, as the number of people affected by diabetes is anticipated to rise 552 million worldwide. Due to hyperglycemia and too low level of insulin accumulate more fluid in blood vessels cause hypertension and impairment of cardiovascular system such as macrovascular complications (cardiovascular comorbidities), microvascular complications (nephropathy, neuropathy and retinopathy), insulin resistance (metabolic syndrome) above all it is highly linked with epidemiology of obesity which is known as the mother of diseases. Currently nutritional therapy and life style modification are gaining attraction for the treatment of T2DM. There are three types of diets mostly utilized to control blood glucose level the vegetarian, Mediterranean and the keto diet. In past Mediterranean diet which is rich in monosaturated fatty acids; olive oil, legumes and grains vegetable was use to prevent heart diseases in Mediterranean region. The ingredients of Mediterranean diet such as olive oil, oily fish such increase adiponectin levels, which is interlink with insulin sensitivity. The vegetarian diet comprises of low glycemic index food; fibers, low fatty acids use to improve plasma lipid and to prevent chronic diseases. The vegetarian could be high in cholesterol which can cause coronary heart problems. Moreover, it is also believed that vegetarian diet lowers creatine level in body which can reduce kidney function and malnutrition. By looking the pros and cones of vegetarian and mediterranean diet scientists are moving toward keto diet. In past keto diet has been use for the treatment of epilepsy and brain disorders now a days it has gotten attention toward treating obesity and T2DM. According to Americans diabetes association ADA's keto diet (low carb diet) contain less then 130g carbohydrates per day. The keto diet utilizes 30% of carbs and produce ketone bodies whereby it is given name keto diet. In this study ADA's recommendations of keto diet is briefly discussed and a metanalysis is done on the pros and cons of keto diet. Is it good to use keto diet for nutritional therapy the mechanism of ketosis, how production of ketone bodies in starvation phase can be used as a tool for reduction of HbA1C level in blood for the prevention and treatment of T2DM and obesity.

**Key Words:** Obesity, T2DM, Keto diet, ADA's, vegetarian diet, HbA1c.

P-22/ICAZ-2022

**Role of Hydrogen Peroxide Producing Nox4 in Cancer Development and Metastasis**

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**Abstract:**

Cellular microenvironment plays a crucial role in cancer cell migration and metastasis. Increase exposure of cells to oxidative stress like increase level of hydrogen peroxide aberrantly increase the risk of migration of cancer cells through extracellular matrix and directing its way towards blood stream. NADPH oxidases, a family of protein consists of seven members (NOX1, NOX2, NOX3, NOX4, NOX5, Duox1, Duox2) and four of them explicitly generate non radical oxidant species. NADPH oxidase4, a prominent member of oxidase family, plays a significant role in development and progression of carcinoma cells through hyper production of reactive oxygen species. Elevated ROS level tend to disturb the redox homeostasis of the cells through epithelial to mesenchymal transition and contribute to cancer metastasis. Thus, targeting the NOX4 could serve as alluring avenue for drug design against cancer. The aim of this review is to summarize the scientific research and data against cancer- specific role of NOX4 to elucidate its function in cancer cell migration and progression. Moreover, we have also summarized the reported potent inhibitors of NOX4. This study suggests that further investigations should be made in exploration of detailed molecular mechanism of action of NOX4 in producing oxidative stress and discovery of natural sources of its potent inhibitors.

**Keywords:** NOX4; metastasis; Oxidative stress; Tumor progression



ISBN: 978-627-7502-01-0