Plenary lectures

Plenary 1.1

Enzyme Kinetics in the Development and Assessment of Engineered Enzymes for Amino Acid Analysis or Synthesis

Professor Paul C. Engel, Conway Institute of Biomolecular and Biomedical Research, University College Dublin, Dublin, Ireland

Plenary 1.2

Genome wide quantitative trait loci reveal the genetic basis of cotton fiber quality and yield related traits in G.hirsutum RIL population

Professor Youlu Yuan : 1Key Laboratory of Biological and Genetic Breeding of Cotton, The Ministry of Agriculture; Institute of Cotton Research, Chinese Academy of Agricultural Sciences; Anyang, Henan, 455000 China
2Research Base, Anyang Institute of Technology, State Key Laboratory of Cotton Biology, Anyang, Henan, 455000 China

Plenary 1.3

Mushrooms biomaterial for promoting health in human and animals

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Plenary 2.1

Bioactivity of natural antioxidants

Prof. Dr. Ahmed Hassan El-Ghorab: Department of Chemistry, Faculty of Science, Jouf University, Saudi Arabia KSA.

Plenary 2.2

Combined Linkage and Association Mapping of Fiber Quality Traits and Yield Components in Upland Cotton Using Enriched High-Density SNP Markers

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Plenary 2.3

Cell Culture Models – From a Single Cell to an Organ Culture

Prof. Muhammad Mukhtar**:** Faculty of Industrial Sciences & Technology, University of Malaysia Pahang 26300 Gambang, Pahang, Malaysia

Plenary 1: Enzyme Kinetics in the Development and Assessment of Engineered Enzymes for Amino Acid Analysis or Synthesis

Paul C. Engel

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Over the past 35 years it has become increasingly easy to alter the function of natural enzymes by mutagenesis. This may be either site-directed mutagenesis guided by structural insight or random mutagenesis followed by screening to select favourable mutations. All too often the assessment of the mutants is based exclusively on a standard assay under optimal conditions. This presentation will make the case for more thorough kinetic scrutiny and will offer a number of examples in which detailed kinetics has been essential in judging what has or has not been achieved. These examples will be drawn from work in the author's research group on amino acid dehydrogenases and aminotransferases aimed at producing effective catalysts either for diagnostic analysis or for chiral synthesis. In the first case it is important a) to have a high degree of specificity and also high levels of activity at low substrate concentrations. In the second case. In the second case relevant specificity is of course also important, but broad specificity is now an advantage in engineering a versatile catalyst applicable to a range of related feedstock substrates. Kinetics can still offer guidance with regard to what properties can realistically be tackled as targets for improvement.

Plenary 2: Genome wide quantitative trait loci reveal the genetic basis of cotton fiber quality and yield related traits in *G.hirsutum* RIL population

Zhen Zhang1,2†,Junwen Li1,2†, Muhammad Jamshed1†, Yuzhen Shi1†, Aiying Liu1, Juwu Gong1, Shufang Wang1,Jianhong Zhang1, Fuding Sun1, Fei Jia1,Qun Ge1, Liqiang Fan1, Zhibin Zhang1, Jingtao Pan1, Min Zhang1, Senmiao Fan1, Yanling Wang1, Quanwei Lu2, Ruixian Liu1, Xiaoying Deng1, Xianyan Zou1, Xiao Jiang1, Ping Liu1,Pengtao Li2, Muhammad Sajid Iqbal1, Jinping Hua3, Chuanyun Zang4, Juan Zou4, Hong Chen5, Qin Tian5, Xinhe Jia6, Baoqin Wang6, nijiang Ai7, Guoli Feng7, Yumei Wang8, Mei Hong9, Shilin LI9, Wenming Lian10, Bo Wu10, Chaojun Zhang1, Haihong Shang1,2*, Wankui Gong1,2*and **Youlu Yuan1**,2*

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Cotton was widely planted in the world. To identify QTL/Gene for fiber quality and yield, a RIL population was developed between upland cotton. A consensus genetic map covered the whole upland cotton genome was constructed by three types of marker (8295 markers, 5197.17cM). Combined with the 17 environments phenotype data, 983 QTLs were identified for fiber quality and yield traits 198 of them were stable, mainly distributed on chromosome 4, 6, 7, 13, 21, and 25. Thirty-seven QTL clusters were identified, in which 92.8% of two-pair-traits with significantly

medium or high positive correlation had the same additive effect direction of QTLs, and all of the two-pair-traits with significantly medium or high negative correlation had the opposite additive effect direction. 1297 genes were discovered in the QTL clusters and 414 of them were expressed in two RNA-seq data Plenty of novel genes were discovered and 20 of them were promising genes. This was the first report about constructing a high coverage and saturation consensus map, and identifying most number of stable QTLs and QTL clusters for fiber quality and yield, elucidating the genetic basis of correlation between fiber quality and yield is related to QTL cluster on the whole genome. It could provide information about the genetic basis of cotton fiber and yield and help cotton breeders to improve the fiber quality and yield synchronously.

Key words: upland cotton, consensus genetic map, fiber quality, fiber yield, QTL clusters, genetic correlation, gene expression level, promising gene

Plenary 3: Mushrooms biomaterial for promoting health in human and animals

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Though mushrooms have been used as food for centuries all over the world, they have become a source of new biomaterial and compounds useful for health improvement in humans and animals. Some of the popular mushrooms used as health supplements, though are cultivated today, are *Ganoderma spp, Lentinula edodes, Trametes versicolor, Pleurotus spp*, etc. It is an established fact that mushrooms are functional foods with their immense nutraceutical properties, due to their content of bioactive compounds like β- and α-glucans, triterpenoids, antioxidants, glycoproteins, lectins, etc. These compounds have therapeutic and immuno-modulation properties. There are products of various types in the market and they have started to reach worldwide sales that amounts to millions of dollars. Though application in human health has been the focus in the past years, their use in farm animal feed is on the rise. The presentation will summarize existing knowledge on the use of mushrooms in human health and focus on recent advances in their use in animal production. Modern scientific approaches have allowed us to exploit mushrooms for food and biomaterials useful for various purposes, without massive depletion through harvesting from the forests. However, many 'difficult to cultivate' mushrooms, especially the mycorrhiza used for food and from which many medicinally active compounds are being discovered are still obtained from the forests. While the discovering of such compounds is good, we need massive investment in research and development so that we can use modern techniques now available for the extraction and synthesis where necessary, in order to expand the array of biomaterials from mushrooms to serve mankind. This could become multibillion dollar industry in which those who make the investment now will rule the future with considerably high financial returns.

Keywords: Biomaterials, Food production, Human and animal health, Medicinal mushrooms.

Plenary 4: Bioactivity of natural antioxidants

Prof. Dr. Ahmed Hassan El-Ghorab

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Antioxidants are important in the diet as it is rich in unsaturated fatty acids, which are easily oxidized. Consumers prefer natural antioxidants to synthetic antioxidants, mainly for many reasons. The common daily diet contains about 1 g natural antioxidants even if no natural antioxidants have been added for lipid stabilization. Their main sources are cereals, fruits, vegetables, and beverages. Only a part of the natural antioxidants is absorbed and used as free-radical scavengers in vivo. Natural antioxidants should be added to food in larger amounts in comparison with synthetic antioxidants as they are less active, but the actual activity depends very much on certain conditions and food. so it is very important maximize the value addition of indigenous food by-products as a good source of natural antioxidant and replace high-polyenoic oils in the diet with high-oleic oils, and to use alternative methods of food protection against autoxidation.

Key words: Natural and synthetic antioxidant, indigenous foods, autoxidation

Plenary 5: Combined Linkage and Association Mapping of Fiber Quality Traits and Yield Components in Upland Cotton Using Enriched High-Density SNP Markers

Ruixian Liu, Juwu Gong, Xianghui Xiao, Junwen Li, Aiying Liu, Haihong Shang, Yuzhen Shi, Qun Ge, Muhammad S. Iqbal, Xiaoying Deng, Shaoqi Li, Jingtao Pan, Abdul Hafeez, Benna Alam, Youlu Yuan* and **Wankui Gong***

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It is of great importance to identify quantitative trait loci (QTL) controlling fiber quality traits and yield components for future marker-assisted selection (MAS) and candidate gene function identifications. In this study, two kinds of traits in 231 F 6:8 recombinant inbred lines (RILs), derived from an intraspecific cross between Xinluzao24, a cultivar with elite fiber quality, and Lumianyan28, a cultivar with wide adaptability and high yield potential, were measured in nine environments. This RIL population was genotyped by 122 SSR and 4729 SNP markers, which were also used to construct the genetic map. The map covered 2477.99 cM of hirsutum genome, with an average marker interval of 0.51 cM between adjacent markers. As a result, a total of 134 QTLs for fiber quality traits and 122 QTLs for yield components were detected, with 2.18–24.45 and 1.68–28.27% proportions of the phenotypic variance explained by each QTL, respectively. Among these QTLs, 57 were detected in at least two environments, named stable QTLs. A total of 209 and 139 quantitative trait nucleotides (QTNs) were associated with fiber quality traits and yield components by four multilocus genome-wide association studies methods, respectively. Among these QTNs, 74 were detected by at least two algorithms or in two environments. The candidate genes harbored by 57 stable QTLs were compared with the ones associated with QTN, and 35 common candidate genes were found. Among these common candidate genes, four were possibly "pleiotropic." This study provided important information for MAS and candidate gene functional studies.

Keywords: upland cotton, QTL, multilocus GWAS, QTN, candidate gene, fiber quality traits, yield components

Plenary 6: Cell Culture Models – From a Single Cell to an Organ Culture

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Cell culture models are conventionally used for basic and applied biomedical research. Generally two-dimensional (2-D) *in vitro* cell culture setups have been used to observe the effects of various chemicals including anticancer drug discovery and transport of biomolecules through a monolayer of adherent cells. Our laboratory developed a 2-D cell culture model for the human brain in which four different types of cells can interact with each other. Among these, the brain microvascular endothelial cells in conjunction with astrocytes form a functional blood-brain barrier, whereas neurons at the bottom layer of two compartment system can communicate with all the cellular elements including monocytes/macrophages in the top layer. Recent developments in cell culture models have led to the establishment of three-dimensional (3-D) cell culture models mimicking *in vivo* environments. These models are not only used for individual or mixed cells culture instead organs culture have also been developed through this unique cell culturing methodology. Several mini organoids created through 3-D models proved their physiological functions like *in vivo*. We have evaluated both the 2-D and 3-D existing cell culture models in their relevance to neurogenerative disorders. This involved critical evaluation of empirical information related to both these models. Our data suggest that a 3-D cell culture model no doubt offers a unique set up closely resembling with the *in vivo* environments as well as cellular interactions. However, several delimitations are proving the utility of 2-D cell culture model in neurodegenerative disease including several others. Comparative evaluations related to 2-D and 3-D cell culture models suggest that 2-D model provides more physiological relevant details about neurodegenerative drug discovery. However, the 3-D cell culture model has better utility in the regeneration of degenerated tissues in the brain.

Plenary 7: Mechanism of the formation of high mannose N-glycans in advanced cancer

Pi-Wan Cheng

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Elevated high mannose N-glycans has been reported in many cancers. But, the mechanism was not clear. Recently, we discovered that Giantin, a *cis*-Golgi type 1 membrane protein, is the primary Golgi targeting site for the vesicles that transport glycosylation enzymes and their substrates from Endoplasmic Reticulum. This Giantin function was lost in aggressive prostate cancer cells due to failure to be phosphorylated and form dimer (Petrosyan et al. Mol Cancer Res 12: 1704, 2014). This defect forces these vesicles to use an alternative site (GM130-GRASP65) in the *cis*-Golgi for Golgi targeting, thus creating a disorganized glycosylation environment at this site. As a result, α-mannosidase IA (Man IA), the enzyme responsible for trimming $Man_8GlcNAc_2$ down to $Man_5GlcNAc_2$ to initiate formation of complex-type N-glycans by N-acetylglucosaminyltransferase I, fails to process all high mannose N-glycans to $Man_5GlcNAc_2$. The $Man_{6-8}GlcNAc_2$ N-glycans that are not processed at this site cannot be processed further through subsequent glycosylation steps. Further, $Man_5GlcNAc_2$ that fails to be processed by N-acetylglucosaminyltransferase I also will remain unchanged (Bhat et al: BBA - General Subjects 1861: 2891, 2017). By proximity ligation assay, Man IA was detected at the Giantin site in androgen-dependent prostate cancer cells and stages I & II prostate cancer. However, Man IA was localized at the GM130-GRASP65 site in androgen-refractory prostate cancer cells and stages III & IV prostate cancer. The differential Golgi localization of Man IA may be used for identification of indolent versus advanced prostate cancer cells. To sum it up, altered Golgi targeting of glycosyltransferases and Man IA from Giantin to GM130-GRASP65 as prostate cancer progresses from indolent to advanced stages causes incomplete processing of high mannose N-glycans resulting in their accumulation. This observation forms the basis for developing an assay for identification and a targeted therapy for treatment of advanced prostate cancer.

Plenary 8: Combined Linkage and Association Mapping of Fiber Quality Traits and Yield Components in Upland Cotton Using Enriched High-Density SNP Markers

Ruixian Liu, Juwu Gong, Xianghui Xiao, Junwen Li, Aiying Liu, Haihong Shang, Yuzhen Shi, Qun Ge, Muhammad S. Iqbal, Xiaoying Deng, Shaoqi Li, Jingtao Pan, Abdul Hafeez, Benna Alam, Youlu Yuan* and Wankui Gong*

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It is of great importance to identify quantitative trait loci (QTL) controlling fiber quality traits and yield components for future marker-assisted selection (MAS) and candidate gene function identifications. In this study, two kinds of traits in 231 F 6:8 recombinant inbred lines (RILs), derived from an intraspecific cross between Xinluzao24, a cultivar with elite fiber quality, and Lumianyan28, a cultivar with wide adaptability and high yield potential, were measured in nine environments. This RIL population was genotyped by 122 SSR and 4729 SNP markers, which were also used to construct the genetic map. The map covered 2477.99 cM of hirsutum genome, with an average marker interval of 0.51 cM between adjacent markers. As a result, a total of 134 QTLs for fiber quality traits and 122 QTLs for yield components were detected, with 2.18–24.45 and 1.68–28.27% proportions of the phenotypic variance explained by each QTL, respectively. Among these QTLs, 57 were detected in at least two environments, named stable QTLs. A total of 209 and 139 quantitative trait nucleotides (QTNs) were associated with fiber quality traits and yield components by four multilocus genome-wide association studies methods, respectively. Among these QTNs, 74 were detected by at least two algorithms or in two environments. The candidate genes harbored by 57 stable QTLs were compared with the ones associated with QTN, and 35 common candidate genes were found. Among these common candidate genes, four were possibly "pleiotropic." This study provided important information for MAS and candidate gene functional studies.

Keywords: upland cotton, QTL, multilocus GWAS, QTN, candidate gene, fiber quality traits, yield components

Plenary 9: Genome-wide characterization of mutations induced by genetic carcinogens using next-generation sequencing

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Mutations are heritable changes in the nucleotide sequence of DNA that can lead to many adverse effects, such as cancers. Genotoxicity assays have been used to identify chemical mutagenicity and carcinogenicity. Current FDA-recommended mutation assays, such as the Ames test and mouse lymphoma assay, predict mutagenicity of test agents in the genes that allow mutant cells to be positively selected when mutations occur in the genes. These assays only detect mutations related to the genes, but not the whole genome. The mutations induced by the test agents may bias to certain types of mutations due to the target genes' natures. Although the assays have been used for many years, a new mutation assay that can directly measure all types of mutations in genome has been expected for a long time. Recently developed next-generation sequencing (NGS) technology allows us to detect genome mutations in the cells directly. In our laboratory, we have used whole genome sequencing method to screen mutagens using *Salmonella typhimurium* TA100 cells, a bacteria system, to detect germline mutations in *Caenorhabditis elegans,* a worm system, and to evaluate mutational spectra in mouse lymphoma cells, a mammalian system. The results show that NGS technology can sensitively detect mutation induction caused by genetic carcinogens and effectively evaluate the different types of mutations including base pair substitutions, insertions and deletions (indels), loss of heterozygosity, and chromosome number changes, suggesting that the unparalleled advantages of NGS for evaluating mutagenicity of chemicals can be applied for the next generation of mutagenicity tests.

Plenary 10: "Clickable" siRNA-polyisoprenoids-conjugated nanoparticles: a new pharmacological approach for cancers harboring fusion oncogenes

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Fusion oncogenes are the products of chromosomal rearrangements that are responsible for the development of more than 20% of cancers. Indeed, fusion transcription factors are driver oncogenes in many tumor types, thus, represent crucial targets. As their presence is observed only in cancer cells and only a minority of the known fusion proteins contain a "druggable" domain for small molecules, their targeting *via* small-interfering RNA (siRNA) represents a new therapeutic breakthrough for a personalized therapy. The siRNA, short oligonucleotides able to knockdown genes at mRNA level, are highly specific and efficient at very low doses; however their administration is a major challenge because the biological efficacy is hampered by their poor stability in biological environments. Therefore, to protect their pharmacological activity they require vectorization. To deliver and protect siRNA, we developed a method based on coupling siRNA to polyterpenes taking advantage of the unique property of polyisoprenoid chains to adopt a compact molecular conformation and to self-assemble into nanoparticles (NPs). More particularly, a new chemical strategy was applied to conjugate squalene (SQ) and solanesol (SOLA) to siRNA consisting in an activated variant of the azide-alkyne Huisgen cycloaddition also known as Copper–free click chemistry. We conjugated siRNA against TMPRSS2-ERG, a fusion oncogene found in more than 50% of prostate cancers to SQ or SOLA. The resulting nanoparticle formulations, siRNA TMPRSS2-ERG-SQ NPs and siRNA TMPRSS2-ERG-SOLA NPs were investigated for their biological activity. *In vitro*, both formulations were able to decrease the corresponding oncogene and oncoprotein expression, however, i*n vivo*, only the siRNA TMPRSS2-ERG-SQ NPs showed antineoplastic activity that seems to be tightly related to the dissimilar biodistribution behavior of the two formulations.

In conclusion, we performed a new approach easily transposable for pharmaceutical development to synthetize siRNA-SQ and siRNA-SOLA bioconjugates and obtained stable, reproducible and efficient siRNA-nanoparticles. These studies would offer an innovative nanomedicine for patients affected by cancer pathologies harbouring fusion oncogenes. The robustness of the process could be extended to several other polyterpenes and likely applied to other siRNA, thus rendering the clickable" siRNA-polyisoprenoid-conjugated nanoparticles a new delivery platform for oligonucleotides.

Track 1

Clinico-Medical and Nutritional Biochemistry, Medicinal Plants and Traditional Medicines

TRACK COMMITTEE

1. **PROF. DR. KHALIL-UR-RAHMAN (FOCAL PERSON)**
2. **DR. NAZISH JAHAN**
3. **DR. FOZIA ANJUM**
4. **DR. ABID ALI**

Keynote Lectures

Track 1

K-1.1 : A green approach for the production of biodiesel from fatty acids of corn oil deodorizer distillate

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A novel alginic acid derived tin catalyst, tin alginate (Sn–Alg), was successfully synthesized, characterized and applied for methyl esterification. Initially, the amount of catalyst, methanol to fatty acid ratio and reaction time were optimized using an oleic acid standard for esterification. The optimal reaction conditions were found to be 4% catalyst, 1 : 12 oleic acid to methanol mole ratio and 2 h reaction time with 98.7% fatty acid methyl ester recovery. The capability of Sn–Alg beads to esterify the fatty acids of corn deodorizer distillate was evaluated. High recovery (97.6%) of esters was obtained after 8 cycles using reprocessed catalyst under the optimized parameters. The results of the present study indicated that based on the environmental pollution, reusability, avoiding the use of potassium or sodium hydroxides or sulphuric or phosphoric acids, and ease of catalyst separation, the solid Sn–Alg catalyst has a great potential for biodiesel production from highly free fatty acid deodorizer distillates.

K-1.2 : Edible fats and oils: Biochemical signatures and significance as depicted through optics

Hina Ali, PhD

Principal Scientist

National Institute of lasers and Optronics, Islamabad

Food is essential for sustenance and human nourishment, therefore its quality and authenticity is of major concern and has drawn attentions of stakeholders and consumers. Multichannel fingerprinting techniques are available for the assessment of food quality: a multifaceted issue that involves many aspects. Spectroscopic techniques offer a quick and non-invasive tool to determine the food quality. Fat is one of the major nutrients and is important in modulating disease risks. The comparative study of edible oils, spreads and ghee based on fatty acid composition using Raman spectroscopy. It has a potential to differentiate desi ghee, mono-unsaturated extra virgin olive oil (EVOO) from other processed ghee, spreads and polyunsaturated oils. Desi ghee contains conjugated Linoleic acid (CLA) has proved to be anti-carcinogenic, anti-inflammatory and anti-allergic properties. Raman spectroscopy along with chemometric techniques can potentially be utilized for efficient and reliable compositional analysis and authentication of commercially available edible oils, spreads and ghee.

Oral Presentations

Track 1

O.1.1. CLINICO -PATHOLOGICAL CHANGES ASSOCIATED WITH INDUCED NEWCASTLE DISEASE IN NEEM (*AZADIRACHTA INDICA*) SUPPLEMENTED BROLIER CHICKS

Muhammad Umar, Farzana Rizvi, Shah Nawaz*, Ayesha Ramzan and Muhammad Shahzad Shafiq
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Abstract

Aim of study was to investigate the effects of Neem (Azadirachta indica) supplementation on Newcastle disease (ND) in broiler chicken. During this trail a flock of total 175, one-day old chicks were randomly divided into 5 groups; having 35 broiler chicks in each group. Birds of one group kept as control and no treatment was given. Chicks of other groups were given neem leaves at the prescribed dose @ 8g/kg, in feed from day 3 to 42 of trail. Chicks of rest of groups were challenged with field isolated NDV strain on 30^{th} day of study by sub cutaneous route. All birds were observed twice daily for clinical signs and behavioral changes. At a week interval, seven birds were slaughtered from each group upto 42 day of the trail. Blood from wing vein was collected with and without anticoagulant for hematology and for serum biochemistry. At the end of trail, significant increase in body weight was found in all neem fed groups as compared to control group. There was significant increase in total erythrocyte count (TEC), packed cell volume (PC V), hemoglobin (Hb), serum proteins and globulins level in all neem supplemented groups as compared to control group. There was non-significant difference in total leukocyte count (TLC), serum ALT, serum urea and creatinine of broiler chicks of all neem supplemented groups as compared to control group. From this study it could be concluded that the use of neem has beneficial effects on performance and body weight gain of broiler chickens. Similarly, it has no adverse effects on the internal physiology of broilers and haematological & serum biochemical parameters.

O.1.2. OMEGA-3 ENRICHMENT OF POULTRY EGGS THROUGH USE OF FLAXSEED

Asghar Subhani[1], Shaukat Ali Bhatti[1]*, Gulraiz Ahmad[2], Tahir Mahmood[1], Shahzad Ashraf[1], Najam Us Sahar[1,] Muhammad Khalid Qadeer [1]

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Abstract

Saturated and trans fatty acids have negative effect on the human health, however, polyunsaturated fatty acids (PUFAs) have positive effect to prevent from cancer and cardiovascular diseases. Omega-3 and Omega-6 PUFAs compete for metabolism and have antagonistic effects on human health. Hens have a unique ability to accumulate dietary lipid into their egg yolk. Adding flaxseed to layer diets significantly increased yolk omega-3 fatty acid. The study was planned to investigate the effect of flaxseed (FS) on omega-3 fatty acid composition of eggs in laying hens. For this purpose, one hundred and ninety-two (n=192) Lohmann Selected Leghorn (LSL) Lite laying hens at age of 31 week were divided randomly into three groups and fed diets containing three levels (0, 5 and 10%) for 10 weeks with first two week as adaptation period. Eggs were collected, counted and weighed daily. Egg fatty acids were analyzed by gas chromatography technique. Data were analyzed using mixed procedure of SAS. The effect of bird was taken as random. Treatment and weeks were taken as dependable variables. Means were compared using Tukey's Test. Alpha-linolenic acid contents in eggs increased with increasing level of FS while linoleic acid (omega-6), decosahexanoic acid (DHA) and ecosapentanoic acid (EPA) contents were not affected by dietary treatments. It was concluded that supplementation of FS in layer diet significantly enhanced the linolenic acid contents.

Keywords: flax seed, omega-3 fatty acids, eggs, layer birds

O.1.3. EFFECT OF ALOE VERA POWDER AGAINST ACNE VULGARIS

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Abstract

Acne vulgaris is common skin disease characterized with chronic inflammatory and multifactorial pathogenesis. All age groups are affected mainly teenagers and adults once in their lives. For treatment, a number of standard oral and tropical therapies are used but these drugs induce serious complications. *Aloe vera* herb is used in different cultures and pharmaceutical industries for its therapeutic agents. It contains several active components and antimicrobial properties. To keep in view the unique role of *Aloe vera* powder, study was designed to evaluate the effect of *Aloe vera* in group of patients with mild to severe acne vulgaris. Powder was prepared from *Aloe vera* and filled in capsules. Human subjects were recruited and divided in 3 groups. Subjects from study 1 and 2 consumed a capsule each day. Subjects were clinically examined at DHQ hospital Faisalabad. In control group T_0 who didn't receive any medication the initial mean value of acne vulgaris severity was 2.3±0.8 and after 15 days was 2.1±0.5 while the final value was 2.2±0.6. In experimental study T_1 with 15mg capsule the initial mean value was 2.9±0.8 and e after 15 days of study 2.6±1.2, while the final value was 2±0.8. Whereas in experimental group T_2 who received 30mg capsule the initial mean value was 2.9±0.8 and after 15 days was 2.3±1.1. Mean value after 30 days significantly reduced to 0.9±0.7. It proves that *Aloe vera* has therapeutic effect against acne vulgaris.

Key words: Acne, Aloe vera, skin disease

O.1.4. STUDY OF THE *ANDROGENIC* POTENTIAL OF ANACYCLUS PYRETHRUM ROOTS EXTRACT IN ADULT MALE RATS

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Abstract

Anacyclus pyrethrum belongs to Asteraceae plant family which is found in Asian countries. This plant is being used in traditional system of medicines for variety of diseases including infertility. The current study was conducted explore the androgenic potential of methanolic roots extract of Anacyclus pyrethrum by determining the testosterone concentration in serum and the testicular histology of male rats. The methanolic roots extract was evaluated for various biological activities i-e antioxidant potential and cytotoxic activities. Animals were divided into six study groups of four animals each including normal control (A), toxic group (B), positive control (Testosterone treated) (C) and test groups (D, E and F). Test groups D, E and F received 50, 100 and 200 mg/Kg bw A. pyrethrum roots extract for six weeks. Body, testis and relative testis weight of rats were recorded. Testosterone level was determined through ELISA kit method. Testicular histology was performed by H & E staining. Significant ($p<0.05$) variation in body and relative testis weight were observed in A. pyrethrum roots extract treated animals compared to control rats. Significant ($p<0.05$) increase in testosterone concentration was found in extract treated rats. Histological study revealed that A. pyrethrum roots restored the histoarchitecture of rat testis in CCl_4 intoxicated rats. The study concluded that A. pyrethrum roots have testosterone like activity probably due to the presence of bioactive phytocompounds and might enhance male fertility.

O.1.5. LEVEL OF TRACE ELEMENTS AND STEROID HORMONE IN POLYCYSTIC OVARY SYNDROME

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Abstract

Polycystic ovary syndrome is an endocrine dysfunction and abnormal androgen production. There is almost 6.5–8% females affected at the age of puberty. Approximately 4 to 12% females are affected by this syndrome at their reproductive age. Symptoms of PCOS include obesity, pelvic pain, menstrual irregularities, acne, hirsutism, and alopecia. In polycystic ovary syndrome there is also an important role of the oxidative stress. Various studies investigate the relation of oxidative stress to polycystic ovary syndrome. Symptoms of polycystic ovary syndrome include obesity, acne, hirsutism, infertility and alopecia etc. we aimed to find out level of hormones, level of heavy metals and check biochemical profile. Fifteen patients and five healthy females under the age of 20-40 years selected. So, by the investigation it is concluded that the level of testosterone, FSH, LH and insulin was significantly higher in patients than the healthy females and because of this the patients suffer from menstrual irregularities, obesity, infertility and hirsutism. Level of different elements also checked out. Level of zinc and copper was significantly higher in the patients while level of magnesium, cobalt and cadmium differ a little bit. Biochemical parameters also checked during the research. Glucose and triglycerides level also have significant increase in disease condition and it resultantly increase level of cholesterol and which cause obesity. Mean and standard deviation of all parameters was determined which show the level difference in polycystic ovary syndrome (PCOS) and control group.

Keywords: Polycystic Ovary Syndrome, Trace Elements, Steroid Hormones, Infertility, obesity.

O.1.6. SERO-SURVEY OF CANINE PARVOVIRUS INFECTION IN DOGS IN DISTRICT FAISALABAD

Farrah Deeba[1], Anas Sarwar Qureshi[2], Muhammad Haleem Tayyab[1], Naureen Rana[3], Shanza Khalid[3], Khurram Ashfaq[1]

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Abstract

CPV-2b is well-known to cause contagious canine parvoviral enteritis and now newest CPV-2c strain is causing emergence of CPV in canids with high morbidity and high case fatality across the globe. CPV infection is typically characterized by protracted vomiting, dysentery with distinctive foul smell, myocardial suppuration, cerebral hypoplasia, leukopenia (e.g., lymphopenia and neutropenia), dehydration, hypothermia and death due to hypovolemic or septic shock. Current study was designed to find out the seroprevalence of CPV in stray and client-owned dogs of Faisalabad metropolis, Pakistan. During the period of 2016-17, a total of 50 blood samples were collected from cephalic vein of dogs with main presenting complaint of gastrointestinal abnormalities that were hospitalized to veterinary clinics in different locales of district Faisalabad. Predesigned questionnaire was used to record history related to age, breed, sex, locales, environment type (captive or free living), clinical signs, and vaccination status. Hemagglutination inhibition assay (HIA) test was performed on the blood samples to detect the sero-conversion against CPV. The overall recorded prevalence of antibodies against CPV was 88% (44/50). Significant association ($P < 0.05$) between CPV and enteritis and age group less than 6 month was observed. Breed, sex, lifestyle and vaccination status were observed as non-significantly associated factors ($P > 0.05$). Non-significant association of vaccination with the presence of endemic status of CPV in district Faisalabad highlights the significance of further molecular investigation of field strains of CPV to modify vaccines.

Keyword: CPV-2c, Emergence, Dogs, Antibody titer, Endemic status, Faisalabad

O.1.7. ENDOGENOUS ANTIOXIDANT AND CHEMICAL ASSESSMENT OF POLYHERBAL FORMULATION (PHF) AGAINST VARIOUS HEPATOTOXIC AGENTS IN EXPERIMENTAL ANIMALS

Abid Ali and Khalil-ur-Rahman

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Silymarin isolated from the *Silybum marianum* is used clinically for the management of hepatic ailments worldwide and its hepatoprotective potential is also proved in previous study by our research group. Advancement of liver injury characterized by increased levels of enzymes in blood stream and its complication includes bile leak, *hepatic* and perihepatic abscesses, ascites, cirrhosis and decompensated cirrhosis. In order to manage the multiple symptoms of liver injury and reduction in the progression of liver related complication there is need to formulate a herbal combination of medicinal plants to manage the hepatic ailments. In addition to silymarin another plant that has similar therapeutic character is *Rheum emodi* and *Artemisia absinthium* are combined to see the synergistic hepatoprotective effect. The extract of poly herbal combination was standardized using LCMS/MS) to evaluate their hepatoprotective effect on various hepatotoxicant induced in experimental animals. The administration of hepatotoxin, significantly increased the levels of SGPT, SGOT and ALP whereas the levels of protein and albumin were decreased. Treatment with herbal combination showed a strong hepatoprotective activity based on assessing the levels of above described markers. The levels of antioxidants enzymes i.e. SOD, POD and Catalase in medicinal plants treated groups remained in normal limit as in the control group. Histopathological examination of liver tissues of control and treated animals showed significant difference indicating that the herbal combinations successfully restored the liver functions.

O.1.8. Assessment of Medicinal Impact of *Calotropis Procera* Supplemented Diet through Haematology, Gut Microbial Diversity and Immune Response in Broiler Chicks

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Abstract

The effects of *Calotropis procera* Linn. leaves supplemented diet in poultry chicks on haematology, gut microbial diversity and immune response were evaluated in this study. Ross 308 broiler chicks (a total of 400 birds) were randomly assigned five dietary treatments with four replicates in a completely randomized designed with 20 pens containing 20 chicks in each pen. The chicks were fed diet containing 0, 12.5, 25, 37.5 g/half bag dried *Calotropis* leaves along with Enramycin 3.125, 2, 1, 0 g/half bag and designated as TI, T2, T3, T4 and T5. Supplemented diet along with fresh clean drinking water was supplied ad libitum throughout the experimental trial of 35 days. On the last day of trial 2 birds per pen were selected for blood samples for hematology and gut microbial diversity evaluation. The results were found significant (P<0.05) for hemoglobin (Hb), total leucocytes (TLC), total red blood cells (TRBCs), hematocrit (HCT), mean corpuscular volume (MCV), mean corpuscular hemoglobin concentration (MCHC) in hematology and significant (P<0.05) for total coliform (TC), clostridium (Clos) and Bifido in gut microbial diversity. However, the plant material did not show significant results (P<0.05) for immunological response against New Castle and Infectious Bronchitis diseases in chickens. It was concluded that the *C. procera* has no negative effects on poultry haematology and gut microbial diversity but it improves chick's health.

Keywords: *Calotropis Procera*; broiler chicks; hematology; microbial diversity; New Castle; Infectious Bronchitis

O.1.9. ANTIMICROBIAL AND ANTIFUNGAL PROPERTIES OF SKIN MUCUS FROM FRESH WATER CULTIVABLE *CYPRINUS CARPIO.*

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ABSTRACT

Fish face heavy pathogenic load in their natural habitat. Epidermal mucus protect the fish from pathogenic effect. The present study was conducted to determine antifungal and antimicrobial potential of epidermal mucus of *Cyprinus carpio*. For this purpose, mucus collected from ten wild habitats (River Ravi) and ten control sites (pond reservoir). *Cyprinus carpio* were tested against pathogenic bacterial strains (*Escherichia coli, Staphylococcus aureus, Streptococcus dysgalactiae, Streptococcus equisimilis, Pseudomonas putida*) and pathogenic fungal *(Aspergillus terreus, Aspergillus niger, Trimates versicolor*) strains by disc diffusion method. The mucus secreted by the epidermis of wild site of *Cyprinus carpio* exhibited higher antifungal and antibacterial activity than control site of fishes except *Trimates versicolor* that remain unaffected. Ciprofloxacin and ketoconazole were used as positive control for both of the bacterial and fungal strains respectively. The study also determined the protein contents of fish mucus by Bradford assay using bovine serum albumin as standard. The protein content was higher (1.90 mg/mL) in the crude mucus of wild site of fish than the protein contents (1.04 mg/ml) of control site of fish. Protease activity found higher (1.97 Umg^{-1}) in the riverine fish mucus as compared to the mucus of pond fish (1.71 Umg^{-1}) assessed by Casein hydrolysis test. In this investigation, we isolated and detected protease from the skin mucus constituents of *Cyprinus carpio* using a series of ion exchange column chromatography steps then measured molecular mass of protease by SDS-PAGE. The present findings suggest that *Cyprinus carpio* mucus having very good antimicrobial activity against pathogenic microbes.

Keywords: Antimicrobial, *Cyprinus carpio*, Skin mucus, Protease activity.

1.10. PREVALENCE OF HYPOTHYROIDISM AND AUTOIMMUNITY IN OBESE WOMEN

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Abstract

Objective: Obese subjects particularly female are at increased risk of endocrine disorders. We determined hypothyroidism and thyroid autoimmunity (TAI) in local obese female referred to CENUM for thyroid function evaluation. Patients and Methods: At CENUM, Mayo Hospital Lahore during February to May 2018, obese female (BMI ≥30 Kg/m^2) were recruited and necessary information and a 5 ml venous blood was collected from each participant. Weight and height was noted and BMI was calculated. Exclusion criteria were the presence of known thyroid disorder or any systemic disease. Serum concentration of FT_4, FT_3 and TSH were estimated by radioimmunoassay technique. Normal ranges of serum FT_4, FT_3 and TSH were 11.0-23.0 pmol/L, 2.5-5.8 pmol/L and 0.3-5.0 mIU/L. Hypothyroidism was considered when TSH was more than upper and FT_4 was lower than lower limit. A serum thyroid-peroxidase antibodies (TPO-Ab) titer ≥ 20.0 IU/ml was considered AIT positive. Results: A total of 265 obese women and as many normal weight women were enrolled. Their mean (+ SD) age and height was comparable (P>0.05) but average weight, BMI, hip circumference, waist circumference and hip-waist ratio was significantly higher in obese women (P<0.05). Hypothyroidism was detected in 30 (11.3%) patients among obese and 19 (7.2%) patients from control group. Overt hypothyroidism was observed in 19 (7.2%) obese and 9 (3.4%) control women. Subclinical hypothyroidism was detected in 11(4.2%) obese and 9(3.4%) control women. Thus incidence of hypothyroidism was more in obese female than control group. A comparison of mean thyroid hormone parameters of euthyroid obese and control women showed that mean FT_4 was significantly lower in obese euthyroid women while mean levels of FT_3 and TSH were comparable. Prevalence of TAI was also comparable in obese and normal weight women (13.1% versus 12.7%; P>0.05).

Conclusion: Obese women are increased risk for development of hypothyroidism and thyroid autoimmunity.

O.1.11. BIOACTIVE ANALYSIS AND SEARCH OF NOVEL ANTIMICROBIAL FAMILY SPECIFIC GENES FROM MEDICINAL PLANTS

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Abstract

The defence mechanism of plants provoked by biotic and abiotic hassles cause the instigation of defensin genes. These defensin genes are key gear for the fabrication of transgenic self-defensive pants and potential natural antibiotics. This rummage of natural weapons, beginning in 90s, is still on the way. This research work also deliberated to chase potential novel defensin genes relying on the antimicrobial potential of the medicinal plants including *Cassia fistula, Cymbopogon citratus, Albizzia lebecck* and *Saccharum officinarum*. After isolation of quality genomic DNA, PCR was done using defensin primers, which were designed by primer3 using open reading frame of already acknowledged defensin genes of palnts. Defensin genes of *Cassia fistula* and, *Albizzia lebecck* were efficaciously amplified, with size of 150 bp and 300 bp respectively. Both genes were isolated from gel and purified using Thermoscientific genejet gel extraction Kit. After that, genes were sent for sequencing. The sequence results will be prophesied for Insilco analysis to evaluate the possible potential of the purified genes.

O.1.12. CLINICO -PATHOLOGICAL CHANGES ASSOCIATED WITH INDUCED NEWCASTLE DISEASE IN NEEM (*AZADIRACHTA INDICA*) SUPPLEMENTED BROLIER CHICKS

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Abstract

Aim of study was to investigate the effects of Neem (Azadirachta indica) supplementation on Newcastle disease (ND) in broiler chicken. During this trail a flock of total 175, one-day old chicks were randomly divided into 5 groups; having 35 broiler chicks in each group. Birds of one group kept as control and no treatment was given. Chicks of other groups were given neem leaves at the prescribed dose @ 8g/kg, in feed from day 3 to 42 of trail. Chicks of rest of groups were challenged with field isolated NDV strain on 30^{th} day of study by sub cutaneous route. All birds were observed twice daily for clinical signs and behavioral changes. At a week interval, seven birds were slaughtered from each group upto 42 day of the trail. Blood from wing vein was collected with and without anticoagulant for hematology and for serum biochemistry. At the end of trail, significant increase in body weight was found in all neem fed groups as compared to control group. There was significant increase in total erythrocyte count (TEC), packed cell volume (PC V), hemoglobin (Hb), serum proteins and globulins level in all neem supplemented groups as compared to control group. There was non-significant difference in total leukocyte count (TLC), serum ALT, serum urea and creatinine of broiler chicks of all neem supplemented groups as compared to control group. From this study it could be concluded that the use of neem has beneficial effects on performance and body weight gain of broiler chickens. Similarly, it has no adverse effects on the internal physiology of broilers and haematological & serum biochemical parameters.

O.1.13. OMEGA-3 ENRICHMENT OF POULTRY EGGS THROUGH USE OF FLAXSEED

Asghar Subhani[1], Shaukat Ali Bhatti[1]*, Gulraiz Ahmad[2], Tahir Mahmood[1], Shahzad Ashraf[1], Najam Us Sahar[1,] Muhammad Khalid Qadeer [1]

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Abstract

Saturated and trans fatty acids have negative effect on the human health, however, polyunsaturated fatty acids (PUFAs) have positive effect to prevent from cancer and cardiovascular diseases. Omega-3 and Omega-6 PUFAs compete for metabolism and have antagonistic effects on human health. Hens have a unique ability to accumulate dietary lipid into their egg yolk. Adding flaxseed to layer diets significantly increased yolk omega-3 fatty acid. The study was planned to investigate the effect of flaxseed (FS) on omega-3 fatty acid composition of eggs in laying hens. For this purpose, one hundred and ninety-two (n=192) Lohmann Selected Leghorn (LSL) Lite laying hens at age of 31 week were divided randomly into three groups and fed diets containing three levels (0, 5 and 10%) for 10 weeks with first two week as adaptation period. Eggs were collected, counted and weighed daily. Egg fatty acids were analyzed by gas chromatography technique. Data were analyzed using mixed procedure of SAS. The effect of bird was taken as random. Treatment and weeks were taken as dependable variables. Means were compared using Tukey's Test. Alpha-linolenic acid contents in eggs increased with increasing level of FS while linoleic acid (omega-6), decosahexanoic acid (DHA) and ecosapentanoic acid (EPA) contents were not affected by dietary treatments. It was concluded that supplementation of FS in layer diet significantly enhanced the linolenic acid contents.

Keywords: flax seed, omega-3 fatty acids, eggs, layer birds

O.1.14. EFFECT OF ALOE VERA POWDER AGAINST ACNE VULGARIS

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Abstract

Acne vulgaris is common skin disease characterized with chronic inflammatory and multifactorial pathogenesis. All age groups are affected mainly teenagers and adults once in their lives. For treatment, a number of standard oral and tropical therapies are used but these drugs induce serious complications. *Aloe vera* herb is used in different cultures and pharmaceutical industries for its therapeutic agents. It contains several active components and antimicrobial properties. To keep in view the unique role of *Aloe vera* powder, study was designed to evaluate the effect of *Aloe vera* in group of patients with mild to severe acne vulgaris. Powder was prepared from *Aloe vera* and filled in capsules. Human subjects were recruited and divided in 3 groups. Subjects from study 1 and 2 consumed a capsule each day. Subjects were clinically examined at DHQ hospital Faisalabad. In control group T_0 who didn't receive any medication the initial mean value of acne vulgaris severity was 2.3±0.8 and after 15 days was 2.1±0.5 while the final value was 2.2±0.6. In experimental study T_1 with 15mg capsule the initial mean value was 2.9±0.8 and e after 15 days of study 2.6±1.2, while the final value was 2±0.8. Whereas in experimental group T_2 who received 30mg capsule the initial mean value was 2.9±0.8 and after 15 days was 2.3±1.1. Mean value after 30 days significantly reduced to 0.9±0.7. It proves that *Aloe vera* has therapeutic effect against acne vulgaris.

Keywords: Acne, Aloe vera, skin disease

O.1.15. STUDY OF THE *ANDROGENIC* POTENTIAL OF ANACYCLUS PYRETHRUM ROOTS EXTRACT IN ADULT MALE RATS

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Abstract

Anacyclus pyrethrum belongs to Asteraceae plant family which is found in Asian countries. This plant is being used in traditional system of medicines for variety of diseases including infertility. The current study was conducted explore the androgenic potential of methanolic roots extract of Anacyclus pyrethrum by determining the testosterone concentration in serum and the testicular histology of male rats. The methanolic roots extract was evaluated for various biological activities i-e antioxidant potential and cytotoxic activities. Animals were divided into six study groups of four animals each including normal control (A), toxic group (B), positive control (Testosterone treated) (C) and test groups (D, E and F). Test groups D, E and F received 50, 100 and 200 mg/Kg bw A. pyrethrum roots extract for six weeks. Body, testis and relative testis weight of rats were recorded. Testosterone level was determined through ELISA kit method. Testicular histology was performed by H & E staining. Significant ($p<0.05$) variation in body and relative testis weight were observed in A. pyrethrum roots extract treated animals compared to control rats. Significant ($p<0.05$) increase in testosterone concentration was found in extract treated rats. Histological study revealed that A. pyrethrum roots restored the histoarchitecture of rat testis in CCl_4 intoxicated rats. The study concluded that A. pyrethrum roots have testosterone like activity probably due to the presence of bioactive phytocompounds and might enhance male fertility.

O.1.16. LEVEL OF TRACE ELEMENTS AND STEROID HORMONE IN POLYCYSTIC OVARY SYNDROME

*Muhammad Jahangeer[1], Zahed Mahmood[1], Maliha Batool[1], Sarmad Ahmad Qamar[2], Ghazia Fatima[1]

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Abstract

Polycystic ovary syndrome is an endocrine dysfunction and abnormal androgen production. There is almost 6.5–8% females affected at the age of puberty. Approximately 4 to 12% females are affected by this syndrome at their reproductive age. Symptoms of PCOS include obesity, pelvic pain, menstrual irregularities, acne, hirsutism, and alopecia. In polycystic ovary syndrome there is also an important role of the oxidative stress. Various studies investigate the relation of oxidative stress to polycystic ovary syndrome. Symptoms of polycystic ovary syndrome include obesity, acne, hirsutism, infertility and alopecia etc. we aimed to find out level of hormones, level of heavy metals and check biochemical profile. Fifteen patients and five healthy females under the age of 20-40 years selected. So, by the investigation it is concluded that the level of testosterone, FSH, LH and insulin was significantly higher in patients than the healthy females and because of this the patients suffer from menstrual irregularities, obesity, infertility and hirsutism. Level of different elements also checked out. Level of zinc and copper was significantly higher in the patients while level of magnesium, cobalt and cadmium differ a little bit. Biochemical parameters also checked during the research. Glucose and triglycerides level also have significant increase in disease condition and it resultantly increase level of cholesterol and which cause obesity. Mean and standard deviation of all parameters was determined which show the level difference in polycystic ovary syndrome (PCOS) and control group.

Keywords: Polycystic Ovary Syndrome, Trace Elements, Steroid Hormones, Infertility, obesity.

O.1.17. INVESTIGATION OF *FELINE PANLEUKOPENIA* VIRUS ANTIBODIES IN DIARRHEIC CAPTIVE FELINES IN DISTRICT FAISALABAD, PAKISTAN

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Abstract

Feline infectious enteritis due to Feline panleukopenia virus (FPV) is a highly fatal disease of domesticated and wild felines with worldwide distribution. The present study was devised to establish prevalence of antibodies for feline panleukopenia virus in different breeds of domesticated cats in district Faisalabad. In 2016-17, blood samples were drawn from 50 cats with history of enteritis from all areas of district Faisalabad for detection of antibodies to FPV infection. All the sera harvested by centrifugation were subjected to hemagglutination inhibition assay (HIA). Out of 50 samples tested, 37 samples were found HIA positive for FPV infection with overall 74% prevalence in cats in district Faisalabad. Multivariable analysis revealed significant association ($p < 0.05$) of seroprevalence of FPV with juvenile age group (<1year), lack of vaccination and enteritis history, while breeds and sex were considered as non-significant factors with $p > 0.05$. This study concluded higher prevalence of FPV antibodies in domestic cats of district Faisalabad and suggested proper vaccination protocol to avoid fatal outbreaks in household cats.

Keywords: Panleukopenia, Hemagglutination assay, Enteritis, Felines, Seroprevalence, Faisalabad

O.1.18. ENDOGENOUS ANTIOXIDANT AND CHEMICAL ASSESSMENT OF POLYHERBAL FORMULATION (PHF) AGAINST VARIOUS HEPATOTOXIC AGENTS IN EXPERIMENTAL ANIMALS

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Silymarin isolated from the *Silybum marianum* is used clinically for the management of hepatic ailments worldwide and its hepatoprotective potential is also proved in previous study by our research group. Advancement of liver injury characterized by increased levels of enzymes in blood stream and its complication includes bile leak, *hepatic* and perihepatic abscesses, ascites, cirrhosis and decompensated cirrhosis. In order to manage the multiple symptoms of liver injury and reduction in the progression of liver related complication there is need to formulate a herbal combination of medicinal plants to manage the hepatic ailments. In addition to silymarin another plant that has similar therapeutic character is *Rheum emodi* and *Artemisia absinthium* are combined to see the synergistic hepatoprotective effect. The extract of poly herbal combination was standardized using LCMS/MS) to evaluate their hepatoprotective effect on various hepatotoxicant induced in experimental animals. The administration of hepatotoxin, significantly increased the levels of SGPT, SGOT and ALP whereas the levels of protein and albumin were decreased. Treatment with herbal combination showed a strong hepatoprotective activity based on assessing the levels of above described markers. The levels of antioxidants enzymes i.e. SOD, POD and Catalase in medicinal plants treated groups remained in normal limit as in the control group. Histopathological examination of liver tissues of control and treated animals showed significant difference indicating that the herbal combinations successfully restored the liver functions.

O.1.19. Assessment of Medicinal Impact of *Calotropis Procera* Supplemented Diet through Haematology, Gut Microbial Diversity and Immune Response in Broiler Chicks

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Abstract

The effects of *Calotropis procera* Linn. leaves supplemented diet in poultry chicks on haematology, gut microbial diversity and immune response were evaluated in this study. Ross 308 broiler chicks (a total of 400 birds) were randomly assigned five dietary treatments with four replicates in a completely randomized designed with 20 pens containing 20 chicks in each pen. The chicks were fed diet containing 0, 12.5, 25, 37.5 g/half bag dried *Calotropis* leaves along with Enramycin 3.125, 2, 1, 0 g/half bag and designated as TI, T2, T3, T4 and T5. Supplemented diet along with fresh clean drinking water was supplied ad libitum throughout the experimental trial of 35 days. On the last day of trial 2 birds per pen were selected for blood samples for hematology and gut microbial diversity evaluation. The results were found significant (P<0.05) for hemoglobin (Hb), total leucocytes (TLC), total red blood cells (TRBCs), hematocrit (HCT), mean corpuscular volume (MCV), mean corpuscular hemoglobin concentration (MCHC) in hematology and significant (P<0.05) for total coliform (TC), clostridium (Clos) and Bifido in gut microbial diversity. However, the plant material did not show significant results (P<0.05) for immunological response against New Castle and Infectious Bronchitis diseases in chickens. It was concluded that the *C. procera* has no negative effects on poultry haematology and gut microbial diversity but it improves chick's health.

Keywords: *Calotropis Procera*; broiler chicks; hematology; microbial diversity; New Castle; Infectious Bronchitis

O.1.20. ANTIMICROBIAL AND ANTIFUNGAL PROPERTIES OF SKIN MUCUS FROM FRESH WATER CULTIVABLE *CYPRINUS CARPIO.*

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Abstract

Fish face heavy pathogenic load in their natural habitat. Epidermal mucus protect the fish from pathogenic effect. The present study was conducted to determine antifungal and antimicrobial potential of epidermal mucus of *Cyprinus carpio*. For this purpose, mucus collected from ten wild habitats (River Ravi) and ten control sites (pond reservoir). *Cyprinus carpio* were tested against pathogenic bacterial strains (*Escherichia coli, Staphylococcus aureus, Streptococcus dysgalactiae, Streptococcus equisimilis, Pseudomonas putida*) and pathogenic fungal *(Aspergillus terreus, Aspergillus niger, Trimates versicolor*) strains by disc diffusion method. The mucus secreted by the epidermis of wild site of *Cyprinus carpio* exhibited higher antifungal and antibacterial activity than control site of fishes except *Trimates versicolor* that remain unaffected. Ciprofloxacin and ketoconazole were used as positive control for both of the bacterial and fungal strains respectively. The study also determined the protein contents of fish mucus by Bradford assay using bovine serum albumin as standard. The protein content was higher (1.90 mg/mL) in the crude mucus of wild site of fish than the protein contents (1.04 mg/ml) of control site of fish. Protease activity found higher (1.97 Umg^{-1}) in the riverine fish mucus as compared to the mucus of pond fish (1.71 Umg^{-1}) assessed by Casein hydrolysis test. In this investigation, we isolated and detected protease from the skin mucus constituents of *Cyprinus carpio* using a series of ion exchange column chromatography steps then measured molecular mass of protease by SDS-PAGE. The present findings suggest that *Cyprinus carpio* mucus having very good antimicrobial activity against pathogenic microbes.

Keywords: Antimicrobial, *Cyprinus carpio*, Skin mucus, Protease activity.

O.1.21. PREVALENCE OF HYPOTHYROIDISM AND AUTOIMMUNITY IN OBESE WOMEN

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Abstract

Objective: Obese subjects particularly female are at increased risk of endocrine disorders. We determined hypothyroidism and thyroid autoimmunity (TAI) in local obese female referred to CENUM for thyroid function evaluation. Patients and Methods: At CENUM, Mayo Hospital Lahore during February to May 2018, obese female (BMI ≥30 Kg/m^2) were recruited and necessary information and a 5 ml venous blood was collected from each participant. Weight and height was noted and BMI was calculated. Exclusion criteria were the presence of known thyroid disorder or any systemic disease. Serum concentration of FT_4, FT_3 and TSH were estimated by radioimmunoassay technique. Normal ranges of serum FT_4, FT_3 and TSH were 11.0-23.0 pmol/L, 2.5-5.8 pmol/L and 0.3-5.0 mIU/L. Hypothyroidism was considered when TSH was more than upper and FT_4 was lower than lower limit. A serum thyroid-peroxidase antibodies (TPO-Ab) titer ≥ 20.0 IU/ml was considered AIT positive. Results: A total of 265 obese women and as many normal weight women were enrolled. Their mean (+ SD) age and height was comparable (P>0.05) but average weight, BMI, hip circumference, waist circumference and hip-waist ratio was significantly higher in obese women (P<0.05). Hypothyroidism was detected in 30 (11.3%) patients among obese and 19 (7.2%) patients from control group. Overt hypothyroidism was observed in 19 (7.2%) obese and 9 (3.4%) control women. Subclinical hypothyroidism was detected in 11(4.2%) obese and 9(3.4%) control women. Thus incidence of hypothyroidism was more in obese female than control group. A comparison of mean thyroid hormone parameters of euthyroid obese and control women showed that mean FT_4 was significantly lower in obese euthyroid women while mean levels of FT_3 and TSH were comparable. Prevalence of TAI was also comparable in obese and normal weight women (13.1% versus 12.7%; P>0.05).

Conclusion: Obese women are increased risk for development of hypothyroidism and thyroid autoimmunity.

Track 2

Pharmaceutical Biochemistry, Drug Development and Delivery Systems

TRACK COMMITTEE

1. **PROF. DR. TAHIRA IQBAL (CONVENER)**
2. **DR. IMTIAZ MEHMOOD TAHIR**
3. **DR. RAZIYA NADEEM**

KEYNOTE LECTURES

Track 2

K-2.1. Polymer based cancer nano-therapeutics

Dr Abida Raza, Principal Scientist
Group Leader, NILOP Nanomedicine Research Laboratories
National Institute of Laser and Optronics
Pakistan Atomic Energy Commission, Islamabad

Cancer is amongst the leading cause of death across the globe. In last few decades, remarkable breakthrough has been achieved in developing the strategies in better understanding of cancer prognosis, diagnosis and treatment. These developments have decreased the cancer mortalities during last 5 years, but still mortality is high. This high mortality is because of inability of the drug carriers to deliver anticancer agent to its specific site and reducing the dose dependent adverse effects. The quest for nanotechnology based Novel Drug Delivery System (NDDS), has paved the way to develop new drug delivery systems with enhanced biodegradability and biocompatibility. The nanocarriers have potential to carry the drug molecule safely and efficiently to the target site thus reducing the side effects, especially in case of drugs having narrow therapeutic index or cytotoxic effects. Polymeric nanoparticles have proven to be of more interest when compared with metallic and lipid based nanoparticles because of number of reasons like ease of fabrication, high drug loading and encapsulation efficiency, encapsulation of hydrophilic, hydrophobic, charged and macromolecules and above all their greater biodegradation and biocompatibility. These engineered nanoparticles have shown tremendous applications in chemotherapy, a widely used technique to treat millions of patients, predisposed by the cellular sensitivity. Current presentation will highlight the use of polymer as anticancer drug delivery system at NILOP Nanomedicine Research Laboratory.

K-2.2. Development in Nanoparticles Research for Biological Applications

Irshad Hussain

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Metal/metal oxide nanoparticles and nanoclusters have been recognized as an important class of materials whose properties can be tuned by controlling their nanoscale features. A control over their size, shape and surface chemistry is, therefore, extremely important to use them for any potential applications in biomedical sciences. In this regard, we have demonstrated several reproducible protocols to prepare metal nanoparticles from subnanometer to over 100 nm in aqueous/organic media with a fair control over their size, shape, and surface chemistry. These metal nanoparticles have been used as building blocks to design/synthesize new nanostructured materials using template-based and template-less strategies. The functionalized metal/metal oxide nanoparticles/ nanoclusters possess interesting optical, recognition and catalytic properties and we are now focusing more on their applications in biological sciences especially those in bio-sensing (bacterial detection), bio-imaging, drug delivery, improved bioavailability and targeted delivery of drugs. This talk would be an overview of our interdisciplinary research activities to synthesize metal nanoparticles/nanoclusters with controlled nanoscale features and surface chemistry, possessing unique chemical and physical properties, and their diverse applications in biological sciences.

ORAL PRESENTATIONS

Track 2

O.2.1. DEFENSIVE EFFECTS OF NUCIFERIN AND NORCOCLAURINE ON ACETYLCHOLINESTERASE AND ANTIOXIDANT ENZYMES IN ALLOXAN INDUCED DIABETIC ALBINO RATS

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Abstract

The present study investigates the antidiabetic, antiacetylcholinesterase and antioxidant enzymes effects of nuciferin and norcoclaurine from *N. nucifera* seeds in diabetic rats. The alloxan (100 mg/kg b.w) induced diabetic rats (200-250 g) were divided into 7 groups (n = 6). Group I; normal, Group II; diabetic, Group III; standard glabenclamide, Group lV-VII were methanolic crude (100, 200 mg/kg), nuciferin and norcoclaurine (10 mg/kg b.w.), received for 15 days in dose dependent manner. Different tests included glucose, body weights, enzyme assays i.e. superoxide dismutase, catalase, lipid peroxidation, glutathione and acetylcholinesterase were performed. Nuciferin and norcoclaurine significantly reduced blood glucose ($P<0.05$) and restored body weight in diabetic rats. Diabetes caused decrease in the antioxidant enzymes level, nuciferin and norcoclaurine (10 mg/kg) significantly increased the antioxidant enzymes in diabetic groups. While, significant increase in TBARS level was observed in diabetic group. Nuciferin and norcoclaurine (10 mg/kg) prevented this increase of diabetic animals ($P<0.05$). AChE levels were significantly decreased in blood and brain of diabetic group ($P<0.05$). Our results demonstrated that Nuciferin and norcoclaurine improved memory and interfered with the cholinergic signaling. These observations suggesting a promising use of *N. nucifera* in treatment of Alzheimer's disease and oxidative stress.

Keywords: Nuciferin, norcoclaurine, antidiabetic, antiacetylcholinesterase, antioxidant enzymes effects, *N. nucifera* seed

O.2.2. MESOPOROUS NANO-BIOACTIVE GLASS FOR THE BONE TISSUE REGENERATION AND DELIVERY OF IMATINIB ALONG WITH IN VITRO INHIBITORY EFFECTS ON CANCER CELLS

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Abstract

For treatment of bone cancer, controlled drug delivery is one of the important methods. Bioactive scaffolds are widely used biomaterials due to their usefulness in localized drug delivery. The aim of this study was to develop mesoporous bioglass (MBG) with improved bioactivity and controllable drug delivery rate. By using pluronic 123 (P123) as a template, a facile sol-gel route was employed for the synthesis of MBG nanoparticles (nps). The composition of the prepared sample was estimated by using energy dispersive X-ray spectroscopy (EDX). These nanoparticles demonstrated the specific surface area of 310 m^2/g and pore size of 13 nm as measured by brunauer-emmett-teller (BET) and barrett-joyner-halenda (BJH) method, respectively. The spherical shape of nps was confirmed by scanning electron microscopy (SEM) and transmission electron microscopy (TEM). Imatinib (IMT); an anti-cancer drug was loaded with the efficiency of 77.59%. The drug release kinetics were precisely controlled by changing the ph (4.4 to 10.4) as well as drug loading concentration (0.2-1.0 mg/ml). The maximum cumulative drug release of 81% was observed over a time period of 250 h at ph of 4.4. Importantly, significant inhibitory effects on the viability of the MG-63 osteocarcinoma cancer cells at 12.19 µg/ml of IMT-MBG were observed. Furthermore, MBG demonstrated ionic dissolution with the release of Ca, K, Si, Na, and P ions upon immersion in simulated body fluid (SBF), which support the formation of hydroxycarbonate apatite (HCA), as confirmed by wide-angle X-ray diffraction (WAXD) pattern and fourier transform infrared (FTIR) spectroscopy. These features proved that IMT-MBG system is effective for bone tissue regeneration and bone cancer treatment.

Keywords: Mesoporous; bioglass; anti-cancer; bone cancer; ph-responsive; tissue regeneration; hydroxycarbonate.

O.2.3. ISOLATION, PURIFICATION, STRUCTURAL ELUCIDATION & OF ANTIBACTERIAL SECONDARY METABOLITES FROM MARINE BACTERIA AGAINST MDR STRAINS OF HUMAN ORIGIN

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Abstract

The emergence and spread of antimicrobial resistance continues unabated around the world, leaving devastating health and economic outcomes in its wake. Those consequences will multiply if collaborative global action is not taken to address the spread of resistance. To combat this issue new antimicrobials are urgently needed. Fifteen microbial strains were screened for their capacity to produce antimicrobial metabolites of pharmaceutical interest. These strains were associated to the brown seaweed Pelvetia canaliculata (Linnaeus) attached to the rocks of Sonmiani Beach (Karachi, Pakistan). bacterial strains were isolated from sea weeds attached to rocks of Baluchistan coast line using marine agar 2216 and screened for antibacterial activity by agar well diffusion method and crude extract was made and antimicrobial metabolites were purified using silica gel column and structure of pure compound was elucidated using spectroscopic techniques. Crude extract filtrates from CMG 2180 strain, grew on ZMA medium, showed the most remarkable antimicrobial activity, and thus was chosen for further examination. The identification of CMG 2180 as a probable new type strain of the Actinobacterium Kocuria marina was based on phenotypic aspects and biochemical characteristics (e.g. halotolerant Gram-positive micrococcoid) as well as on the nucleotide sequence analysis of its full-length 16S rRNA gene showing the highest similarity with the type strain KMM 3905 (GenBank accession number EU073966). Interestingly, a unique UV-bioactive compound, for which the name of kocumarin was proposed, was isolated and purified from CMG 2180 strain's crude extracts by flash silica gel column chromatography and TLC/HPTLC. Using routine methods, kocumarin demonstrated prominent and rapid activities against all tested fungi and pathogenic bacteria including MRSA. Its chemical structure was unraveled by 1D and 2D-NMR spectroscopy as 4-[(Z)-2 phenyl ethenyl] benzoic acid.Taken together and to the best of knowledge, our in vitro data report both a possible new Kocuria type strain and the breakthrough discovery of kocumarin, a promising antibiotic exerting

quick bactericide and permanent spore inhibition effects. Eventually, after in vivo validation, kocumarin could be produced at high-scale from crude extracts to treat newly infected or microbial resistant patients and/or clean environmental surfaces in order to prevent nosocomial infections.

O.2.4. ANTIPLATELET ACTIVITY OF THUJA OCCIDENTALIS CRUDE EXTRACT AND PARACETAMOL

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Abstract

Thuja occidentalis (Arbor vitae, Yellow cedar, tree of life) belongs to the family Cupressaceae. The leaves of Thuja contain volatile oil (with up to 60% thujone), flavonoids, wax, mucilage and tannins. The established medicinal uses are: anti-viral, expectorant, anti-catarrhal, counter-irritant and diuretic. It is prescribed for both internal and external use in the treatment of warts and polyps as well as for treating amenorrhea. It is an intensively used medicinal plant in Pakistan in alternative system of medicine. The present antiplatelet activity was carried in vitro on the sub-threshold doses of paracetamol and Thuja occidentalis extract against arachidonic acid induced platelet aggregation using dual channel chronolog lumi aggregometer. In this study T. occidentalis and paracetamol extract sub-threshold dilutions were used with slight modification in solvent system while aspirin was used as standard drug. The results exhibited that T. occidentalis extract at 1ng/ml potently inhibits AA-induced human platelet aggregation (82%) in comparison to paracetamol (79%) and aspirin (82%).On the basis of ourprevious and present results it can be concluded that T.occidentalis has diversified therapeutic effect and is beneficial in the treatment of various pathophysiological conditions associated with cancers, kidneys, skin, respiratory tract and digestive system.

Keywords: Thuja occidantalis, paracetamol, aspirin, antiplatelet

O.2.5. ABSORPTION KINETICS OF FIXED –DOSE COMBINATION OF SITAGLIPTIN AND METFORMIN IN HEALTHY HUMAN

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Abstract

Type-2 diabetes mellitus has become a huge socioeconomic global burden over the last few decades and its prevalence is still increasing. The combined use of sitagliptin and metformin proved to be more effective treatment for type 2 diabetes than a single drug treatment. It is a dipeptidyl peptidase-4 inhibitor and biguanide combination, suggested for treatment of type 2 diabetes. The present work was designed to study the absorption kinetics of fixed-dose combination (FDC) of sitagliptin and metformin in healthy human. After preliminary screening 24 young healthy male volunteers (Average age = 22 years) were selected to participate in this study. Each volunteer was orally administrated a single fixed dose tablet of sitagliptin and metformin 50/500 mg. After predefined time intervals blood sample were collected in the Vacuette® tubes from each volunteer and centrifuged for separation of plasma. Amount of sitagliptin and metformin were determined using a validated High Performance Liquid Chromatographic (HPLC) method. The plasma concentration versus time data was used to calculate the absorption kinetics using Equivtest PK software. Maximum plasma concentration (C_{max}) of sitagliptin (278.2±45.6 ng/ml) and metformin (1220±58.8 ng/ml) were observed at 3.67±1.41 hours and 2.88±0.62 hours, respectively. Average area under curve (AUC_{0-t}) of sitagliptin and metformin were 3513±1887 µg.h/ml and 8199±413 µg.h/ml, respectively. Average half-life of sitagliptin and metformin (50/500 mg FDC) were 20.21±13.1 hours and 7.18±7.66 hours, respectively. The results indicated the well absorption response of sitagliptin/metformin FDC tablets.

Keywords: Sitagliptin, metformin, HPLC, kinetics, absorption

O.2.6. BIOGENIC SYNTHESIS OF SILVER NANOPARTICLES OF FUNGAL STRAIN (PENICILLIUM OXALICUM) AS POTENTIAL ANTIBIOTICS

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Abstract

Biotechnology is the use of living things especially cells and bacteria for production of various products for benefiting human beings. Nanobiotechnology is the convergence of engineering and molecular biology that is leading to a new class of multifunctional devices and systems for biological and chemical analysis with better sensitivity and specificity and a higher rate of recognition. At the nanoscale level, the properties of matter are significantly different from their macroscopic bulk properties. Silver is a nontoxic, safe inorganic antibacterial agent and can serve as replacement of antibiotics. Present research was based on biogenic synthesis of silver nanoparticles as potential antibiotics. Biological method was used for the biogenic synthesis of silver nanoparticles from fungal metabolite of penicillium oxalicum. For characterization of these biosynthesized silver nanoparticles, different analytical techniques X-ray diffraction and scanning electron microscopy were used. Further the antibacterial activity of biosynthesized silver nanoparticles was checked against Staphylococcus aureus, Shigella dysentry and Salmonella typhi by using well diffusion method and U-V visible spectrophotometer. Maximum zone of inhibition for Staphylococcus aureus 17.5 Shigella dysentry 17.5 and Salmonella typhi was 18.3mm. The biosynthesized silver nanoparticles of Penicillium oxalicum show excellent antibacterial activity. So it was concluded from our results that biosynthesized silver nanoparticles have significant potential for a wide range of biological applications such as antibacterial agents for antibiotic resistant bacteria, preventing infections, healing wounds and anti-inflammation.

O.2.7. SYNTHESIS OF NANOSTRCUTRED, CHARACTERIZATION, & IMPROVEMENT OF BIOAVAILABILITY, PHARMACOKINETICS IN VITRO AND VIVO STUDIES

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Abstract

Synthesis of nanomaterials is being gained extensive attention in the fields of biochemistry, drug delivery and the most important in diagnosis and therapeutic applications. Loureirin B (LB) Luteolin and other hydrophobic marker compound of chinese herbal plants, which exhibits great potentials such as antimicrobial, anti-inflammatory, anti-cancer, antirdiation and antimutagen. However, its poor bioavailability, hydrophobicity, and pharmacokinetics restrict clinical application. Nano biomaterials synthesized by hot-micro emulsion ultrasonic, or thin film evaporation technique to improve the bioavailability & pharmacokinetics of compound. Synthesized nanoparticles size have been confirmed by particle size analyzer with range from 10 to 100 nm, having zepta potential -9.2 mV and polydisperse index 0.247, respectively. Drug encapsulation efficiency investigated by HPLC/Uv-Vis spectrometry. Both in vitro and vivo studies, LC–MS/MS technique was used for quantification of Loureirin B (LB) and Luteolin in rat plasma. The Tmax value of drug with nanomaterials after the administration was Ten times shorter than pure Luteolin suspension administration. Cmax value of drug after the administration of Nanomaterial with drug was five times higher than obtained with native drug suspension. In the end, the relative bioavailability of nanomaterials has improved about 4.89 compared to Loureirin B and Luteolin. From this study, it can be concluded that nanomaterials have not only great potential for improving solubility but also increased the drug concentration in plasma.

O.2.8. TECHNETIUM-99M LABELED IBUPROFEN: DEVELOPMENT AND BIOLOGICAL EVALUATION USING STERILE INFLAMMATION INDUCED MICE MODEL

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Abstract

In this study we are presenting the development of technetium-99m (^{99m}Tc) labeled ibuprofen for the imaging of aseptic inflammation. ^{99m}Tc-Ibuprofen complex was developed by optimizing the radiolabeling conditions such as reaction time, ligand and reducing agent concentration, pH, reaction time and temperature. After addition of 600 µg of ibuprofen, 4 µg of stannous chloride as reducing agent and about 300 MBq ^{99m}Tc radioactivity, the mixture was allowed to react for 15 min at room temperature and 11 pH. Chromatography analysis revealed >94% ^{99m}Tc ibuprofen complex formation with promising stability in saline and blood serum up to 6 h. Biodistribution study using normal and sterile inflammation induced mice indicated low accumulation of labeled compound in major body organ, however, kidneys (14.76 ± 0.87 % ID/g organ) and bladder (31.6 ± 3.0 % ID/g organ) showed comparatively higher radioactivity due to principal excretory path. Inflammation tissue to normal tissue ratio (T/NT) at 1 h showed significant value (4.57 ± 0.56). Radiochemical purity of ^{99m}Tc-ibuprofen and biological evaluation using sterile inflammation induced mice revealed the agent bears promising potential to locate the aseptic inflammation which can be utilized to discriminate the septic and aseptic inflammation in combination with true septic inflammation agent.

O.2.9. The proactive bio-pharmacological potentials of Pleurotus species

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O.2.10. ISOLATION AND IDENTIFICATION OF ANTIMICROBIAL AGENTS FROM THE EPIDERMAL MUCUS OF LABEO ROHITA AS AN ANTIMICROBIAL DRUG FOR THE TREATMENT OF MICROBIAL INFECTIONS

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Abstract

The epidermal mucus of fish species has been found to contain antimicrobial proteins and peptides, which is of interest in regard to fish immunity. Labeo rohita was collected from the wild site showed the highest activity against pathogens as compared to the control site. The mucus was tested for antibacterial activity against double pathogenic strains of Escherichia coli, Staphylococcus aureus, Streptococcus dysgalactiae, Pseudomonas putida, and Streptococcus equisimilus. The maximum and minimum antibacterial zones of inhibition were exhibited by Staphylococcus aureus of the wild site (7.58±0.081) and Streptococcus equisimilus of control site (3.2±0.163). The mucus was tested for antifungal activity against double pathogenic strains of Aspergillus terrus, Aspergillus niger. Highest and lowest diameter of inhibition zones were showed up by Aspergillus niger of wild and Aspergillus terrus of control site that was (6.7±0.163) and (5.7±0.205) respectively. Estimation of proteins was also done for mucus from the river and intensive system, their results show that protein concentration was high (2.51±0.139) in the control site than the river areas as (1.72±0.198). Amino Acid analysis was done to identify the composition of amino acids in the mucus. Some important amino acids were found in the mucus of Labeo rohita at high percentages such as phenylalanine, proline and the moderate amount of lysine, ammonia, and aspartate.

Keywords: Identification, antimicrobial, Labeo rohita, mucus and drug

O.2.11. DETERMINATION OF ANTIBIOTIC RESISTANT GENES IN LACTOBACILLUS SPECIES ISOLATED FROM COMMERCIALLY AVAILABLE FERMENTED YOGURT

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Abstract

Fermented foods have great interest due to the presence of lactic acid bacteria i.e. Lactobacillus. That bacteria fall in probiotic category that has tremendous beneficial effects on gut health. Lactobacillus is permanent inhabitant as intestinal microbiota. The genus works as reservoir for resistance genes and also involves in dissemination of resistant genes to pathogenic strains. Antibiotic resistance can transfer through different mechanisms as horizontal gene transfer mechanism among lactic acid bacteria to other bacteria. Current study is designed to determine the availability of antibiotic resistance genes in isolated Lactobacillus from commercially available fermented yogurt that exhibited antibiotic resistance. The presence of antibiotic resistance genes was analyzed in Lactobacillus acidophilus. For this purpose commercially available fermented yogurt samples were used. Total 3 types of fermented yogurt samples were used. Samples were positive to Lactobacillus acidophilus. Different tests were applied for identification and resistance was detected by antibiotic susceptibility assay. Lactobacillus acidophilus was resistant to metronidazole, amoxicillin and ampicillin. Genomic DNA was isolated with the help of mini kit. Nano drop method was used for quantification of DNA. Amplification was done with PCR. Molecular confirmation was done by the visualization of PCR product in gel Electrophoresis. 1-7 bands were produced for gene of Lactobacillus acidophilus. Gene sequencing analysis of Lactobacillus acidophilus was done with the help of expression of three genes that were tet(M), erm(B) and sul(2) genes. Analysis was done by the comparison of two samples. Results showed that Lactobacillus acidophilus that was isolated from commercially available fermented yogurt

contained minute resistance against sul(2) and tet(M) genes and also showed no resistance against erm(B) genes. According to statistical analysis this resistance was non-significant.

O.2.12. EVALUATION OF ANTIBACTERIAL PROPERTIES OF NANO-SIZED IRON OXIDE AGAINST GRAM POSITIVE AND GRAM NEGATIVE BACTERIA

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Abstract

Biotechnology and nanotechnology are two of the 21st century's most promising technologies. Nano-biotechnology is considered to be the unique fusion of biotechnology and nanotechnology and play a vital role in developing and implementing of many useful tools in improving life. However, the emergence of nanoparticle (NPs) technology has come with the promising broad range biomedical applications. A nanoparticle is the most fundamental component in the fabrication of a nanostructure. Iron oxides are one of the most important transition metal oxides of biomedical importance. Well-developed surface chemistry of Iron oxide nanoparticles (IONPs) provides an opportunity to incorporate a variety of biomolecules applications and also act as antibacterial agents. In current study, IONPs have been synthesized by co-precipitation method. The X-ray diffraction (XRD) analysis revealed that the synthesized IONPs (48 nm) are crystalline in nature. Mean particle size and morphology of synthesized IONPs was confirmed by SEM analysis which shows cubic spinel in shape. Furthermore, the antibacterial effect of IONPs at pre-defined concentrations 50, 100 and 150 mg/mL were evaluated against S. aureus, S. flexneri, P. Aeruginosa, S. typhi, S. dysentry and E.coli. Bacterial strains, which showed that the nanoparticles have potent antibacterial activity. Results revealed that iron oxide nanoparticles might have potential bactericidal activity and applicable in pharmaceutical and biomedical industries.

Key Words: Bactericidal activity, iron oxide nanoparticles, nanobiotechnology, X-ray diffraction and scanning electron microscopy.

O.2.13. EFFICACY OF NOVEL CHOLINESTERASE INHIBITORS AGAINST ALZHEIMER'S DISEASE AND RELATED DEMENTIAS

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Abstract

The aim of the cholinesterase inhibitors is to boost the endogenous levels of acetylcholine in the brain of Alzheimer's disease patients and herby, to boost cholinergic neurotransmission. Currently several cholinesterase inhibitors such as tacrine, revistagmine, donepizel and galanthamine has been used in the first mark for pharmacotherapy Alzheimer's disease. However these drugs have severe side effects like hepatotoxicity and gastrointestinal disorders. Hence there is a great interest in the discovery of novel AChE inhibitors from natural sources suh as huperzine, bacosdies, hyperforin used in the treatment of neurological disorders. New aconitine type C19 nor diterpeniod alkolid Isotelatazidine hydrate isolated from *Delphinium denudatum* Wall was tested for their acetyl cholinesterase (AChE) and butyryl cholinesterase (BChE) inhibitory activities in dose dependent manner. The IC_{50} values of compounds against AChE and BChE were 11.13± 0.43μM and 21.41± 0.23μM respectively. atisine type C_{20} diterpenoid alkaloid Ajaconine **1** and lycoctonine type C_{19} Norditerpenoid alkaloid Delectinine **2** isolated from *Delphinium chitralense* were tested for their acetylcholinesterase (AChE) and btyrylcholinesterase (BChE) inhibitory activities in dosedependent manner. The IC50 (50% inhibitory effect) values of compounds CD6 and CD8 against AChE were 5.04± 0.09 and 12.61 ± 0.05μmM while the values obtained against BChE were 9.21± 0.06 and 10.18± 0.91 μM respectively.

All the nitrogen containing novel derivatives of progesterone (**1**-**16**) were screened for their acetylcholinesterase (AChE) and butyrylcholinesterase (BChE) inhibitory activities in dose dependent manner. The IC_{50} (50% inhibitory effect) values of compounds **1**, **3**, **4**, **5**, **6**, **7**, **8**, **9**, and **13** were showed strong activity against AChE as 14.40 ± 0.08, 18.02 ± 0.19, 19.08 ± 0.18, 23.11 ± 0.05, 21.47 ± 0.06, 22.18 ± 0.13 , 20.27 ± 0.08, 15.97 ± 0.07 and 17.01 ± 0.02 μmM while the values obtained against BChE were 22.21 ± 0.06, 28.01 ± 0.01, 26.12 ± 0.09, 37.31 ± 0.11 , 34.14 ± 0.05, 32.45 ± 0.20, 30.15 ± 0.16 , 20.08 ± 0.01 and 30.44 ± 0.14 μM respectively. Compounds

11, **16**, and **17** showed weak inhibition profile. All compounds were docked against AChE and BChE were showed most effective interaction. The synthesis of acetylcholine from choline and acetyl–coenzymeA (Acetyl-coA) in presynaptic neurons is catalysed by the enzyme cholineacetyltransferase. When released, acetylcholine's effects are mediated via pre- and post-synaptic muscarinic and nicotinic receptors. Results may be either excitatory or inhibitory. Released acetylcholine is broken down within the synaptic cleft by the enzyme acetylcholinesterase (AChE)

O.2.14. SYNTHESIS OF POLYMERIC NEXUS FOR TAREGETED DRUG DELIVERY AND ITS IN-VITRO EVALUATION

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Abstract

Polymers play potential role in the development of drug-delivery systems. This research work investigated the use of Hydroxyethyl cellulose (HEC), acrylic acid (AA) and N'N'-methylene bis-acrylamide (MBA) in the synthesis of hydrogels for controlled drug delivery of acid sensitive drug perindopril erbumine (PE). Different ratio of HEC, AA and MBA were blended with each other to fabricate hydrogels via free radical polymerization technique. Fourier transform infrared spectroscopy (FTIR) revealed successful grafting of components into the polymeric network. Thermal and morphological characterization confirmed the formation of thermodynamically stable hydrogels having porous structure. The pH responsive behavior of hydrogels has been documented by swelling dynamics and drug release behavior in simulated gastrointestinal fluids. Drug release kinetics revealed controlled release behavior of the perindopril erbumine in developed polymeric network. Cross-linked Hydroxyethyl cellulose (HEC), hydrogels can be used as promising candidates for the design and development of controlled drug-delivery systems.

Keywords: Hydroxyethyl cellulose (HEC); acrylic acid (AA); Hydrogel; pH-Responsive

O.2.15. SERUM AND CELLULAR PHARMACOKINETICS OF SOFOSBUVIR AND ITS CONCENTRATION EFFECT ANALYSIS IN HCV PATIENTS RECEIVING SOFOSBUVIR AND RIBAVIRIN THERAPY

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HCV has been major cause of death for decades in Pakistan due to poor health conditions and management. Sofosbuvir and ribavirin have emerged as direct acting antivirals agents for the proper eradication of viral load in HCV patients. The present study reports serum and cellular pharmacokinetics and concentration effect analysis of sofosbuvir in human. HCV positive individuals and receiving 400 mg sofosbuvir along with low dose or weight base ribavirin were used in this study. Concentrations were modeled through NONMEM and unpaired t-test was used for the association of concentrations and treatment outcomes. Average day 10 sofosbuvir metabolite BM 331007concentration was higher in patients having haemoglobin nadir <10 g/dl with relative to the patients having heamoglobin >10 g/dl (5.34 versus 4.87 pmol/10^6 cells; p=0.03). the average concentration trends of GS331007 at day 10 was towards being higher in the patients which achieves sustained virologic response (SVR) as compare to the patients who relapsed (5.19 versus 4.86 pmol/10^6 cells; p=0.05). Sofosbuvir (GS331007) thresholds concentration which was suggested at day 10 through receiver operating characteristic curve was 5.4 pmol/10^6 cells for SVR (p=0.05) and haemoglobin nadir cells was 6.3 pmol/10^6 with sensitivity and specificity of ≥60%. Dosing simulations shows that 400 mg sofosbuvir twice daily produce day 10 concentration range of 5.4 to 6.7 pmol/10^6 cells. It was concluded that GS 331007 concentration in serum at day 10 was related to the SVR and Anemia. The range of therapeutic values was identified for HCV patients receiving sofosbuvir plus ribavirin for 24 weeks, suggesting a potential pharmaceutical basis for individualized therapeutic dosing.

Keywords: Hepatitis C virus (HCV), Sustained virologic response (SVR), GS 331007

O.2.16. PHYTOPHARMACEUTICALS: PROMISING CANDIDATE FOR DISEASE PREVENTION IN HUMAN

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Abstract

Plants are gift of nature. These are used as food, increase nature beauty and also used for medicinal purposes. As the diseases are emerging day by day there is also need to cure them. Nature has provided us tremendous therapeutic agents hidden in plants which we have to explore. Herbs are plants or plant parts that are used as medicine and contain chemical compounds that act upon the body and are related to different diseases. Many plants are known so far e.g. Cichorium intybus is used as nerve tonic, Anthemis nobilis as anti-inflammatory and anticoagulant, Papaver orientale as analgesic, Alhagi for wound healing and kidney stones, Echeveria elegans for headache, Paliurus spina for magarine, Alcea aucheri for preventing hair loss, Ziziphus jujuba for cold treatment. Medicinal plants are also useful for treating chronic diseases such as cancer e.g. Celosia trigyna contains ethanol that cytotoxic activity against cancer and promotes apoptosis, Cannabis sativa contains methyl alcohol that exert antitumor effect by inducing apoptosis and also decreases telomerase activity by hindering TERT gene expression. Mangifera indica contain Lupeol that act as cure for skin cancer. Medicinal plants have advantage over conventional plants as they are safe and less costly. These are derived from nature and have less side effects as compared to conventional plants. Thousands of plants are known but still many are unknown to us. Further study should be done in this regard to discover plants worldwide and exploring their medicinal value for medical uses and for disease treatment in less costly manner.

Keywords: Herbs, TERT gene, nerve tonic, therapeutic agents

O.2.17. Anti-diabetic Activity and Synthesis of benzimidazole-benzothiazine Structural Hybrids

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O.2.18. SYNTHESIS OF AG (I)-N HETEROCYCLIC CARBENE COMPLEXES FOR ANTICANCER STUDIES

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Abstract

Silver complexes have become attractive tool in the field of medicinal chemistry. The present project was designed to synthesize new series of silver-*N* heterocyclic carbene (NHC) complexes. Various NHCs precursors were designed leading to the syntheses of target silver complexes, respectively. Three series of novel mono- and bis-imidazolium salts as ligands and their mono, di, tri and polynuclear silver adducts were synthesized. The corresponding Ag(I) adducts were afforded by the *in situ* deprotonation of the NHC ligands. All the precursors and silver complexes were well characterized by FTIR, GC-MS, ^{1}H, ^{13}C (one and two dimensional), ^{31}P and ^{19}F NMR, elemental analysis, melting points, ESI-MS and X-ray crystallographic techniques. After successful syntheses, the silver complexes were employed to study their anticancer activities against EAhy, MDA, A549 and Hella cancer cell lines. All the salts and silver complexes showed potential anticancer activity against tested cancer cell lines. The complexes were found to have many fold better results compared to the respective salts concluding that the silver imparts greater anticancer potential to the compounds. On the whole the present project provided useful information for drug designing.

Keywords: Silver Adducts; Heterocyclic carbenes; Biological activity; Anticancer Activity

O.2.19. INVESTIGATION OF ERYPTOTIC ACTIVITY OF METHOTREXATE AND ANTI ERYPTOTIC POTENTIAL OF AQUEOUS EXTRACTS OF *CURCUMA LONGA* AND *ALLIUM SATIVUM*

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Abstract

Erythrocytes are cells that contain hemoglobin and survive for only 3-4 months. Erythrocytes are anucleated and lack mitochondria. Eryptosis is the suicidal death of RBCs. Main features are cell shrinkage, cell membrane destruction, energy shortage and phosphatidylserine translocation. Eryptosis stimulated by oxidative stress, 68ctivation of kinases and elevated intracellular calcium level. Folate antagonist methotrexate is an anti-cancerous and anti-inflammatory agent that inhibit the folate dependent enzymes. This chemotherapeutic agent has ability to induce eryptosis and oxidative stress. Erythrocytes were treated with different physiological doses of methotrexate and decline in antioxidative defensive system was observed. Oxidative stress is the leading cause of cell death. Perennial herb turmeric is extensively cultivated in Asia. The rhizome is used medicinally gives up yellow powder. Source of turmeric is dried Curcuma longa that gives yellow color. It is traditional medication used against many ailments like gastric ulcer, jaundice, skin diseases, and joint inflammation. Allium sativum is broadly cultivated antioxidative plant for its therapeutic purposes. Erythrocytes were treated with Curcuma longa and Allium sativum aqueous extracts to check the anti oxidation and anti eryptotic potential of both plants. It is observed that the toxic effects of methotrexate were neutralized by aqueous extracts of used plant.

Keywords: Methotrexate, Extracts, Eryptosis

O.2.20. RENAL CLEARANCE AND URINARY EXCRETION OF IBUPROFEN IN MALE VOLUNTEERS

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Abstract

Ibuprofen is an anti-inflammatory, antipyretic and analgesic drug. It is commonly used to get relief from pain and fever. It can be used for various diseases like Alzheimer's, orthodontic disorders, cystic fibrosis of lungs etc. It works by inhibiting the production of prostaglandin. Excretion through urine is the primary way for the elimination of drug from the body, so, the urinary excretion and renal clearance of ibuprofen was determined by taking blood and urine samples from male volunteers after the administration of ibuprofen tablets. Before the administration of ibuprofen, blank blood and urine samples was taken. Volume and pH of urine samples will be determined and recorded. Blood and urine samples was analyzed by HPLC to determine the concentration of ibuprofen. Standard curve of ibuprofen was prepared by using regression analysis and concentration of ibuprofen in samples was determined by using regression equation.

Keywords: Ibuprofen, Urinary extraction, Renal clearance, Male volunteers, HPLC

TRACK 3

Molecular Biology, Genetic Engineering and Bioinformatics

TRACK COMMITTEE

1. **PROF. AMER JAMIL (FOCAL PERSON)**
2. **DR. AFTAB AHMED**
3. **DR. MUHAMMAD JAMSHED**
4. **DR. ZAIN UL ABDIN**

Keynote lectures

Track 3

K-3.1 Animal Biotechnology & Genomic Research in Pakistan; Current Scenario & Future Prospects

Masroor Ellahi Babar, Akhtar Ali, Tanveer Hussain

Faculty of Science & Technology, Virtual University of Pakistan, Lahore

Animal genetic resources are very diverse in Pakistan. Animal resources are goat (74.1 million), Sheep (30.5 million), Cattle (46.1 million), Buffalo (38.8 million) and Camel (1.1 million). Genomic techniques used for investigation include sequencing, genotyping and microarray based genotyping. We have Characterized indigenous animal breeds using FAO and ISAG molecular markers on local cattle, buffalo, sheep, goat, camel, yak, horses and chicken. We developed DNA bank (≃ 10,000 samples) of local species of Pakistan including domestic animals, wild animals and birds. Wild animals are Urial, Mouflon sheep, Markhor, Hog Deer, Chinkara, Black Buck while birds are domestic chickens, Pheasant, Peafowl, Chukar etc. Our finding include genetic characterization (Mt D-loop, Cyto b, COX1, ATPase6-8, FAO/ ISAG rec. microsatellite markers), production traits (Meat, Milk, Fertility), disease resistance genes (MHC Complex genes, ILs, DRBs), heat shock protein genes (Hsp40,70,90), barcoding of endangered species in Pakistan (COX1), prion genes in domestic and wild animals (Prp). Now we are heading towards NGS, GBS, ddRAD, Transcriptome analyses with international collaborations.

K-3.2 Journy of DNA evidence from genotyping to phenotyping

Nouman Rasool

Department of Life Sciences, University of Management and Technology, Lahore.

The recent development in the field of forensic DNA analysis cast a huge impact on criminal justice systems around the globe. This technique is playing pivotal role in solving crimes by convicting the criminals without any doubt. The courts are relying much on Forensic DNA reports than eyewitnesses during trial while deciding cases. The analysis carried out by determining the genotypes of evidence and reference samples. For comparison with evidence samples, the reference DNA profiles are required to made inclusion or exclusion of perpetrator in a crime. In case of non availability of such profile, it becomes hard to identify suspects. With advent of new technologies, phenotypic analysis of DNA samples can be carried out which includes various physical characteristics of an individuals. Today we are able to develop gender, skin color, iris color, facial features and gait of the perpetrator using this technology. Modern way to perform DNA sequencing has revolutionized such identifications. It means that when someone deposits its DNA at crime scene during commission of a crime, actually he is depositing his photograph there. These technological advancements will help in reducing crime in society and provide speedy justice to everyone.

Oral presentations

Track 3

O.3.1. PARTIAL CHARACTERIZATION OF EXTRA-CHROMOSOMAL DNA FROM MULTIDRUG RESISTANCE STAPHYLOCOCCUS SPECIES OF LOCAL ISOLATES PRESENT IN THE NASAL FLORA CHILDREN UNDER FIVE YEAR OF AGE

Amtul Jamil Sami[1*], Madeeha Khalid[1], Sermad Ahmad Mangat[2] and Hammad Ahmad Mangat[3].

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Abstract

Background: Pneumonia is one of the major killer diseases among children of age<05 years. In Pakistan, the quantification of the burden of pneumococcal disease through surveillance has not been focused thus, the problem is being unaddressed. Immunization against pneumococcal disease could help to attain WHO Millennium Development Goal, in Pakistan. Methods: We designed a study to estimate the burden of invasive pneumococcal diseases and antibiotic-resistance patterns of Staphylococcus Species isolates in children aged <5 years in Lahore, Pakistan. To meet the objectives children belong to affluent background and camp cities were studied. Nasal swabs were collected from the subjects and the microbial flora was identified. All the subjects had in their nasal flora. The Staphylococcus strains were tested for drug resistance using a number of antibiotics. Results: It was found 20% of the subjects (effluent background) had resistant strains of Staphylococcus Species in their nasal flora, whereas over 50% resistance was observed in the samples of camp city children. The presence of an extra chromosomal DNA of phage origin was recorded, in the resistant strains. The resistant bacterial was also identified in the drinking water samples of the area. The extra-chromosomal DNA was partially sequenced and analyzed. It was concluded that the major role in the spread of epidemic of Staphylococcus Species disease could be viral. The extra chromosomal DNA identified can be a major contributor to pathogenesis and strain diversity via horizontal gene transfer (HGT).

Keywords: Pneumonia, Staphylococcus, drug resistance, extra chromosomal DNA

O.3.2. PROTEOMIC ANALYSIS OF A TRUNK DISEASE OF FRUITING TREES CAUSED BY A NOTORIOUS FUNGAL PATHOGEN

Tanveer Hussain[1*], Muhammad Ishtiaq[1], Tony Adesemoye[2] and Sumaira Thind[3]

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Abstract

Attack of fungal pathogens on fruiting trees is a big problem in many important plants worldwide. A trunk disease caused by a fungus "Lasiodiplodia theobromae" is very epidemic in fruiting trees. Pathologists try to check the interaction of the pathogen with host with special reference to protein functions. Proteomics is a highly useful technology for studying protein expression and for discovering new proteins in any host. The recent proteomics approaches used for protein extraction of the fungus were SDS-PAGE (2-D) and multiple technologies including protein mass spectrometry, sequencing and advances in bioinformatics. Yet, the assignment of function of fungal proteins encoded as *in silico* annotated or un-annotated genes. It is still remains problematic. The main aim of the analysis is to find out the unknown function of protein. A combination of approaches including comparative proteomics, pathogen-induced protein expression and immune-proteomics are used in combination with other techniques to explore the comprehensive information on protein function of the specific fungi. These proteins and their functions may be targeted for further functional characterization and validation efforts due to their potential uses in fungal biotechnology as well as various novel proteases. This work contributes to genomic annotation efforts which explicated genomic sequencing of the specific fungi. It will help to improve fungal bioinformatics databases for future studies of different fungal pathogens. In future, quantitative proteomics, combined high-throughput sequencing and transcriptomic sequencing of protein function in different fungal species are set goal of pathologists.

Keywords: Fungal pathogens; Fruiting trees; Fungal proteomics; Genomic sequencing; Multiple technologies; Bioinformatics databases

O.3.3. A BIOINFORMATIC STUDY OF LIPASES FROM REPORTED THERMOPHILIC BACTERIA

Rozina Aslam[1] and Muhammad Sarwar Yaqub[2]
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The objective of this bioinformatic study was to analyze lipases, reported from thermophilic bacteria. Lipase sequences were recovered from Uniprot KB/SwissProt. The unfiltered aggregate of lipase sequences from different species including fungi, archea, and bacteria were 1056. After removing lipase sequences of fungi and archea, 511 sequences left for bacteria. Uncharacterized proteins, regulatory proteins, Precursors, hydrolases, peptides, carrier proteins and proteins which could not be classified on the basis of temperature were eliminated. After elimination of non reviewed sequences, five sequences from thermophilic bacteria were left and studied comparatively. Physico-chemical properties were compared using Protparam and Protscale software. SOPMA and GOR IV software were used for the analysis of secondary structure composition. GOLDMAN PRANK (Probabilistic Kit) and Jalview were used for multiple sequence alignment. The presence of conserved domains were studied using CD-BLAST, whereas Phyre2 was utilized for predicting 3D-structures.3D-Ligandsite online server was used for finding ligand binding sites. ProtParam analysis showed that lipases from thermophilic bacteria had high percentage of valine (V), proline (P) and glutamic acid (E) residues. ProtScale analysis indicated that heat resistant lipases had higher percentage of polar charged residues, CvP indices, IVYWREL, and Alpha helix content. Sequences aligned by Goldman Prank gives higher matching score between basic and hydrophobic residues suggesting that, replacement of acidic residues with basic residues may increase thermostability of lipases.

Keywords: GOLDMAN PRANK, Protparam, Protscale, SOPMA, Phyre2

O.3.4. CHARACTERIZATION OF LARVICIDAL ACTIVITY OF BIOGENIC NANOPARTICLES

Neeha Ghafoor[1], Sheeraz Ahmad[1], M Javaid Asad[1], Kumail Ali Rizvi[2], Tayyaba Zainab[1]
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Abstract

Synthesis of green nanoparticles (NPs) is a one of the most emerging field of Nano biotechnology. Plant extracts are used for the synthesis of green NPs. Green silver nanoparticles are used as vector mosquito control agent against *Aedes agypti*, vector of Dengue. Silver NPs are more effective than Gold or any other metal because they have property of high stability. $AgNO_3$ solution was mixed with appropriate amount of Crude Methanolic Extracts (CME) of *Eucalyptus globulus* and *Curcuma longa* to form green AgNps with vigorous shaking. Characterization of these green AgNps is done with U/Visible Spectroscopy for confirmation of silver nanoparticles and Scanning Electron Microscope (SEM) to analyze the nanoparticle size and shape. Both samples showed absorbance between 420-430nm. SEM results showed spherical shape of green silver nanoparticles. The size of nanoparticles of *Eucalyptus globulus* is approximately is 25nm and the nanoparticles of *Curcuma Longa* are of 15nm. These Green NPs were proved to be very effective against 3rd and 4th larval stage of *Aedes agypti* as they are eco-friendly, less harmful and have strong larvicidal activity. Overall AgNPs of both plants exhibited significant larvicial activity.

Keywords: Green synthesis**,** Nanoparticles, Dengue, Larvicidal, Characterization, Silve

O.3.5. IN-SILICO PREDICTION OF ZIKA VIRUS EPITOPES AGAINST BRAZILIAN HUMAN LEUKOCYTE ANTIGEN BACKGROUND: AN APPROACH TOWARDS DEVELOPMENT OF FUTURE VACCINES FOR BRAZILIAN POPULATION

Malik Siddique Mahmood[1]*, Naeem Mehmood Ashraf[2], Aadil Hussain[2], Muhammad Zubair Mahmood[2], Nadia Zeeshan[2], Mahjabeen Saleem[1]

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[2]Department of Biochemistry and Biotechnology, University of Gujrat, Pakistan.

O.3.6. Cell Free Circulating DNA Quantification and Methylation Status of DCC gene as Predictive Diagnostic Biomarkers of Lung Cancer

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O.3.7. PURIFICATION, N-TERMINAL AND PHYLOGENETIC STUDIES OF POLYPHENOL OXIDASE ISOFORMS FROM APPLE, PEAR AND BANANA FRUIT PULP

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Abstract

Polyphenol oxidases (PPOs) are a group of copper containing enzymes. PPOs catalyze the oxidation of phenols to *o*-quinones that are highly reactive molecules can easily go through non-enzymatic secondary reactions to form brown complex polymers called melanins. The interaction with pests and pathogen and handling during storage and postharvest processing, wounding and senescence cause the loss of sub-cellular compartmentalization that ultimately results in contact between PPOs and vacuolar phenolic substrates. This overall process eventually leads to a reaction called enzymatic browning. It negatively affecting nutritional properties, flavor, color and shelf life of food products. Enzymatic browning might be useful in some cases as it ultimately leads to the formation of compounds conferring characteristic flavors. Polyphenol oxidase in plants is known to exist in many isoforms with different molecular weight. Currently, PPO attained important attention because it has high capacity for oxidizing aromatic compounds. This feature makes the use of PPO good for biotechnological applications in medicines, environmental technology, pulp and paper industry, food industry and textile industry. Keeping in view the significance of PPO in various fields the given study was designed to extract and comparatively analyze the PPO from apple, pear and banana fruit pulp. PPOs were extracted from fresh apple, pear and banana fruits after peeling and were purified by gel filtration chromatography. Two isoforms from apple having molecular weight (45kDa, 28kDa), three isoforms from banana (65kDa, 45kDa, 28kDa) and single PPO from pear (60kDa) were detected by sodium dodecyl sulphate polyacrylamide gel electrophoresis. Purified PPOs were comparatively analyzed for pH, temperature, metal ions and enzyme kinetics. The maximum PPO activity for apple, pear and banana was found at pH 6.5. Optimum temperature for PPO activity was determined to be 30-40˚C. Michaelis constant (K_m) and maximum reaction velocity (V_{max}) values using catechol substrate under optimal conditions were determined by means of Lineweaver-burk plot for apple, banana and pear. K_m and V_{max} values for apple (74.21mM, 4.45µM/ml) banana (53.33mM,

9.15µM/ml) pear (72.27mM, 2.94µM/ml) were calculated. Western blotting (Electroblotting) was used to transfer all the proteins from the gel to an inert membrane (PVDF). N-terminal microsequencing of PPO isofroms from apple, pear and banana was performed on an applied biosystem pulse liquid protein sequencer for N-terminal protein sequencing. N-terminal microsequencing of 28 kDa PPO isoform from apple (Alanine, Lysine, Isoleucine, Threonine, Phenylalanine, Histidine, Glycine), 45 kDa PPO isoform from apple (Alanine, Proline, Glycine, Glycine, Glycine) 28 kDa isoform of banana PPO shows (Alanine, Proline, Asparagine, Serine, Tyrosine) and 45 kDa isoform shows (Alanine, Proline, Isoleucine, Alanine, Proline) and 60 kDa pear PPO shows (Serine, Leucine, Proline, Asparagine, Proline, Proline) amino acid residues. Multiple sequence alignment was performed by using the protein sequence from the gene data bank and sequence homology was studied by using CLASTALW tool. Phylogenetic tree of N-terminal sequence of the reported PPO isoforms in the given study shows strong resemblance with the protein having accession no AHA91117.1, AHA91116.1, AHH92831.1 and ACJ65307.1. PPO Protein contains three conserved regions: an N-terminal region, CuA, CuB (tyrosinase) domain and a C-terminal extension. N-terminal transit peptides of PPOs cleaved at an alanine motif after import into the thylakoid lumen. CuA and CuB domain contain several conserved histidine residues. The C-terminal end of the protein consists of DWL (Pfam 12142) and KFDV (pfam12143) domains.

O.3.8. DEVELOPMENT OF EFFICIENT MATHEMATICAL MODEL FOR OPTIMIZED BACTERIOCIN PRODUCTION FROM LOCAL ISOLATE OF LACTOBACILLUS ACIDOPHILUS MS1 USING RESPONSE SURFACE METHODOLOGY

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Abstract

Bacteriocins are antimicrobial peptides synthesized by bacteria and these are well known to control pathogenic microbial populations in fermented foods and extend their shelf-life and safety. The optimized production of bacteriocin was predicted by using Box-Behnken experimental design. The produced bacteriocin yields 2600AU/mL activity units at 30ºC temperature, 6 initial pH and 18 h incubation time. The results derived from response surface methodology (RSM) regression equation indicated that the initial pH of the model system influencing stronger than other physical variables at 95% confidence level. Moreover, quadratic and interaction effects of these variables were also found significant. A monomeric peptide of 6.5 kDa was purified to 59.1-fold from crude sample using ion exchange and gel filtration chromatography. Purified peptide showed strong inhibitory activity against biofilm produced by Bacillus cereus, a food borne pathogen. Conclusively, Box-Behnken design can be used for large scale production of bacteriocin from locally isolated strain of Latobacillus acidophilus MS1 that might be used as a preservative and non- allergic antibiotic in food as well as in pharmaceuticals.

Keywords: Lactobacillus acidophilus, bacteriocin, response surface methodology, Box-Behnken experimental design

O.3.9. PHYLOGENY AND AN *IN SILICO* STUDY TO REVEAL ALL POTENTIAL AND TOLERATED SINGLE-SITE MUTATIONS WITH INCREASED STABILITY OF STREPTOKINASE C

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Abstract

Streptokinase which is also known as fibrinolysin helps in breakdown of fibrin that is the main component of blood clots. Various strains of β-hemolytic *streptococci* have been found to produce streptokinase. Streptokinase has been preferred over all thrombolytic agents as it is one of the less expensive and suitable among all. Since the discovery of streptokinase in 1930s, scientists have been working on developing mutant strains to hyper-express streptokinase. In this study, the bioinformatics tools I-Mutant and SIFT were used to explore all possible mutations that would be tolerated and involved in an increased stability of streptokinase. The sequence of streptokinase c from *Streptococcus dysgalactiae* subsp. *equisimilis* was taken as a query and all positive mutations were predicted in signal peptide and non-cytoplasmic domain of the enzyme. CASTp was used to find active site in streptokinase. Total 46 potential point mutations were found in active site at 9 different positions. All these mutations are involved in increased stability but not tolerated. Similarly, 19 potential point mutations at 2 different positions in signal peptide and 304 potential single-site mutations at 54 different positions in non-cytoplasmic domain of streptokinase were predicted. The mutations of both regions are involved in an increased stability of the enzyme and all are also tolerated. The homologs of streptokinase with ≥90% identity were retrieved from UniProtKB and compared through multiple sequence alignment. A phylogram of query streptokinase and its homologous proteins was also generated to reveal their evolutionary relationships. Thy phylogram exhibited that query sequence has close evolutionary relationships with kinases, streptokinases and some hypothetical proteins from various *Streptococcus* spp. and *Escherichia coli*. The study will help scientists to find potential sites of mutations which could be tolerated to develop strains with increased stability of streptokinase. Further, these strains would be used to hyper-express streptokinase.

Keywords: Streptokinase; *Streptococcus dysgalactiae*; Single-site mutations; Phylogeny

O.3.10. MOLECULAR CHARACTERIZATION OF ATCNGC19 AND ATCNGC20 IN ARABIDOPSIS THALIANA FOR THEIR POTENTIAL ROLE IN SALT STRESS

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Abstract

We have previously reported finding of AtMIPS and AtbHLH106 for salt tolerance by activation-tagging of Arabidopsis calli (ICBBB 2016). Here we show identification and characterization of Arabidopsis thaliana Cyclic Nucleotide Gated Channel 19 (AtCNGC19) and Arabidopsis thaliana Cyclic Nucleotide Gated Channel 20(AtCNGC20) in one of the mutants stc13 through activation tagging. In stc13, two insertions were confirmed on chromosome number3 through TAIL PCR and in real time PCR, expression of AtCNGC19 was activated twice in control and about 5 times under 150mM NaCl stress level. AtCNGC20 was also present adjacent to AtCNGC19 on the same chromosome. Homozygous knock-out lines for AtCNGC19 and AtCNGC20 were generated by self-pollination, but both KO lines did not show any salt sensitivity in plants, however expression of both genes was significantly reduced in KO lines.Overexpression lines generated for both genes by expressing AtCNGC19 and AtCNGC20 under 35S constitutive promoter. The overexpression calli showed salt tolerance at 150mM NaClcompared with control calli however, when overexpression plants were exposed to different levels of NaCl, they did not show any tolerance. Similar results have been reported by other scientists but both genes show significant enhancement under salt stress in microarray there we assume that both genes compensate functions of each other during KO analysis. So, we further constructed CRISPR/Cas vector for simultaneous KO of both genes in same plant. Moreover, we have transformed overexpression lines of AtCNGC19 with 35S:AtCNGC20 construct to generate double overexpression lines. These results provide new evidences for role of AtCNGC19 and AtCNGC20 undersalt stress regulation in Arabidopsis.

O.3.11. AGROBACTERIUM MEDIATED DELIVERY OF MULTIPLEX CRISPR/CAS9 SYSTEM IN COTTON AGAINST THE COTTON LEAF CURL VIRUS DISEASE

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Abstract

Pakistan is at the fifth position in cotton production in the world. In cotton trading, it is the third largest exporter of raw cotton. In case of cotton consumption, it is at the fourth number. Cotton is considered as white gold, it performs a splendid role in the economy of Pakistan. The production of the cotton is severely reduced due to *Begomoviruses*. These viruses can cause different diseases in cotton. They produce viral disease in cotton leaves and make leaves curly. The leaf curl virus disease in tomato and some ornamental plants also get the mosaic disease. The disease of the cotton leaf curl virus has reduced the cotton production in the past years. In these days, many techniques are used to remove such problems and to find the remedies against them. Nowadays, an advanced genome editing technique is used called as the CRISPR/Cas9 system. This technique consists of the gRNAs and Cas9 endonuclease. The proposed research was focus on induction of disease resistance against cotton leaf curl virus by using the multiplex CRISPR/Cas system. Agrobacterium mediated transformation was used to deliver the multiplex CRISPR/Cas9 construct into cotton (Coker-312) using medias like MSB and CIM (Callus Induction Media). Moreover, the transgenic callus was used for further downstream analysis i.e. screening of transformation event in cotton via PCR analysis.

O.3.12. ANTIVIRAL PHYTOCHEMICALS IDENTIFICATION, AGAINST NS1 VIRULENCE PROTEIN, TO COPE *ZIKA VIRUS* INFECTION USING BIOINFORMATICS

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Abstract

Zika virus (ZIKV) is becoming a serious health issue across the globe. About 0.5-1.3 million cases have been reported since 2015, ZIKV infection, from its mild symptoms to association with serious disorders like microcephaly, macular atrophy and Guillain-Barre syndrome (GBS), is a serious concern. There is no vaccine or drug present against ZIKV that is why we need to find out potential therapeutics to fight against the virus. The purpose of this study is to find out phytochemicals that have antiviral activity against ZIKV NS2 protein, involved in replication and host immune system modulation, with the aid of molecular docking and simulation studies. MOE was used to perform the in silico docking analysis. Results have shown that 7 phytochemicals (Oolonghomobisflavan B, TANNIC ACID, Calceolarioside A, chebulinic acid, 2,3-Dihydroirigenin, Oolonghomobisflavan A, Amentoflavone) shows good binding properties against the NS2 protein of ZIKV. So, from this study we can conclude that Oolonghomobisflavan B may prove to be a potent inhibitor of the NS2 protein of ZIKV.

O.3.13. A COMPUTATIONAL NANOTECHNOLOGY APPROACH FOR SCREENING POTENTIAL THERAPEUTIC NANOPARTICLES AGAINST ALZHEIMER'S DISEASE

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Abstract

Alzheimer's disease (AD) is a nervous system destructive disease which causes structural, biochemical and/or electrical (neural) abnormalities inside the human brain. Especially gene mutations as well as other factors such as environment, fitness and lifestyle also make contributions to the disease. Latest mode of interest has been growing to become closer to utilize therapeutic perspectives of nanomaterials to cure AD. The in vitro and in vivo approaches are time consuming and they need advanced technologies as well. In this study, we reported nanoinformatics approaches for designing exclusive nanoparticles considering the virulence of nanoparticles and approaches to explore their medicinal potential for treatment of AD. The study was mainly focused on the usage of Lipinski rule of five including rule-of-three to evaluate lead-like and drug-like attributes of nanomaterials. It also enlightened the benefits of computer-aided investigation of nanomaterials for their adsorption, distribution, metabolism and excretion (ADME). The activities of nanoparticles in the body as ligands, their drug likeliness and therapeutic potentials were also explored through using in silico approach. The study provides a novel and clearer insights into the interaction properties of known putative nanoparticles as potential inhibitors of AD.

Keywords: Alzheimer's disease; Nanomaterials; Molecular docking; Lipinski's rule of five; Oral activity; Lead-like attributes

O.3.14. FREQUENCY OF NULL GENOTYPE IN HEALTHY AND LEUKEMIC PATIENTS IN LOCAL SUBJECTS

Naila Rafiq*, Shamaila Rafiq, Tahira Iqbal, Nusrat Shafiq, Tanzila Sahar, Sumera Kousar, Sobia Aleem

Abstract

Leukemia is a group of diseases that originate in bone marrow. Among four different types of leukemia, Chronic lymphocytic leukaemia (CLL) has several unique features that distinguish it from other cancers. Most CLL tumour cells are inert and arrested in G0/G1 of the cell cycle and there is only a small proliferative compartment; however, the progressive accumulation of malignant cells will ultimately lead to symptomatic disease. GSTM1 is Phase II enzyme that has potential to eliminate xenobiotics that may be carcinogenic. Deletion of the gene may cause susceptibility to leukemia. In Present study the population of CLL patients were checked for GSTM1 deletion polymorphism. The blood collected from 50 patients and 100 healthy volunteers was subjected to PCR and gel electrophoresis. Absence of GSTM1 gene was consider as null genotype. Healthy subjects (38%; 38/100) were found to have lesser null genotype compared to leukemic patients CLL (54%; 27/50).

Keywords: Leukemia, CLL, GSTM1, Null Genotype

O.3.15. RESISTANCE TO CITRUS TRISTEZA VIRUS VIA RNA INTERFERENCE

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Abstract

Several fungal, bacterial and viral diseases infect agricultural crops in Pakistan. Citrus is the major fruit crop in Pakistan where Kinnow is the dominant cultivar, accounting for the 80% acreage. Most graft transmissible pathogens of citrus present in Pakistan are transmitted to new plants only by using infected nursery material for propagation. Citrus tristeza virus disease is the most devastating disease of citrus. CTV is an RNA virus and its replication is without any proof reading. Many people have reported different strains of the CTV infecting the same plant. So diversity study is of utmost importance. Previously no data about the citrus tristeza virus from Pakistan at molecular level is available so first there is need to clone and sequence CTV from different regions of Pakistan. After this through RNAi, a strategy of broad-spectrum resistance against this virus is devised. RNA interference is a conserved host defensive mechanism against exogenous nucleic acids including viruses. If we target nucleotide sequence through RNAi (the most conserved region of virus) the resistance will be durable and broad spectrum against all viruses containing that conserved portion.

O.3.16. ENGINEERING PLANTS FOR BEGOMOVIRUS RESISTANCE WITH RNA-GUIDED CAS9 NUCLEASE

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Abstract

Begomoviruses infect many economically important crops worldwide. Conventional approaches for resistance management failed to tackle with emerging and rapidly evolving plant viruses. Last decade has witnessed an unprecedented progress in plant genome editing technologies. Among these technologies, the CRISPR-Cas9 system has been successfully applied to establish plant resistance against different plant viruses. In the present study, we demonstrated use of the Cas9-gRNA construct to confer resistance against begomoviruses. We synthesized unique gRNA specific for non-coding region of three most prevalent strains of *Cotton Leaf Curl Virus* (CLCuV) in Pakistan. Using CLCuV infectious clones and Cas9-gRNA construct, transient assays were performed in 3-4 weeks old tobacco (*Nicotiana benthamiana*) plants. The results demonstrated that targeting consensus sequences of CLCuV with Cas9-gRNA complex reduced symptom severity and virus accumulation by 60%-75%. Viral DNA interference was further confirmed by T7E1 DNA double strand break (DSB) assay. The results demonstrated the efficiency of the CRISPR-Cas9 system for the development of virus resistance in plants. Use of this novel strategy can open the possibility to develop resistant plant germplasm against multiple virus infections.

Keywords: *Begomoviruses*, CLCuV, Genome editing, CRISPR/Cas9, Transient assay, Virus suppression.

TRACK 4

INDUSTRIAL/ENZYME BIOTECHNOLGY, BIOCOMPOSITES AND BIOMATERIALS

TRACK COMMITTEE

1. **PROF. DR. MUHAMMAD ASGHER (FOCAL PERSON)**
2. **DR. FATMA HUSSAIN**
3. **DR. NAYLA MUNAWAR**
4. **DR. ASMA YAQOOB**

Keynote lectures

Track 4

K-4.1 Native Resources: Key for National Progress and Prosperity

Faiz-ul Hassan Nasim

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In this era of knowledge-based economic growth progress of a nation has become associated with the development of technologies that need a variety of raw materials originating from biological sources. Data show that economies of the countries generating raw materials from their own resources are benefitting more from the rapid global technological development. Majority of the newly emerging technologies are bio-based technologies, as living systems have become one of the cheapest sources of the raw materials. Although bio-based technologies have been is use, in crude form, for centuries, the newly developing technologies are heading towards improvement in production and applications and hence performance and sustainability. Time has come to understand renewable chemistry of these technologies to design cost-effective strategies as bio-based products are expected to soon replace the petroleum-based products. Transformed fuel, food and material choices are the targets. Since the global population is expected to increase to 9 billion by 2050, developing economies like Pakistan need to step up their efforts to improve the wealth and health of their human resource. World is looking forward to tap their native biological resources and so is required for the countries like Pakistan. We have vast reservoirs of unexplored biological resources that need to be explored to understand and solve our problems by developing and using the bio-based technologies.

K-4.2 Eco-friendly leather processing using highly active alkaline proteases of bacterial origin

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Alkaline protease isolated from *Bacillus subtilis* by submerged fermentation, showing maximum enzyme activity (6.0 U/ml) was employed for dehairing of goatskin. In the lab scale experiments, the process of dehairing was accelerated by the optimization of experimental conditions and by the addition of a penetrant. The complete removal of hairs occurred from the skin pieces after 3 hrs of enzyme treatment at pH 13, 35ºC temperature and 3:1 ratio of enzyme and penetrant, respectively, without damaging the hair texture and skin grain pattern. Then the process was scaled up to the industrial level. Soaked goat skins were treated separately, with crude enzyme preparation and concentrated enzyme preparation by dip and paint methods under defined conditions along with the control, lime-sulfide treatment. The best results with the skin processing were obtained when the skin was treated with concentrated enzyme. The quality of wetblue (Area, appearance, plumping, etc) and physical properties of the finally prepared crust leather (Tensile strength and Tear strength) were also improved with the use of concentrated protease. There was remarkable reduction in BOD, COD and TDS of effluent produced as a result of enzymatic treatment.

Keywords: Pollution, effluent, tannery, depilation, enzymatic, protease.

Oral presentations

Track 4

O.4.1. PYROLYSIS OF PLASTIC WASTE INTO FUEL OIL: KINETICS AND PRODUCTS DISTRIBUTION

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Abstract

This work is focused on the use of a metal impregnated molecular sieve for pyrolysis of polypropylene waste using thermogravimetry and pyrolysis gas chromatography-mass spectrometry. Ozawa Flynn Wall, Tang Wanjun and Coats-Redfern (modified) methods were used for finding out kinetics parameters of the pyrolysis reaction. The lowest activation energy observed confirms the suitability of the catalyst for the pyrolysis reaction. Therefore, the pyrolysis of polypropylene in the presence of same catalyst was performed in an indigenously made furnace. The process involves simple unit operations associated with a liquid fuel production of more than 70% with a wide range of hydrocarbons. Moreover, a few useful aliphatic hydrocarbons were also observed in the gaseous fraction. It was observed that the catalytic degradation of polypropylene performed in an indigenously made furnace in the presence of metal impregnated molecular sieve provides a better selectivity in the product distribution and was demonstrated to be a useful method for the production of potentially valuable hydrocarbons. Finally, the pyrolysis oil composition was compared to the standard parameters of diesel, gasoline and kerosene oil and concluded that pyrolysis oil from polystyrene waste have potential application replacing fuel oil.

O.4.2. BIOCHEMICAL CHARACTERIZATION OF XYLANASE BY LOCALLY ISOLATED ASPERGILLUS SPECIES

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Abstract

Hemicellulose is major constituent of plant biomass and xylanase hydrolyzes ß-1-4, glycosidic bonds in the structure of xylan. The current study was aimed to optimize the cultural conditions for the maximum production of xylanase by aspergillus species. Enzyme was purified by ammonium sulfate precipitation and gel filtration chromatography. Purified enzyme was used for the characterization of temperature, pH and kinetic parameters. Maximum activity of xylanase was observed after 96 hours of incubation, at 40^0C and 7 pH (2.121 IU/mL/min). Among various carbon source, wheat bran showed maximum xylanase activity (2.155 IU/mL/min) followed by maise bran (2.001 IU/mL/min) and xylan (1.972 IU/mL/min), while saw dust showed least activity (0.124 IU/mL/min). Trypton as a nitrogen source supported higher production of xylanase 1.816 IU/mL/min compared to beef extract (1.749 IU/mL/min). In case of carbon source (wheat bran), maximum production of xylanase was observed at pH 6 (1.977 IU/mL/min), significant xylanase production was observed at pH 5 (1.888 IU/mL/min) and at pH 4 also (1.841 IU/mL/min). After addition of nitrogen source (trypton) maximum xylanase production was obtained at pH 5 (1.788 IU/mL/min), significant activity at pH 6 (1.712 IU/mL/min) and at pH 7 also (1.703 (IU/mL/min). The presence of 20 % ammonium sulphate gave maximum precipitation with activity 1.171 IU/mL/min and activity increased upto 2.224 IU/mL/min after gel filtration chromatography. Optimum pH and temperature of enzyme were 5 and 50 ^{0}C respectively. The activity of xylanase was inhibited by $ZnSO_4$ and $FeSO_4$ while it was stimulated in the presence $CuSO_4$ and $CaCl_2$. The activity of enzyme was enhance in the presence of organic solvents like glycerol and methanol while decreased ethanol and isopropanol. The activity was slightly decreased by 0.25 % SDS. Xylanase activity was decreased with the increasing concentration of inhibitor (EDTA). The Vmax and Km of xylanase were calculated as 4409.17 µM/mL /min and 1.982 mM respectively.

Keywords: Xylanase, hemicellulose, xylan, wheat bran, ammonium sulfate

O.4.3. SIMULTANEOUS *PRETREATMENT* AND BIOHYDROGEN PRODUCTION FROM WHEAT STRAW BY NEWLY ISOLATED LIGNINOLYTIC BACILLUS SP. STRAINS WITH TWO-STAGE BATCH FERMENTATION SYSTEM

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Abstract

Biodegradation of agribiomass especially wheat straw to biohydrogen and biomethane is an encouraging approach to the current waste management problem. To do so, the biomass must first be pretreated to break down lignin thereby increasing accessibility of the substrate to fermentative organisms. In the current study, out of 20 isolates from the granular sludge of full-scale anaerobic digester, four ligninolytic Bacillus sp. strains were selected based on their lignin and Azure B degradation. Further among the four isolates, Brevibacillus agri AN-3 *exhibited the highest of 88.4 and 78.1%* decrease in COD *of lignin and Azure B* respectively. These strains were also found to secrete optimum yields of lignin peroxidase (LiP) at pH 3, laccase (Lac) at pH 5, xylanase and cellulase enzymes at pH 7. The strains demonstrated maximum activity of Lip and Lac at 50 °C and xylanase and cellulase at 60 °C after 72 h growth. Among the four strains, Brevibacillus agri AN-3 showed hydrogen (H_2) yield of 1.34 and 2.9 mol-H_2/mol from xylose and cellulose respectively. In two-phase wheat straw batch fermentation, Brevibacillus agri AN-3 produced 88.3 and 283.7 mL/gVS cumulative H_2 and methane (CH_4) respectively. Biotreatment with ligninolytic Bacillus sp. strains perceived that 261.4 % more methane yield could be obtained from the wheat straw than using the untreated wheat straw in batch fermentation. This is the first study establishing not only the hydrogen potential of ligninolytic Bacillus sp. strains but also indicates a vital role of these species in developing standard inoculum and a biocatalyst for processing agribiomass.

Keywords: anaerobic ligninolytic; fermentation; Bacillus sp. strains; lignocellulosic waste biomass

O.4.4. PRODUCTION, PURIFICATION AND CHARACTERIZATION OF EXOGLUCANASE FROM LOCALLY ISOLATED *ASPERGILLUS FLAVUS*

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Abstract

Lignocellulosic biomass is considered as plentiful organic raw material in the world. Due to the depletion of oil reserves and shortage of food the consumption of cellulosic biomass is considered to be a subject of worldwide interest. The current study was aimed to optimize the cultural conditions for maximum production of exoglucanase by Aspergillus flavus. Wheat straw was used as a substrate. The parameters were optimized like incubation period, pH, temperature, substrate level, moisture level, inoculum size, addition of various readily available carbon and nitrogen source for higher yield of exoglucanase enzyme. By gel filtration chromatography and ammonium sulphate precipitation, enzyme was partially purified. The enzyme that is purified has been characterized for optimum pH and temperature. Effect of different metals ions, effect of solvents, effect of inhibitors, and effect of non-ionic surfactants on enzyme activity was also monitored. The maximum activity of exoglucanase was observed at 72 hour of incubation, 40ºC, 7 pH, 5mL, inoculum size, 60 % moisture level, 8g substrate level. Different combinations of nitrogen and carbon sources had no effect on the production of exoglucanase. The maximum exoglucanase activity was conferred by adding 70% ammonium sulphate. Exoglucanase activity was increased by Mn^{2+}, Cu^{+2}, Co^{+2}, Ca^{+2}, Mg^{+2} while Zn^{+2} slightly decreased exoglucanase activity. Hg^{+2} and Fe3+ was inhibited the exoglucanase activity.

O.4.5. COMPARISON OF BIODEGRADATION POTENTIAL OF SELECTED DISPERSE TEXTILE DYES BY DAEDALEA DICKINSII IEBL-02 AND PIPTOPORUS BETULINUS IEBL-03 AND STUDY OF LIGNINOLYTIC ENZYMES

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Abstract

Current study was designed to investigate the ability of *Daedalea dickinsii* IEBL-02 and *Piptoporus betulinus* IEBL-03 to decolorized disperse textile dyes. Biodegradation of disperse Yellow SRLP, and disperse Red S3B was monitored along with secretion of lignolytic enzymes. The decolorization process was observed for 10 consecutive days with the analysis of process on each day. The results showed that *Daedalea dickinsii* IEBL-02 (70-75 %) has the more potential of biodegradation of above mentioned disperse dyes while *Piptoporus betulinus* IEBL-03 (47-53 %) has the least. The biodegradation process of dyes was optimized by Response Surface Methodology with *D. Dickinsii* IEBL-2 and more than 85 % biodegradation was achieved. The study of ligninolytic enzymes i.e. lignin peroxidase, manganese peroxidase and laccase showed that *D. dickinsii* IEBL-02 produced most active enzymes. Higher enzymatic activities related with more degradation indicated that these are involved in decolorization process. Enzymes showed maximum activities at 30 ^{0}C and pH 5.8 with good affinity towards their substrates as indicated by values of Km and Vmax. This study will bring the attention of other scientist to use brown rot fungi for the treatment of wastewater.

Keywords: Response Surface Methodology, Ligninolytic enzymes, Wastewater, textile dyes

O.4.6. BIOCATALYTIC *DEGRADATION* OF VARIOUS DYES BY A NOVEL PEROXIDASE FROM SOYBEAN

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Abstract

Peroxidases are emerging as an important class of enzymes that can be used for the efficient degradation of textile and non textile dyes. The present study revealed the potential of soybean peroxidase towards degradation of series of dyes such as Brilliant Yellow, Methyl Blue, Naphthol Blue Black, Congo Red, Tartrazine, Rhodamine B, Toludine Blue, Orange G, Naphthol Yellow, Trypan Blue. Recalcitrant dyes could also be mineralized by soybean peroxidase in the presence of redox mediator. It was also observed that Soybean Peroxidase could be successfully immobilized in Polyacrylamide gel and used up to 6 times without significant loss of activity. In order to confirm the dye degradation HPLC-DAD and LC/MS studies were carried out to and analyzed the intermediate metabolites. The results showed that Soybean peroxidase causes Trypan Blue degradation via symmetrical azo cleavage and subsequent radical-initiated ring opening of the metabolites. Hence, plant peroxidases are easily available, inexpensive and ecofriendly biocatalysts for the treatment of wastewaters containing a wide spectrum of textile and non-textile synthetic dyes.

Keywords: Dyes; Peroxidases; Degradation; Wastewaters

O.4.7. TOPOPYRONE C DERIVATIVES, CREDIBLE TOPOISOMERASE-1 ENZYME INHIBITORS

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O.4.8. ENHANCED ETHANOL *PRODUCTION* FROM LIGNOCELLULOSIC WASTES BY AN INDIGENOUSLY ISOLATED MIXED CULTURE OF SACCHAROMYCES AND CANDIDA USING BOX BEHNKEN DESIGN

Shagufta Kamal[1*]· Ismat Bibi[2] · Abdullah Ijaz Hussain[3] · Naheed Akhter[4]· Razia Noreen[1,] Saima Rehman[3] Tanvir Ahmed[5] · Sumbel Maqsood[1] · Nadeem Abbas Faisal[3]

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Abstract

Corn stover is readily available due to the proximity of corn grain and hence can be the prime source of bioethanol. High degree of complexity due to mixed composition of non-homogeneous fiber is the main hurdle in its use. In the present study, corn stover has been used for bioethanol production using statistically optimized simultaneous scarification and fermentation by locally isolated and identified strain of Aspergillus niger Saccharomyces cerevisiae (IBL-01) and Candida *cantarellii (IBL-01)*. Regression analysis and Box Behnken design (3 significant factors at 3 levels) were used to analyze the effect of the process parameters i.e. temperature 35ºC to 41 ºC, pH 4.5-7.5 and inoculum size 1mL to 5mL on the final yield of ethanol. NaOH pre-treatment increased cellulose composition by 19.53% accompanied by 13.98% decrease of lignin contents. HPLC analysis revealed that concentration of glucose 2.45 mg/mL, mannose 1.67 mg/mL, fructose 1.008 mg/mL after saccharification with Aspergillus niger whereas the activities of exoglucanase, endoglucanase, and β-glucosidase were 41.3 ± 1.31, 53.5 ± 1.24 and 46.8 ± 1.43 U/mL respectively. Every step in SSF decreased the degree of polymerization and crystallinity of corn stover which was confirmed by SEM analysis. The results showed that maximum ethanol concentration obtained after SSF was 18.50mg/100mL ± 1.00 after 6h at 35 ºC with 5mL inoculum

and pH 6. The results suggested that BBD using indigenously isolated microbe is a useful tool for optimum yield of bioethanol from agro-industrial wastes.

Keywords: Corn stover, Bioethanol, Regression analysis, Box Behnken design.

O.4.9. PURIFICATION AND IDENTIFICATION OF PEPTIDES WITH INHIBITORY EFFECT AGAINST ANGIOTENSIN-I CONVERTING ENZYME GENERATED FROM GOAT MILK

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O.4.10. ISOLATION AND CHARACTERIZATION OF THIOPHENIC COMPOUND DESULFURIZING BIOCATALYSTS FROM OIL CONTAMINATED SITES

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Abstract

Combustion of sulfur loaded fossil fuels releases a great amount of sulfur oxides into atmosphere that causes environmental pollution and serious health problems. To reduce the sulfur levels, chemical process of hydrodesulfurization (HDS) is being used in oil refineries; however, this process demands high operating conditions and is inefficient in removing sulfur from recalcitrant thiophenic compounds such as dibenzothiophene (DBT). Biodesulfurization is a potential complementary technology to HDS process as it operates under mild conditions and removes thiophenic compounds that are resistant to HDS. The aim of current study was to isolate and characterize the potential DBT desulfurizing biocatalysts from oil contaminated sites. For this purpose a total of 51 soil, sand, water and sludge samples were collected from the oil contaminated areas of OGDCL Rajian, Chakwal. The samples were enriched in selective media containing DBT as a sole source of thiophenic sulfur and about 40 pure bacterial isolates were obtained from these mixed cultures. Among 40 pure cultures, seven isolates (W3SN5, W3SN4, W3SL1, W3SN2, W3SN1, W3S2-P9 and W3S5) were able to convert DBT into 2-hydroxybiphenyl (the end product of DBT desulfurization 4S pathway) as determined through Gibb's assay and HPLC analysis. The isolated DBT metabolizing biocatalysts were characterized through 16S rRNA gene sequencing followed by nucleotide BLAST homology search and phylogenetic analysis (MEGA 5). Six of the isolated biocatalysts showed 99-100% 16S rRNA gene sequence homology to different species of the genus *Gordonia* while the isolate W3SN5 showed 100% 16S rRNA gene sequence homology to *Kocuria polaris*. Phylogenetically the isolates W3S2-P9, W3S4, W3SN1, W3SN2 and W3SL1 formed a separate group with different species of genus *Gordonia* including *G. terrae*, *G. hongkongensis* and *G. didemni*. However, isolates W3SN4 and W3S5 formed a separate group with *G. alkanivorans*, *G. amicalis*, and *G. rubripertincta.* The isolate W3SN5 formed a completely separate clade with *Kocuria Polaris.* The 16S rRNA gene sequences of these isolates were

submitted to GenBank under accession numbers MH569666-MH569672. The capabilities of the isolated biocatalysts to survive and efficiently desulfurize the thiophenic sulfur containing compounds like DBT make them potential candidate for biorefining of oil in terms of sulfur removal.

O.4.11. COMPARISON OF BIODEGRADATION POTENTIAL OF SELECTED DISPERSE TEXTILE DYES BY DAEDALEA DICKINSII IEBL-02 AND PIPTOPORUS BETULINUS IEBL-03 AND STUDY OF LIGNINOLYTIC ENZYMES

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Abstract

Current study was designed to investigate the ability of *Daedalea dickinsii* IEBL-02 and *Piptoporus betulinus* IEBL-03 to decolorized disperse textile dyes. Biodegradation of disperse Yellow SRLP, and disperse Red S3B was monitored along with secretion of lignolytic enzymes. The decolorization process was observed for 10 consecutive days with the analysis of process on each day. The results showed that *Daedalea dickinsii* IEBL-02 (70-75 %) has the more potential of biodegradation of above mentioned disperse dyes while *Piptoporus betulinus* IEBL-03 (47-53 %) has the least. The biodegradation process of dyes was optimized by Response Surface Methodology with *D. Dickinsii* IEBL-2 and more than 85 % biodegradation was achieved. The study of ligninolytic enzymes i.e. lignin peroxidase, manganese peroxidase and laccase showed that *D. dickinsii* IEBL-02 produced most active enzymes. Higher enzymatic activities related with more degradation indicated that these are involved in decolorization process. Enzymes showed maximum activities at 30 ^{0}C and pH 5.8 with good affinity towards their substrates as indicated by values of Km and Vmax. This study will bring the attention of other scientist to use brown rot fungi for the treatment of wastewater.

Keywords: Response Surface Methodology, Ligninolytic enzymes, Wastewater, textile dyes

O.4.12. SYNTHESIS OF WOOD PLASTIC BIO COMPOSITES INDUCED WITH BIO-WASTE MATERIAL

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Abstract

PVC is the third abundantly used thermoplastic polymer. It is widely used in many valuable products. The bio-waste is one of the major sources of raw materials available in various forms. The plant generated bio-waste is a cheap and abundant source of filler to produce the bio-composites. Wood Plastic Bio Composites (wpbcs) was made of wood fiber and thermoplastic materials including Poly Vinyl Chloride (PVC). In the present study the bio-waste consisting of rice husk was used for the synthesis of biocomposites containing PVC as matrix. The different series of PVC films was synthesized by using various molecular weight of PVC. The PVC films of different thickness were prepared. The biocomposites was prepared using rice husk, which was varied in weight percentage (wt. %). The quantity of filler was optimized in order to obtain the maximum output. The synthesized samples were subjected to the structural characterization by using IR, TGA and DMA. The results of TGA revealed that in the PVC/ rice husk composite of lower molecular weight (48,000 g/mol) the thermal stability was increased up to 10 %. While PVC/rice husk composites of higher molecular weight (62,000 g/mol) the thermal stability was decreased up to 10 % as compared pure PVC films. The results of DMA revealed that in the PVC/rice husk composite composite of lower molecular weight (48,000 g/mol) the storage modulus was increased up to 25%. While composite of higher molecular weight (62,000 g/mol) the storage modulus was decreased up to 20 % as compared with pure PVC films.

Keywords: Biowaste, Poly vinyl Chloride, FTIR, TGA, Mechanical properties

O.4.13. SORPTION OF CRYSTAL VIOLET FROM AQUEOUS MEDIA BY BIOCOMPOSITES

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Abstract

Batch study was performed to investigate the potential of saw dust (SD) and it's biocomposites for the removal of crystal violet from contaminated aqueous media. Different composites with polyaniline (PAN/SD), polypyrrole (Ppy/SD), sodium alginate (Na-Alginate/SD) were synthesized and used as efficient adsorbent for removal of crystal violet from water. The effect of different process parameters such as contact time, temperature, adsorbent dose, pH and initial dye concentration has been evaluated. The results indicated that maximum adsorption capacity was observed at pH 7 for SD and Na-Alginate/SD while at 6, 8 for Ppy/SD and PAN/SD respectively. Temkin, Freundlich, Langmuir, Harkins Jura and Dubinin-Radushkevich isotherm models were applied to experimental equilibrium data of dye. Different kinetics models like pseudo first and second order were applied. It was observed that pseudo second order was best fitted to experimental data. Thermodynamics parameters of adsorption like Free energy change (□G), enthalpy change (□H) and entropy change (□S) were also calculated, which proved the exothermic and spontaneous nature of reaction. The FTIR results showed the presence of different groups like amino, hydroxyl and carboxylic acids on the surface of biosorbents. The results indicated that saw dust and its composites could be used for the remediation of crystal violet containing wastewater.

Keywords: Crystal violet; Removal; Kinetics; Saw dust; Thermodynamics

O.4.14. MUTAGENESIS OF BACILLUS SUBTILIS AND THE PROCESS OPTIMIZATION FOR PRODUCTION OF BIOSURFACTANT

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Abstract

Biosurfactants are biologically active compounds produced by different microbial strains having hydrophilic and hydrophobic compounds. They are best known for its ability to reduce surface tension and help two immiscible solvent to dissolve properly by reducing their surface tension. They are best competitor of synthetic surfactant in term of safety, low toxicity, high biodegradability and eco-friendly nature. It is used in many industries as emulsifiers, conditioners, cosmetics and food industries. In this study, Bacillus subtilis was used for the production of high quality biosurfactant with low production cost and maximum yield. To enhance the yield of biosurfactant, mutagenesis of Bacillus subtilis was done using ethidium bromide at different concentration. Best producing mutant strain (42.46 ul/mL) was selected with high yield of biosurfactant. Optimization was done using response surface methodology (RSM) under central compost design (CCD). Maximum biosurfactant production was 49.65 ul/mL at pH 7, inoculum size 3 mL, incubation time 72 hours and 30^{o}C temperature. Presence of biosurfactant was conformed by using different test such as emulsification index and oil displacement. In this study waste automobile oil was used for the production good quality biosurfactant. This can be the best method for the production of useful and environment friendly compounds and help to overcome environmental pollution.

TRACK 5

Chemical and Plant Sciences

TRACK COMMITTEE

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Keynote LECTURES

Track 5

K-5.1 Synthesis and characterization of magnetic poly (acrylic acid) hydrogel fabricated with cobalt nanoparticles for adsorption and catalytic applications

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In this study, magnetic poly (acrylic acid) hydrogel was prepared by free radical polymerization reaction. The hydrogel was then fabricated with Cobalt nanoparticles by loading Co (II) ions from aqueous solution and their subsequent reduction with $NaBH_4$. Fabrication of Co nanoparticles in hydrogel resulted in magnetic characteristics and also increased the adsorption capacity. The hydrogel was characterized by Fourier Transform Infrared Spectroscopy (FT-IR) and Transmission Electron Spectrometry (TEM).The hydrogel was used as an adsorbent for removal of methylene blue from aqueous solution. 98% removal of methylene blue was achieved. Three adsorption isotherms were applied to the adsorption data. Results showed that Fruendlich isotherm model was followed with R^2 (0.95). The application of pseudo first order and pseudo second order kinetics on the adsorption data revealed that pseudo second order kinetics was followed in this case. The hydrogel was also used for catalytic reduction of a toxic pollutant i.e.4-Nitrophenol. The reduction of 4- Nitrophenol followed pseudo first order kinetics. Activation energy and k_{app} were calculated as 13.35 kJ/mole and 0.24 min^{-1} respectively. Recycling of the magnetic poly (acrylic acid) hydrogel fabricated with Cobalt nanoparticles was carried out for four consecutive cycles and no significant loss in catalytic activity was observed.

K-5.2 Potential of soil extracted Humic acids on mineral nutrients Uptake

Tajnees Pirzada

The investigation was carried out for evaluation of binding ability of humic acid (HA) with the nutrients metal ions. HAs were extracted from local agriculture lands by International Humic Substances Society (IHSS) method. HAs were characterized by UV-Visible spectroscopy to analyse the ability of isolated HAs binding with K(I), Zn (II) and Fe (III) ions Then the complexes of isolated humic acids and Aldrich Standard HA with potassium, zinc and ferric ions were prepared. pH was optimized for the maximum complexes formation wa found 8, 7 and 6 respectively. Concentration of nutrient ions were detected in isolated HAs as well as its complexes by Atomic Absorption Spectrophotometer (AAS). Moisture and electrical conductivity (EC) indicated the better water holding ability of soil and texture indicated silt- loam type. Alkaline pH values proved good fertile soil, beneficial for crop. The optical parameter E_4/E_6 ratio indicates molecular condensation of extracted HAs possessing high molecular condensation, hydrophilic and aromatic nature. Finally the presence of higher concentration of metal ions expressed the chelating capability of HAs.

K.5.3 Phytosanitary risk management program in pakistan – next generation pest management and aflatoxins determination in horticultural commodities

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Food security is one of the main issues of growing population in current century. Horticulture which is an important subsector of agriculture in Pakistan deals with majority of dietary ingredients necessary for human health. Recently high infestation of certain pests and contamination of horticultural produce with aflatoxins – *Aspergillus flavus* resulted in reduced production and less exports from country. CAB International through its project "Phytosanitary Risk Management Program in Pakistan (PRMP)" initiated its interventions to cope with these issues. The objective of the program was to strengthen the capacity of national agricultural system to deploy next generation pest management techniques with special reference to biological control of pests of concerns and to determine the prevalence of aflatoxins along supply chain of selected horticultural commodities. PRMP executed biological control program in Sindh, Balochistan and Gilgit Baltistan. The technologies were developed in Biological Control Laboratories established at all project sites in collaboration with local stakeholders (Department of Agriculture Research & Extension in each province). Project enhanced capacity of farmers, traders and national officials to support and implement PRMP interventions. Deployed technologies resulted in complete eradication of papaya mealybug from Karachi and 1st reports of establishment of biocontrol agents of giant mealybug at farmer's field in Skardu region. While efforts for fruit fly in Gilgit region and for apple codling moth and spider mites in Balochistan are being continued. Besides these, comprehensive surveys for selected horticultural commodities (Chili and Maize) were conducted in Punjab and Sindh, and samples were subjected to NGS tool aid screening for aflatoxins determination. The NGS study was broadened to incorporate metabarcoding (using ITS and 16S) to determine the microbial biodiversity of the soil samples and screening for the presence of toxigenic strains. Moreover, whole genome sequencing (WGS) with low coverage techniques was employed to screen the isolates for molecular differences in the ribosomal RNA gene cluster and

mitochondrial genome. Localities with aflatoxins contamination were determined and categorized based on genomic analysis. Successful implementation of PRMP will result in enhanced capacity of national agricultural system to implement biological control programs for target pests and to design further studies on aflatoxins mitigation in country.

Key words: Aflatoxins, Biological Control, NGS Tools, Whole Genome Sequencing, PRMP.

ORAL PRESENTATIONS

Track 5

O.5.1. GUAIACOL PEROXIDASE EXPRESSION UNDER SALINITY STRESS IN TWO ECOTYPES OF *VETIVERIA ZIZANIOIDE*

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Abstract

On exposure to various abiotic stresses plants activate a complex set of defense activities that ultimately leads to morphological, physiological, biochemical and metabolic changes. Main focus of this study was to document variations in the expression profile of an antioxidant enzyme, Guaiacol peroxidase (GPX), in two ecotypes of a Cholistan desert grass, Vetiveria zizanioide, on exposure to various levels of salinity stress (0 to 350 mM NaCl). Plants were grown hydroponically. Various morphological, physico-chemical and biochemical features were examined and the data was analyzed statistically. Plant proteins extracted in phosphate buffer (pH 7) were quantified using Bradford assay. The crude extracts were subjected to quantitative assays to document activity of GPX. GPX isoform expression profile was established using enzyme specific native gel electrophoresis assays. Gel images were subjected to densitometric analysis that helped to identify 8 isoforms of GPX in both ecotypes. Among eight isoforms GPX-1, 2, 6 and 8 appeared to be involved in stress management and tolerance. Interestingly, in almost all tissues the pattern of isoforms expression was associated with the strength of the applied salt stress. The information thus obtained provides some insight but also demands further investigation to explore these responses at molecular levels.

Keywords: Vetiver grass (Vetiveria zizanioide), Abiotic stress, Antioxidant enzymes/isozymes, Guaiacol peroxidase (GPX), Zymography.

O.5.2. BIOCHEMICAL DIAGNOSIS OF CITRUS HUANGLONGBING AND ELIMINATION OF *CANDIDATUS* LIBERIBACTER ASIATICUS BY USING PENICILLIN

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Huanglongbing (HLB), also known as citrus greening, is one of the most devastating diseases of citrus worldwide menacing the survival of Pakistan and world's citrus industry. HLB is caused by different species of *Candidatus* Liberibacter bacterium: *Candidatus* Liberibacter asiaticus, *Candidatus* Liberibacter americanus and *Candidatus* Liberibacter africanus. The bacterium is transmitted from one plant to other by psyllid vector and through budding/grafting of infected plant material. As potential control strategies for citrus HLB, the effectiveness of different doses of penicillin including 25ppm, 50ppm, 75ppm and 100ppm in solution form were evaluated on HLB infected scions grafted on rough lemon. Infected grafts were immersed in penicillin solutions for 2, 4, 6 and 8 hours. Biochemical analysis for the elimination of bacterial pathogen from treated sprouts was performed using iodo starch test. Survival of disease free scion after the treatment with antibiotic is landmark for HLB management. Our results revealed that scions immersed for 8 hours in 25ppm solution of penicillin provided the highest efficiency in graft survival, sprouting and suppressing the HLB. This may provide a useful tool for the management of citrus HLB.

Keywords: Asian citrus psyllid, Citrus greening disease, Gram negative, Iodo starch test

O.5.3. EFFECT OF ARBUSCULAR MYCORRHIZAL FUNGI TO REDUCE SALINITY STRESS IN PEA PLANT

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Abstract

Present research project was focused on testing the salinity stress conditions on Pisum sativum plants as a result of inoculation of Arbuscular Mycorrhizal fungi. A green house pot experiment was performed where three salt treatments were used. There were two experimental sets; one was provided with salt concentrations and inoculum of Arbuscular mycorrhizal fungi and other was non-inoculated and provided with different salt concentrations. Three different concentration of sodium chloride T1, T2, and T3 (100mM, 200mM and 300mM) were prepared. Autoclaved soil was used as a medium to grow the Pisum staivum. Different salt treatments were applied after two weeks of planting seedlings. Growth parameters eg. Root and shoot lengths, and root, shoot fresh weight were analyzed among different treatments and also compared with the controls. The chlorophyll and carotenoid content were also analyzed. Percentage root colonization of the inoculated samples was also tested. The samples of set 1 showed increase in fungal colonization as it was inoculated with AM fungi. The AM inoculated samples T1, T2 and T3 showed a trend of decrease in fungal colonization,but this decrease in colonization was not significant. The Chlorophyll and carotenoid contents were increased in AM inoculated salt treated plants as compared to the control treatments. The lower Na^+ accumulation in the leaves was observed in the AM inoculated salt treated plants as compared to the un-inoculated salt treated plants. The activities of the anti-oxidant enzymes (Catalase and ascorbate peroxidase (APX) enzymes) were also improved in the AM inoculated salt treated plants as compared to the control treatments. It was suggested that specific Arbuscular Mycorrhizal Fungi could be used in reducing salt stress in Pisum staivum plants.

O.5.4. IMPACT OF HARVEST MATURITY ON BIOCHEMICAL COMPOUNDS, ANTIOXIDANTS AND SENSORY CHARACTERISTICS OF KINNOW MANDARIN FRUIT UNDER EXTRA DOSES OF POTASSIUM AND PHOSPHORUS NUTRIENTS

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Abstract

Kinnow mandarin is the prime citrus cultivar of Pakistan having pleasant taste and high nutritional value. Fruit quality (external and internal) is an important criteria particularly for export markets. Present study was aimed to evaluate the effect of phosphorus and potassium nutrients on quality of fruit and optimize its harvest maturity with maximum properties. Young Kinnow trees were treated with extra doses (600g and 1200g) of potash and phosphorus contained fertilizers at the time of fruit setting. Fruits were assessed for external as well as internal quality parameters at three times of fruit maturity (fifteen days' interval). Second harvest gave better results in terms of all parameters while, biochemical attributes (TSS, TA %, ascorbic acid, pH) were higher in potash treated treatments as compared to control (farmer practice). Fruits were presented to the panel of judges for sensory evaluation (taste, aroma, flavour and texture) at three times of harvesting; all sensory characters were found to be improved in all treated plants and taste with maximum score at third harvest. However, phytochemicals; antioxidant activity (DPPH %) and total phenolic contents (mg GAE/ 100 mL) increased up to second harvest while declined in third harvest. In conclusion, fruit quality (biochemical, phytochemicals) was improved with potash treatment followed by phosphorus as compared to control. Furthermore, second time of harvest gave best results, with delayed harvesting nutritional profile started declining.

O.5.5. CHARACTERIZATION OF LARVICIDAL ACTIVITY OF BIOGENIC NANOPARTICLES

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Abstract

Synthesis of green nanoparticles (NPs) is a one of the most emerging field of Nano biotechnology. Plant extracts are used for the synthesis of green NPs. Green silver nanoparticles are used as vector mosquito control agent against *Aedes agypti*, vector of Dengue. Silver NPs are more effective than Gold or any other metal because they have property of high stability. $AgNO_3$ solution was mixed with appropriate amount of Crude Methanolic Extracts (CME) of *Eucalyptus globulus* and *Curcuma longa* to form green AgNps with vigorous shaking. Characterization of these green AgNps is done with U/Visible Spectroscopy for confirmation of silver nanoparticles and Scanning Electron Microscope (SEM) to analyze the nanoparticle size and shape. Both samples showed absorbance between 420-430nm. SEM results showed spherical shape of green silver nanoparticles. The size of nanoparticles of *Eucalyptus globulus* is approximately is 25nm and the nanoparticles of *Curcuma Longa* are of 15nm. These Green NPs were proved to be very effective against 3rd and 4th larval stage of *Aedes agypti* as they are eco-friendly, less harmful and have strong larvicidal activity. Overall AgNPs of both plants exhibited significant larvicial activity.

Keywords: Green synthesis**,** Nanoparticles, Dengue, Larvicidal, Characterization, Silve

O.5.6. A STUDY OF PARAPINOPSIN IN AMPHIBIANS

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Abstract

Parapinopsin (PNP) is a novel non-visual pigment protein found in lower vertebrates. PNP protein is similar in function to the human visual pigment protein rhodopsin, found in the eye. The aim of project was to characterize PNP in different frogs species to understand more about PNP as little is known about its structure and function. Tadpole cDNA from different frogs species (*X.laevis, Rana temporaria* and *Rana tigrina*) were used during the project. The cDNA sequencing results of *X. laevis* showed 100% homology but *R. temporaria* and *R. tigrina* showed ~99.9% similarity with *X. tropicalis*. The 0.1% dissimilarity is due to a point mutation from G to A at the 2nd position in the 156th codon. Genomic DNA sequence study results revealed a heterozygosity in *R. temporaria* and a point mutation in *R. tigrina* PNP. This point mutation is very important as it creates a stop codon possibly resulting in protein truncation. Western Blotting results support the cDNA study results with a 37 kDa protein band of PNP in the *X. laevis* protein sample only. Bioinformatics softwares were used to study evolutionary genetics and to predict the 2D structural elements and a 3D structural model for PNP from *X. laevis*. For protein expression studies the coding sequence of PNP gene was chemically synthesized and cloned into the vector pASKGPCR for expression in *E. coli*. The aim of this study was to overexpress and purify the protein for functional studies as well as structural studies using X-ray crystallography and high field NMR.

O.5.7. COCONUT WATER AS SOURCE OF CYTOKININS FOR MICROPROPAGATION OF PLANTS

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Abstract

Plant biotechnology provides innovative tool for large scale production of horticulturally important plants via various tissue culture techniques. In vitro multiplication facilitates the production of genetically identical plants. Bougainvillea glabra is known for its bright colored showy flowers therefore, largely used in landscaping. Present research deals with in vitro multiplication of Bougainvillea glabra on MS medium and use of these in vitro multiplied plants as a continuous source of explant for callogenesis. Various concentrations of coconut milk with 2,4-D were investigated for callogenic response. In addition, biochemical analysis for protein content, peroxidase activity and auxin content were carried out with naturally growing, in vitro growing and callus of B. Glabra. Extracted proteins were then analyzed through SDS-Polyacrylamide gel electrophoresis. Cell suspension cultures were also grown to carry out cell count. Our findings revealed that coconut milk with 2,4-D showed better callogenic response using nodal and leaf explants. Rate of callus proliferation varies with the changing concentrations of growth regulators, emphasizing the use of best concentrations and combinations of growth regulators for large scale in vitro multiplication of Bougainvillea glabra. Biochemical analysis of naturally grown, in vitro grown and calli of B. Glabra showed that exogenous hormonal concentrations affect the auxin and protein content as well as peroxidase activity.

Keywords: Bougainvillea glabra, callogenesis, coconut water, cytokinins, micropropagation, 2,4-D

O.5.8. PLANT BASED VACCINES: PROMISING CANDIDATES FOR THE PREVENTION OF VARIOUS POULTRY DISEASES IN FUTURE

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Abstract

Plant-based vaccines are now new way to tackle some of the major threats that are being linked with traditional vaccines in some developing countries. Plant-based vaccines are of recombinant categories in which immunogenic genes are used and extracts of transgenic plants are administered to the birds orally producing antibodies in large quantity against a particular disease. Plant-based oral vaccines are advantageous and economical because of low manufacturing cost. Due to temperature stability they do not need to be cold stored and can easily be stored up to a year in lyophilized form. Their oral route of administration is more convenient for animals and poultry and plant expressed vaccine antigen in maize, rice, soybean and potato can be given as part of feed for animals with adjuvant priming. Bio-encapsulated plant-based vaccines can be used to deliver multiple antigens. Unlike traditional vaccines they are free of associated toxins and pathogens and can easily be scaled up for large production. it can induce mucosal immune response and have higher immune response than traditional vaccines. A number of poultry and animal's disease related recombinant bacterial and viral vaccines have been successfully expressed in plants.

Keywords: Plant Based vaccines, Immunity, Transgenic Plants

O.5.9. EFFECT OF MORINGA OLEIFERA LEAF SUPPLEMENTATION ON HEMATOLOGICAL PARAMETERS AND IMMUNE RESPONSE IN COMMERCIAL BROILER CHICKENS

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Abstract

The objective of this study was to evaluate the effect of Moringa oleifera leaf powder on hematological parameters and immune response in broilers. For this purpose, a basal iso-nitrogenous (CP: 20 %) and iso-caloric (ME: 3000 kcal/kg) diet was formulated to act as negative control. The basal diet was supplemented with 50 ppm of zinc bacitracin (positive control), or with Moringa oleifera leaf powder at rate of 1.5 (MLP-1.5), 2 (MLP-2) or 2.5% (MLP-2.5), respectively. Two hundred fifty day-old chicks were divided into twenty five replicates of 10 birds each and distributed to all five treatments randomly. The birds were fed experimental diets from day 3-42. Antibody titers against Newcastle disease was tested using Hemagglutination Inhibition test on day 12^{th}, 23^{th}, and 39^{th}. Blood samples were collected for determination of hematological parameters (PCV and Hb) on day 23^{rd} and 39^{th}. Data were analyzed with GLM procedure of SAS using completely randomized design and means were compared by using Tukey's test. Hemoglobin and packed cell volume on day 23^{rd} was not affected ($P > 0.05$) by dietary treatments. Packed cell volume was higher in positive control than MLP2.5 ($P < 0.05$) at day 39^{th}. Geometric mean values of the antibodies titer against Newcastle disease at 12, 23 and 39 day ranged from 54.4-64, 41.6-128 and 70.4-121.8 respectively, and were not affected ($P > 0.05$) by dietary treatments It can be concluded that supplementation of Moringa oleifera leaf powder in broiler's diet did not affect hematological parameters and immune response in commercial broiler chickens.

Keywords: Moringa oleifera leaf, hematological parameters, immune response, broiler chickens

O.5.10. PHYTOCHEMICAL SCREENING AND ANTIMICROBIAL EVALUATION OF POMEGRANATE PEEL EXTRACT

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Abstract

Pomegranate (*Punica granatum* L.) is very important and commercial fruit crop; extensively cultivated in parts of Asia, North Africa, the Mediterranean and the Middle East. In Pakistan, Punjab and KPK are producing Pomegranate in small amount but the dominant region for pomegranate is Baluchistan. Pomegranate peel that is left over after juice is very important for human health. Pomegranate peel has antioxidant and antimicrobial activites due to allagic acid. The objective of the study was to identify the phytochemicals, antibacterial and antioxidant ability of two Afghanistan varieties of pomegranate peel extract i.e. Spin Trush and Toursha Taki. Toursha Taki variety showed highest antioxidant activity (49.07 %), total phenolic contents (132.72 mg GAE/100g) and antimicrobial activity against four bacteria i.e. *Bacillus subtilis* (40.5cm), *E.coli* (119.12cm), *Pasteurella multocida* (18.82mm) and *S.aureus* (15.65mm). GC-MS of Spin Trush and Turosha Taki of n-hexane extract of pomegranate peel showed 18 and 28 peaks on chromatogram. The major compound of Spin Trush Amino propionic acid 48.12% and the Turosha Taki was showed Hexasiloxane 48.32%. FTIR identified volatile compounds of Spin Trush and Turosha Taki with wavelength 616.16 cm^{-1} and 3317.08 cm^{-1}. It was concluded that the Spin Trush and Turosha showed high value of antioxidant, TPC and having antimicrobial activity against microbes. It was also observed that the Spin Trush and Turosha Taki using GCMS and FTIR was an extremely effective technique for determining the presence or absence of variability of phytochemical and volatile compounds.

Keywords: *Punica granatum*. Antimicrobial activity, Antioxidant activity, Phenolic, GC-MS, FTIR

O.5.11. MERCAPTO-TRIAZOLE PRIMING FOR ALLEVIATION OF CADMIUM TOXICITY IN WHEAT

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Abstract

Cadmium interferes with the calvin cycle, pentose phosphate pathway and biosynthesis of chlorophyll. It reduces soluble proteins, sugars, phenolic contents and antioxidant enzyme activities. Cd induced changes in biochemical attributes results in to physiological, biochemical and genetical disorders in germinating plants. Various natural and synthetic priming agents had been employed as stress management strategy. We have used triazolic compounds as priming agents to evaluate their effects on biochemical attributes in wheat seedlings under Cd stress (5µM). The wheat seeds were primed with 10, 20, 30 and 40 ppm of each triazole. In wheat seedlings, protein contents, SOD, POD, CAT, ascorbate peroxidase, MDA, esterase, protease, TPC, TOS, ascorbic acid,α-amylase and chlorophyll contents were studied under normal and stress conditions and compared with control. Triazole-priming helped to reduce the negative impact of Cd stress on aforementioned biochemical attributes.Almost all triazole treatments induced significant improvement in protein contents, POD, SOD and esterase activity under stress conditions. Priming with different concentrations of triazoles increased CAT, α-amylase activities and TPC contents. All priming treatments significantly reduced the MDA contents. Increase in aforementioned biochemical attributes along with a decrease in MDA contents represent a mitigating effect of triazole priming on Cd toxicity in wheat seedlings.

Keywords: Seed priming; antioxidant enzymes; triazole-priming; Cd stress; wheat

O.5.12. EFFICACY OF HEARTWOOD EXTRACTIVES OF *ALBIZIA LEBBECK (L.) BENTH.* AGAINST SUBTERRANEAN TERMITES

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Abstract

Heart wood extractives of Albizia lebbeck (L.) Benth. (sirin kala) in four solvents (n-hxane, pet ether, ethyl acetate and water at four concentrations (0. 2.5, 5 and 10 mg ml-1) were tested against subterranean termites to compare mortality, antifeedant/repellency and field protection of poplar wooden stakes treated with these extractives. Highest concentration of ethyl acetate extractive proved to be toxic and repellent to termites significantly when compared with other extractives. Poplar wooden stakes were also protected in field exposure to the termites treated with extractive of ethyl acetate either dip or vacuum pressure application methods. Organic solvent extractives imparted significant low weight loss percentage than respective control and water extractives in dipping and vacuum application. Ethyl acetate protected >2 fold as compared to water and other extractives significantly.

Keywords: Extracts, Albizia lebbeck, Termites, Organic solvents

O.5.13. AZO DYES DERIVATIVES FOR ORGANIC PHOTOVOLTAICS

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Abstract

Natural azo compounds isolated from fungi, plant, bacteria, and invertebrates. More than 120 biologically active diazene containing alkaloids demonstrate confirmed pharmacological activity, including antitumor, antimicrobial, and antibacterial effects. A series of low energy gap cis-trans aminoazobenzene based donor molecules with dipropylamine donating group and different electron withdrawing groups (OH, CN, NH_2, NO_2) are investigated for solar cell applications. These investigated molecules are studied computationally at PBE1PBE/ 6-31+G** level of theory using DMSO solvent with CPCM model. Structural properties, UV-Vis absorption spectra, electronic properties, light harvesting efficiency, exciton binding energy and charge transfer properties of 1-4 Cis-Trans molecules are investigated. 4-Cis and 4-Trans molecules have smaller energy gap of 2.91 and 2.69, respectively. Absorption spectra of these dyes also showed red shift with respect to other investigated molecules and reference molecules at 4-Cis λ_{max} of 542.31 nm and 4-Trans λ_{max} of 528.14 nm. Although investigated molecules are good hole transfer while 2-Trans and 4-Trans are the best hole transfer. In 4-Cis and 4-Trans molecules, bond lengths are increased while bond angles and dihedral angles are decreased which showed that structural properties are affected by changing electron withdrawing groups and all investigated molecules showed approximately π-π^* transitions. According to the results, it is justified that how different electron anchoring groups influence the structural and optoelectronic properties. We suggest that investigated donor molecules are appropriate candidates for high performance organic solar cell devices.

Keywords: Density Functional Theory, Organic Solar Cells, Azo Dyes. Optoelectronic properties./

O.5.14. NMR BASED COMPARISON OF BIOACTIVE COMPOUNDS PRESENT IN HUMAN MILK AND COW'S MILK

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Abstract

Milk is often called the "perfect food" Produced from the mammary glands of all peri-parturient female mammals. Milk is rich in key nutrients such as carbohydrates, proteins, fats, minerals and vitamins that are dynamically adjusted to meet the specific developmental needs of growing newborns. While milk is normally a species-specific bio fluid consumed by young mammals belonging to that species but infants of those women who are unable to continue breastfeeding uniquely consume cow milk as a safe alternative to breastfeeding. There are many bioactive substances present in low concentrations in human milk but absent from bovine milk with proven effect on nutrient utilization or other health benefits. These bioactive substances are unable to detect by normal biochemical techniques. In an effort to both detect and substantially differentiate human and cow milk nutrition, we have applied a combination of modern, quantitative metabolomics techniques along with state-of-the-art, computer-aided literature mining techniques to obtain the most comprehensive and up-to-date characterization of the chemical constituents in human and cow's milk. In particular, using nuclear magnetic resonance (NMR) and, gas chromatography mass spectrometry (GC-MS), we were able to quantify and validate more than 25 bioactive that are unique to human milk. Some of these bioactive are not only modulate the immune system of premature or mature newborns but also protect them against infections. NMR-based metabolic profiling can provide a rapid characterisation of breast and cow milk composition, thus allowing a better understanding of its nutritional properties to choose the better option.

Keywords: Milk, Bioactive compounds, NMR

O.5.15. MICROWAVE ASSISTED SUSTAINABLE ISOLATION OF COCONUT HUSK BASED NATURAL COLORANT FOR WOOL DYEING

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Abstract

The natural dyes being used in recent years for dyeing the natural fabric are attributed towards its non-toxic & eco-friendly nature and health concerns. Coconut coir (Cocos nucifera) which contains tannin, has been selected for dyeing of wool fabric. Extraction was carried out using aqueous and acidic media. The extracts and fabrics were irradiated for 1, 2, 3, 4, 5 and 6 minutes. To get optimum results, dyeing of treated and un-treated fabrics were carried out using treated and un-treated extracts. For optimum coloring variable, dyeing of fabric was carried out at 35 to 85^0C, for 35 to 85 minutes using salt concentration of 1-10g/100mLs. For improvement in rating of colorfastness, salts of Iron and Al and Tannic acid as chemical mordants has been employed using optimum extraction and dyeing conditions. All dyed samples were investigated using Spectra Flash SF 600. The results showed that microwave treatment has improved the colour strength onto cotton fabric whereas ISO standard methods for rating of fastness show that chemical mordanting has improved the properties from good to excellent.

Keywords: Cocos nucifera, Chemical mordents, Wool, Microwave radiations

O.5.16. HORIZONTAL TRANSMISSION OF *METARHIZIUM ANISOPLIAE* IN ECONOMICALLY IMPORTANT FRUIT FLY SPECIES (*BACTOCERA* SPP.) IN PAKISTAN AND INFECTIVE EFFICACY OF FUNGUS AGAINST SOME BIOLOGICAL PARAMETERS OF MELON FRUIT FLY.

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Abstract

Fruit flies (*Bactrocera zonata*, *B. dorsals* and *B. cucurbitae*) (Diptera: Tephritidae) have great threat to fruit and vegetables industry in Pakistan. Research experiments were conducted in IPM lab, Dept. of Entomology, UAF, Pakistan. *M. anisopliae* isolate obtained from *USDA-ARS, USA*. Day conidia were tapered on velvet in plastic tube and cover with lid. Equal number of male and female flies of three species were introduced into treated tube separately for 2 to 4 minutes and transfer into non treated separated cages already field with field with adult diet. Respect non-infested males and females were allowed to enter for mating for 24 hours. Results revealed that, infected males and female fruit fly species were able to transmit infection to healthy fruit flies species. Mortality for *B. dorsalis* after infested donor species (81.54%) after 12 days of post inoculation similarly mortality of *B. zonata* (79.69%) after 12 days while *B. cucurbitae* show low mortality (69.67%) after 14 days. Significantly lower fecundity as compared to the untreated flies were observed in treated *B. cucurbiate*. Mean egg hatch for treated females, recipient females, and untreated females of *B. cucurbitae* was 57.23, 63.34, and 69.35 respectively. Finding suggested that horizontal transmission of fungal infection occur during physical contact and mating and these infection also reduced fertility and fecundity of insect pest. Results also concluded that *M. anisopliae* could be incorporated into SIT programme for the control of *B. zonata*, *B. dorsalis* and *B. cucurbitae*.

Keywords: *B. zonata*, *B. dorsals* and *B. cucurbitae*, *M. anisopliae*, horizontal transmission,

O.5.17. EVALUATION OF *MYCOFLORA* ASSOCIATED WITH *PHASEOLUS VULGARIS* IN AJ&K, ITS IMPACT ON GERMINATION AND MANAGEMENT STRATEGIES

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Abstract

Seed of *Phaseolus vulgaris* L. collected from different localities of State of Azad Jammu and Kashmir were evaluated for seed associated Mycoflora by standard blotter paper method and Agar plate method. The seed samples were observed contaminated with fungi belonging to eight genera i.e. *Alternaria* (Nees), *Aspergillus*(Micheli), *Curvularia*(Boedijn), *Drechslera* (S. Ito), *Fusarium* (Link), *Mucor* (Fresen), *Penicillium* (Link) *and Rhizopus*(Ehrenb). The highest infection percentage was recorded from Trarkhal, Bagh and Chakaar samples, i.e. 24.75A, 18.25B and 13.25C respectively. Least infection percentage was observed on Lawaat (3.00H) and Kail (11.8E) samples. Impact of fungal presence on seed germination was elucidated by standard rolled paper towel method. Lawaat and Kail samples show better germination 94% and 92% respectively. Incidence of fungi was recorded high and low germination in Trarkhal and Palangi samples 43% and 22% respectively. Three treatments namely, heat, *Allium sativum* extract and Benomyl(fungicide) were used for Mycoflora management. Use of different antifungal treatments found effective in increasing germination percentage and health of seedlings. Efficacy of management was evaluated by using CRD2 Factorial test. The interaction between treatments and localities was significantly different at 0.05 level of significance. Benomyl was more effective in increasing seed germination with 76.37 mean. Locality of Lawaat shows the highest germination percentage with different treatments having 96.00 mean value. Best interaction was observed between treatment 2 and locality 2, i.e. 98.00 while least interaction was calculated between treatment 1 and locality 6 i.e., 15.00. **S**eed samples of *P. vulgaris* collected from different sites were found contaminated with seed associated

Mycoflora. These fungi reduce the germination percentage and use of different antifungal treatments efficiently increases the germination percentage and reduce the fungal growth. Benomyl found more effective for seed treatment before sowing.

O.5.18. THE EVALUATION OF PRIMARY OR SECONDARY HEADACHE IN DIFFERENT AGE GROUP BY USING COMPUTED TOMOGRAPHY (CT) AS IMAGING MODALITY

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Abstract

Introduction

The most common problem is Headache which some people experience it in early ages or some people experience it in old ages but its causes, duration and severity changes person to person. Headache is classified into two main categories. Primary headaches are those which do not have any underlying cause. They occur naturally caused by stress/tension, cluster headache or migraine. They do not require further CT evaluation. Secondary headaches are those headaches that are associated with underlying organic causes or other brain disorders like brain tumor, hypertension, cerebral hemorrhage, cerebral infarction or the cerebral atrophy etc. According to previous studies, about only 10% headaches are secondary headaches when evaluated by neuroimaging. Neuroimaging includes CT/MRI evaluation.

Objective

To the evaluation of primary or secondary headache in different age group by using computed tomography as imaging modality.

Methodology

All the CT scans related to research were conducted in District Head Quarter Hospital Okara from July 2018-November 2018. Cross section study was conducted on 80-100 patients to evaluate the type of headache either primary or secondary headache in different age group patients by using Hi-tech 16 slice CT scanner. The sampling technique was simple random sampling. History was taken and questionnaire was filled. Scan type was axial. Complementary views were sagittal and coronal. The slice thickness was 4mm. The data analysis was done by using the SPSS latest version. Data was analyzed and the main focus was on the findings causing headache in different

age groups. The p-value was considered as the index for the null hypothesis from the observed outcome, the p-value < 0.05 it was considered as statistically significant.

Results

The study was conducted on 100 patients presented with headache. Out of 100 patients 22% patients had headache due to hypertension and it was 55% in people of age group 21-40 years. 20% patients were suffering from cerebral atrophy in which 50% people were of age 41-60 years and 40% were of age group 61-80 years and 10% were above 90 years. Hemorrhage was seen in 11% of patients and 63.3% people were of age group 41-60 years. Cerebral infarction was present in 12% of patients and 58.3% people were of age group 61-80 years. Brain tumor was present in 8% of people and about 50% of people were of age 41-60 years.15% patients were normal had only stress headache about 60% patients were of age 21- 40 years. Post infection headache was seen in 3% of patients. Post head injury headache patients were 5% Ischemic insult along with cerebral atrophy was present in 1% of patient's .Hydrocephalus and meningitis was seen in 2% and 1% of patients respectively.

Conclusion

It is concluded that most prevalent cause of headache in young age group from 21-40 years is hypertension along with vertigo or vomiting in some cases. Stress is the second cause of headache in young people. Cerebral atrophy is the most prevalent cause of headache in people of age above 40 years. Cerebral infraction and hemorrhage are second most prevalent causes of headache in age above 40 years.

Keywords: *primary headache, secondary headache, age group, computed tomography*

O.5.19.

STUDY OF ANTIBACTERIAL POTENTIAL OF THUJA ORIENTALIS LEAVES ESSENTIAL OIL COLLECTED FROM SEMI-ARID CLIMATE

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Abstract

Thuja orientalis (L.), belonging to family Cupressaceae, is a marvelous, evergreen plant which has been used anciently for its medicinal importance. In the present study, the essential oil of Thuja orientalis (L.) Franco leaves, collected from semiarid climate, was extracted by hydrodistillation. The extraction conditions were optimized in order to get considerable yield of essential oil (0.1%). Initial analysis of these oils by TLC showed the presence of different polarity groups ranging from non-polar terpene hydrocarbons to polar terpenoid alcohols. GC-MS analysis revealed that major component of hydrodistilled essential oil of Thuja orientalis (L.)Franco leaves was a-pinene (17.8%). The antibacterial potential of this essential oil was evaluated against gram positive and gram negative bacterial strains. The results showed that hydrodistilled essential oil of Thuja orientalis is slightly more active against S. aureus as compared to E. coli. The present study emphasize that leaves essential oil of Thuja orientalis (L.) can be used to develop natural antibacterial agents.

Keywords: Thuja orientalis (L.), semi-arid climate, essential oil, GC-MS, antibacterial activity

O.5.20. EVALUATION OF ANTIFUNGAL POTENTIAL OF LEAF EXTRACT OF *CHENOPODIUM MURALE* AGAINST *FUSARIUM OXYSPORUM F. SP. LYCOPERSICI*

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Abstract

The present study was performed to evaluate antifungal activity and GC-MS analysis of leaf extract of Chenopodium mural against Fusarium oxysporum f. sp. lycopersici (FOL), a highly problematic soil-borne pathogen of tomato. Dried leaves of C. murale were extracted with methanol for 2 weeks and after evaporating the solvent on a rotary evaporator, antifungal bioassay was carried out against FOL. All concentrations (1% to 5%) significantly reduced FOL biomass by 14–45%. The remaining methanolic extract was fractioned with n-hexane, chloroform and ethyl acetate and all these fractions were assayed for their antifungal potential. A 200 mg mL^{-1} concentration of various sub-fractions reduced fungal biomass significantly by 94-98% over control. All the sub-fractions were subjected to GC-MS analysis that revealed presence of 32 compounds in n-hexane, 2 compounds in chloroform and 13 compounds in ethyl acetate sub-fraction. The predominant compounds in n-hexane sub-fraction were hexadecanoic acid, methyl ester (14.64%), methyl linolenate (16.61%) and γ-sitosterol (13.53%). In chloroform sub-fraction, bis (2-ethylhexyl) phthalate (92.31% and in ethyl-acetate sub-fraction, ethyl butyrate (19.57%), dihexyl phthalate (11.19%) and dioctyl phthalate (12.16%) were present in higher concentration.

POSTER Presentations

P.1

1.	**Pathophysiological role of glucocorticoid receptor (GR) ligands in acetaminophen induced liver injury in mice** Mehwish Batool[1], Bilal Aslam[1]*, Faqir Muhammad[1], Junaid Ali Khan[1], Sultan Ali[2] and Asif Hussain[1] [1]Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, *Agriculture University* Road, *Faisalabad*, Pakistan. Zip Code 38000 [2]Institute of Microbiology, University of Agriculture, Faisalabad-38000-Pakistan *Corresponding Author email: cba933@gmail.com
2.	**Laboratory-acquired infections and Biological risks mitigation in health biotechnology** Ghulam Rasool[1*], Muhammad Riaz[1], Akhtar Rasul[1,] Arif Muhammad Khan[2] [1]Department of Allied Health Sciences, Sargodha Medical College, University of Sargodha, Sargodha-Pakistan. [2]Department of Biotechnology, University of Sargodha, Sargodha-Pakistan
3.	**Treatment of cancer patients by Methylglyoxal based-formulation.** Awais Ali[*1,] Sana Javeed [1]Department of Biochemistry, University of Agriculture , Faisalabad, Pakistan [2] Islamia University Bahawalpur, Pakistan. Email adress; awaismalik0306@gmail.com
4.	**Evaluation of Bioactive Fractions Extracted Through Organic and Aqueous Solvent From Hamelia Patens Leaves** Iram amir and Zahid Mushtaq Department of Biochemistry, University of Agriculture Faisalabad zahid mushtaquaf@uaf.edu.pk
5.	**Bioethanol Production from Various Waste Papers** Muhammad Kashif Javed kashifjaved25443@gmail.com
6.	**Pharmacokinetic and bioavailability study of oral sitagliptin in healthy adult female subjects** Bilal Aslam[1*], Maida Rizwan[1], Faqir Muhammad[1], Mashkoor Mohsin[2] and Asif Hussain[1] [1]Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, Faisalabad-38000-Pakistan

	[2]Institute of Microbiology,University of Agriculture, Faisalabad-38000-Pakistan *Corresponding Author email: cba933@gmail.com
7.	**Effect of curcumin pre-treatment on pharmacokinetics of valsartan in albino rats** Bilal Aslam[1*], Aniza Ashraf[1], Faqir Muhammad[1], Mashkoor Mohsin[2] Asif Hussain[1] [1]Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, Faisalabad-38000-Pakistan [2]Institute of Microbiology, University of Agriculture, Faisalabad-38000-Pakistan *Corresponding Author email: cba933@gmail.com
8.	**Phytochemical analysis and gastroprotective potential of *Ricinius communis* against NSAID induced ulcer in adult rabbits** Muhammad Usman Bari[1], Bilal Aslam[1*], Faqir Muhammad[1], Sultan Ali[2] and Asif Hussain[1] [1]Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, Faisalabad-38000-Pakistan [2]Institute of Microbiology, University of Agriculture, Faisalabad-38000-Pakistan *Corresponding Author email: cba933@gmail.com
9.	**Evaluation of the comparative anti-diabetic efficacy of *Ocimum sanctum* and metformin in alloxan diabetic rats** Bilal Aslam[1]*, Tayyeba Ramzan [1], Faqir Muhammad[1], Asif Hussain[1] and Zia-ud-Din Sandhu[2] [1]Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, *Agriculture University* Road, *Faisalabad*, Pakistan. Zip Code 38000 [2]Department of Parasitology, University of Agriculture, Faisalabad-38000-Pakistan *Corresponding Author email: cba933@gmail.com
10.	**In-Silico Analysis and Identification of Hot Spot Regions for Diagnosis and Drug Designing Against ANO7 Gene in Prostate Cancer** *Irtiza Pervez, Syed Hassan Raza, Mina Ellahi, Zulqurnain Ahmed, Aadil Hussain A-Level, Beaconhouse School System, Kathala, Gujrat Corresponding Author: Aadil Hussain (aadil.uog@gmail.com)
11.	**Effect of high-fat diet and cinnamon on hormonal profile and estrous cycle in rats** Aila Tehreem[1], Junaid Ali Khan[1,*], Zulfia Hussain[1], Syeda Momna Ishtiaq[1], Haroon Rashid[1], Kanwal Rehman[1] and Muhammad Shahid[2] [1]Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, Faisalabad, Pakistan. [2]Department of Biochemistry, University of Agriculture, Faisalabad, Pakistan. **Author Information** *Corresponding Author:

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12.	**Effect of alloxn-induced diabetes on adrenal glands histology and hormonal profile in albino rats** Mehreen Aslam, Junaid Ali Khan,*, Zulfia Hussain, Haroon Rashid, Syeda Momna Ishtiaq, Faqir Muhammad [1]Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, Faisalabad, Pakistan. **Author Information** *Corresponding Author: Junaid Ali Khan, Assistant Professor, Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, Faisalabad (UAF), Pakistan Email: junaidali.khan@uaf.edu.pk, Contact: +92-3313544476, Phone: +92 41 9200161-70 (3119) Fax: +92 41 9200764.
13.	**Evaluation of alloxan-induced diabetic effects on pituitary gland and blood hormonal profile in male albino rats** Sadia Hanif[1], Junaid Ali Khan[1,*], Zulfia Hussain[1], Haroon Rashid[1], Syeda Momna Ishtiaq[1], Bilal Aslam[1] and Rao Zahid Abbas[2] [1]Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, Faisalabad, Pakistan. [2]Department of Parasitology, University of Agriculture, Faisalabad, Pakistan. **Author Information** *Corresponding Author: Junaid Ali Khan, Assistant Professor, Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, Faisalabad (UAF), Pakistan Email: junaidali.khan@uaf.edu.pk, Contact: +92-3313544476, Phone: +92 41 9200161-70 (3119) Fax: +92 41 9200764.
14.	**Evaluation of nephrotoxic effects of alloxan-induced diabetes on rat kidneys** Sehar Bashir[1], Junaid Ali Khan[1,*], Zulfia Hussain[1], Haroon Rashid[1], Muzammil Zaman Khan[1] and Aisha Khatoon[2] [1]Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, Faisalabad, Pakistan. [2]Department of Pathology, University of Agriculture, Faisalabad, Pakistan. **Author Information** *Corresponding Author: Junaid Ali Khan, Assistant Professor, Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, Faisalabad (UAF), Pakistan Email: junaidali.khan@uaf.edu.pk, Contact: +92-3313544476, Phone: +92 41 9200161-70 (3119) Fax: +92 41 9200764.
15.	**Evaluation of alloxan induced diabetic effects on thyroid glands and blood hormonal profile in male wistar rats**

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16.	**Effects of alloxan-induced hyperglycemia on rat testes and reproductive hormonal profile** Umair Rasool[1], Junaid Ali Khan[1,*], Zulfia Hussain[1], Haroon Rashid[1], Anas Sarwar Qureshi[2] and Rao Zahid Abbas[3] [1]Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, Faisalabad, Pakistan. [2]Department of Anatomy, University of Agriculture, Faisalabad, Pakistan. [3]Department of Parasitology, University of Agriculture, Faisalabad, Pakistan. **Author Information** *Corresponding Author: Junaid Ali Khan, Assistant Professor, Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, Faisalabad (UAF), Pakistan Email: junaidali.khan@uaf.edu.pk, Contact: +92-3313544476, Phone: +92 41 9200161-70 (3119) Fax: +92 41 9200764.
17.	**Evaluation of the impact of high sugar diet and cinnamon on hormonal profile and estrous cycle in rats** Muhammad Zubair Anwar[1], Junaid Ali Khan[1,*], Anas Sarwar Qureshi[2], Zulfia Hussain[1], Haroon Rashid[1], Farooq Azam[1] [1]Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, Faisalabad, Pakistan. [2]Department of Anatomy, University of Agriculture, Faisalabad, Pakistan. **Author Information** *Corresponding Author: Junaid Ali Khan, Assistant Professor, Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, Faisalabad (UAF), Pakistan Email: junaidali.khan@uaf.edu.pk, Contact: +92-3313544476, Phone: +92 41 9200161-70 (3119) Fax: +92 41 9200764.
18.	**Computational analysis of different plant families' WRKY domains for the prediction of SNPs and their binding capacity** **Hamid Manzoor** Tehseen Kanwal1*****,Anum Munir1**,** Sumaira Rasul1, Ghulam Shabir1, Sherien Bakht12 and Lubna Rasool1 Institute of Molecular Biology and Biotechnology, Bahauddin Zakariya University, 60800 Multan, Pakistan. 2

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19.	**Development of Technetium-99m labeled epirubicin for Infection diagnostic radiopharmaceutical** Syed Ali Raza Naqvi[a*], Naeem-Ul-Haq Khan[a], Samina Roohi[b], [a]Department of Chemistry, Government College University, Faisalabad-38000, Pakistan [b]Isotope Production Division (IPD), Pakistan Institute of Nuclear Science and Technology (PINSTECH), Nilore, Islamabad-Pakistan *Corresponding and Presenting author: Syed Ali Raza Naqvi Email: draliraza@gcuf.edu.pk Tel 0092 41 9201032; Fax 0092 41 9200671
20.	**DNA barcoding of Pakistani fish species using mitochondrial cytochrome c oxidase I (COI), cytochrome b (Cytb) and nuclear rhodopsin (Rhod) genes** Masooma Kynat
21.	**Development of Seed Priming based Shotgun Strategy for Improvement of Drought Tolerance in Chickpea** Asima Noreen[1,2], Amjad Hameed[1,2], Tariq Mahmood Shah[1,2] [1]Nuclear Institute for Agriculture and Biology, Faisalabad, Pakistan [2]Department of Biological Sciences, Pakistan Institute of Engineering and Applied Sciences, Nilore, Islamabad *****Corresponding author: asimanoreen255@gmail.com
22.	**Effect of phyllospheric bacteria on growth of Triticum aestivum L.** Iffat Fizza and Ambreen Ahmed* Department of Botany, University of the Punjab, Quaid-e-Azam Campus, Lahore 54590, Pakistan *Author for Correspondence (Email: ambreenahmed1@hotmail.com; Tel: 0092-3334595101)
23.	**An integrated approach for analysis of individual and combined effects of irrigation and heat stress in desi chickpea.** Saima Jameel[1], Amjad Hameed[1*] and Tariq Mahmud Shah[1] [1]Nuclear Institute for Agriculture and Biology (NIAB), Jhang Road, Faisalabad, Pakistan. *Corresponding author Saima Jameel: saima2864@yahoo.com Amjad Hameed: amjad46pk@yahoo.com Tariq Mahmud Shah: shahge266@gmail.com
24.	**Bio-methane potential of lignocellulosic biomasses by anaerobic digestion and find its economic feasibility.** Shehbaz Ali[1,2] *, Tawaf Ali Shah[1,2], and Romana Tabassum[1,2] *1 National Institute for Biotechnology and Genetic Engineering, Faisalabad, Pakistan* *2 Pakistan Institute of Engineering and Applied Science, Islamabad, Pakistan.* **Corresponding email:* shehbaz205@gmail.com,

25.	**Genome Wide Analysis of Cyclic Nucleotide Gated ion Channels and their roles during salt and drought stress in Arabidopsis thaliana** Sadaf Oranab[1], Bushra Munir[1], Zulqurnain Khan[2], Sultan Habibullah Khan[2], Aftab Ahmad[2,3*] Abdul Ghaffar[1*] [1]Department of Biochemistry, Government College University, Faisalabad, Pakistan [2]US-Pakistan Center for Advanced Studies in Agriculture and Food Security, University of Agriculture, Faisalabad, Pakistan [3]Department of Biochemistry, University of Agriculture, Faisalabad, Pakistan [*]**Corresponding Author**: aftab.ahmad@uaf.edu.pk
26.	**Synthesis of mercaptan-terminated polythiourethanes: versatile curing agents for epoxy resins** Najum Abbas[1], Ayesha Naseer[1], Sadia Nazir[2], Javed Iqbal[1], Sadia Noor[1], Tehreem Naz[1], Muhammad Abid Rashid[1*] [1]Department of Chemistry, University of Agriculture, Faisalabad 38040, Pakistan [2]Department of Chemistry, Government, College Women University, Faisalabad, Pakistan [*]corresponding author: marashid@uaf.edu.pk
27.	**Renal clearance and urinary excretion of ibuprofen in male volunteers** Mubashra Khan[a] and Tahira Iqbal[b] a Department of Biochemistry, University of Agriculture Faisalabad, Pakistan b Department of Biochemistry, University of Agriculture Faisalabad, Pakistan mubashrakhan04@gmail.com (Mubashra Khan)
28.	**Biochemical Analysis and Characterization of Mucus from the Skin of common carp.** Sehrish Hanif[1], Hina Fatima[2], Muhammad Shahid[2], Urooj Khalid[1]. 1-Department of Zoology, Wildlife and Fisheries, University of Agriculture, Faisalabad. 2-Department of Biochemistry, University of Agriculture, Faisalabad.
29.	**Effect of waterborne cadmium exposure on glutathione s transferase (GST) in Wallago attu liver** Yasmeen Batool[1], Muhammad Anjum Zia[2], Sajid Abdullah[1], Zaheer Ahmed[2] Hadia Naseem[2] [1]Limnology –Fish Nutrition Laboratory, Department of Zoology, Wildlife and Fisheries, [2]Enzyme Biotechnology Laboratory (EBL), Department of Biochemistry, University of Agriculture, Faisalabad, Punjab 38040, Pakistan.
30.	**Production and purification of streptokinase from bacterial strain Streptococcus dysgalactiae subsp. dysgalactiae** Ghulam Akbar[1], Muhammad Anjum Zia[1], Khalil-ur-Rehman[1], Muhammad Shahid[1], Khalid Nadeem[1] , Muhammad Hayat[1] and Muhammad Bilal[1] [1]Enzyme Biotechnology Laboratory, Department of Biochemistry, University of Agriculture, Faisalabad

31.	**Knowledge assessment of obesity, its management and lifestyle of Pakistani population; A survey-based study** Muhammad Ahsan ul Haq[1], Muhammad Numan[1]*, Maria Arshad[1], Adnan Kabeer[1] Department of Biochemistry, Government College University, Faisalabad, Pakistan. **Corresponding author** Muhammad Numan (noooomi143@gmail.com
32.	**Nanotechnology: a modern tool to control mosquitoes and mosquito-borne disease** Muhammad Abdullah Malik*[1], Muhammad Sohail Sajid [1,2], Muhamamd Imran[1], Kashif Hussain[3], Syed Hussain Ahmad Shah[4], Mahnoor Akbar[4], Tean Zaheer[1] [1]Department of Parasitology, University of Agriculture, Faisalabad, Pakistan [2] Center for Advanced Studies in Agriculture and Food Security (CAS-AFS) University of Agriculture, Faisalabad, Pakistan [3],[4]Faculty of Veterinary Science, University of Agriculture, Faisalabad, Pakistan Corresponding author: Email: abdullahmalik42@gmail.com; Cell no. +92 321 7628 994
33.	**Biochemical and Non-Biochemical factors affecting color and shelf life of Tomato ketchup** Tahreem Arshad Butt Institute of Biochemistry and Biotechnology, Punjab University
34.	**Synthesis of Loureirin B Loaded nanoliposomes for Pharmacokinetics in Rat Plasma** Aysha Zafar, Shaheen Qasim, Kinza Mehmood, Huma Gulzar, Mah Rukh Altaf, Murtaza Hasan Department of Biochemistry & Biotechnology, The Islamia University of Bahawalpur, Bahawalpur 63100, Pakistan
35.	**Biochemical composition and toxicological screening of gutka** Saiqa Jamil[1], Muhammad Shahid[2], Hina Fatima[2] 1 Department of Zoology, Wildlife and Fisheries, University of Agriculture, Faisalabad 2 Department of Biochemistry, University of Agriculture, Faisalabad
36.	**Biological activities of stevia rebaudiana leaves in various organic solvents** Muhammad Ghous, Fatma Hussain*, Muhammad Shahid *****For correspondence: Dr. Fatma Hussain, Lecturer, Department of Biochemistry, University of Agriculture, Faisalabad. Cell # 0302-6058018, e-mail: fatmauaf@yahoo.com
37.	**Medicinal Aspects of Zingiber Officinale Roscoe: A Review** Izah Laraib

	Department of Horticulture PMAS Arid Agriculture University Rawalpindi, Punjab, Pakistan
38.	**Effect of Biophysic tool (Laser treatment) on pre-sowing seed of Cucurbita maxima and variation in the yield through different biochemical and enzymatic activities recorded.** Mazhar Abbas[1], Muhammad Arshad[1], Tariq Hussain[2], Zafar Hayat[3] and Munawar Iqbal[4] [1]Department of Basic Sciences, Section Biochemistry, College of Veterinary and Animal Sciences Jhang, Sub Campus of University Veterinary and Animal Sciences Lahore, Pakistan. [2]Department of Basic Sciences, Section Pharmacology and Toxicology, College of Veterinary and Animal Sciences Jhang, Sub Campus of University Veterinary and Animal Sciences Lahore, Pakistan. [3]Department of Animal Sciences, College of Veterinary and Animal Sciences Jhang, Sub Campus of University Veterinary and Animal Sciences Lahore, Pakistan. [4]Department of Chemistry, The University of Lahore, Pakistan. Corresponding author:mazhar.abbas@uvas.edu.pk
39.	**Biochemical Analysis and Characterization of Mucus from the Skin of *Labeo rohita*** Urooj Khalid[1], Hina Fatima[2], Muhammad Shahid[2], Anam Atta[1], Shagufta Ramzan[1] and Sehrish Hanif[1]. [1] Department of Zoology, Wildlife and Fisheries, University of Agriculture, Faisalabad [2] Department of Biochemistry, University of Agriculture, Faisalabad.
40.	**Green Nanobioparticles: Alternative control strategy against ticks** Tean Zaheer[1*], Muhammad Sohail Sajid[1, 2], Mahvish Maqbool[1] and Muhammad Abdullah Malik[1] [1]Department of Parasitology, University of Agriculture, Faisalabad, Pakistan [2] Center for Advanced Studies in Agriculture and Food Security (CAS-AFS) University of Agriculture, Faisalabad, Pakistan *Corresponding Author. Email: teanzaheer942@gmail.com
41.	**Biocompatible one pot green synthesis of Manganese Dioxide nanocapsules using flower extract of *Cryota mitis*** [1]Muniba Rehmat*, Haq Nawaz Bhatti[1*], Sufyan Rahmat[1], Waheed S. Khan[2], Asma Rehman[2]. [1]Department of Chemistry, University of Agriculture, Faisalabad-Pakistan [2]Nanotechnology Group, NIBGE, Jhang Road Faisalabad-Pakistan *Email: rahmat.muniba@gmail.com; hnbhatti2005@yahoo.com
42.	**Chemotherapy vs Enzyme Therapy: Effective tools for the treatment of acute lymphoblastic leukemia (ALL).** Hadia Naseem[1] Muhammad Anjum Zia[1], Zaheer Ahmed[1], Yasmeen Batool[1], [1]Enzyme Biotechnology Laboratory (EBL), Department of Biochemistry, University of Agriculture, Faisalabad, Punjab 38040, Pakistan.

43.	**Biochemical Characterization of Eruca sativa and Determination of its Antioxidant Potential** Hajira Amjad, M. Altaf Hussain and Raja Tahir Mahmood Department of Biotechnology, Mirpur University of Science and Technology (MUST), Mirpur-10250 (AJK) Pakistan
44.	**Morphological and Biochemical Response of Wild and Cultivated Genotypes of Carrot (Daucus carota L.) under In vitro Salt Stress Conditions** Hina Manzoor, Aamir Ali, Naima Huma Naveed Department of Botany, University of Sargodha, Pakistan Corresponding author: manzoorhina45@yahoo.com
45.	**Extraction of bioactive compound from grape fruit peel using deep eutectic solvent.** Hira Ishfaq[1], Muhammad Zahid*[1], Zubera Naseem[1], Muhammad Asif Hanif[1], Muhammad Shahid[2], Asim Mansha[3] [1] Department of Chemistry, University of Agriculture, Faisalabad, Pakistan [2] Department of Biochemistry, University of Agriculture, Faisalabad, Pakistan [3] Department of Chemistry, Government College University Faisalabad, Pakistan *Corresponding Email: rmzahid@uaf.edu.pk
46.	**Solvent extraction of Rhenium from secondary wastes** Humma Akram Cheema and Sadia Ilyas* Mineral and Material Chemistry Laboratory, Department of Chemistry, University of Agriculture Faisalabad (UAF) 38040, Pakistan
47.	**Antihyperglycemic, antioxidant, hypolipidemic, renoprotective and hepatoprotective activities of *Zingiber officinale* rhizome in diabetic rats** Abraisham Fatima, Fatma Hussain, Muhammad Shahid
48.	**Variations in the bubaline growth hormone gene in the coding and non-coding region** Amtul Jamil Sami, Annum Zehra and Sehrish Bilal Institute of Biochemistry and Biotechnology University of the Punjab Lahore Pakistan.
49.	**Elimination of dyes from aqueous solution using biochar based ZnO nanocomposites** Iqra Saleem, Raziya Nadeem, Ammara Amjad, Sumaira Mumtaz, Sadaf Nazir, Hafsa Moazzam Department of Chemistry, University of Agriculture, Faisalabad-38040-Pakistan +92-335-7523922/ iq.sl922@gmail.com
50.	**Identification of bZIP genes in cotton** Atika Tariq, Tayyaba Shaheen*, Hira Tahir and Farrukh Azeem For Correspondence: tayaba_pgmb@yahoo.com
51.	**Efficacy of antibiotics, curcumin longa nanoparticles, and non-steroidal anti-inflammatory drugs against wound based multiple drug-resistant *Staphylococcus aureus* and *E. coli* against** Iqra Sarwar[1], Ashar Mahfooz[1], Ambreen Ashar[2], Ijaz Saleem[1], Amjad Islam Aqib[3], Muhammad Shoaib[4], Tayyab-ur-Rehman[4], Muhammad Fakhar-e-Alam

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52.	**Biodegradation of vat acta ffb by phaeolus spadiceus and study of manganese peroxidase enzyme** Kianat Javaid[1], Raja Tahir Mahmood[1], M. Javaid Asad[2], Imran Ali[1] and Rimsha Ashraf[1] 1- Department of Biotechnology, Mirpur University of Science and Technology (MUST), Mirpur-10250 (AJK) Pakistan 2- Department of Biochemistry, PMAS-Arid Agriculture University Rawalpindi, Pakistan Corresponding: rajatahir87@gmail.com
53.	**Labeling and Biodistribution of ^{99m}Tc-Prednisolone** Muhammad Bilal Butt[1], Tanveer Hussain Bokhari[1]. Muhammad Daud[2], Samina Roohi[2], Saira Hina[3], 1 Department of Chemistry, Government College University, Faisalabad, Faisalabad 38000, Pakistan 2 Isotope Production Division, Pakistan Institute of nuclear Science and Technology P.O Nilore, Islamabad, Pakistan 3 Government College Women University, Faisalabad, Pakistan
54.	**Entomopathogenic fungi: A Novel Control Agent to Combat Acaricidal Resistance** Muhammad Zeeshan[1*], Muhammad Sohail Sajid[1,2], Muhammad Abdullah Malik[1], Kashif Hussain[1], Haroon Ahmad[1] [1]Department of Parasitology, University of Agriculture, Faisalabad. [2]One Health Laboratory, Center for Advanced Studies in Agriculture and Food Security (CAS-AFS), University of Agriculture, Faisalabad *Corresponding Author: dr.zee474@gmail.com Cell No. +92 346 4785 474
55.	**Optimization of quercetin loaded polymer coated iron oxide nanoparticles, their therapeutic potential and sub-acute toxicity studies** Marryum Ashraf [1], Bushra Akhtar[1], Faqir Muhammad[1*], Yasir Javeed[2], Ali Sharif [3], Amreen Ashraf [1] 1-Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, Faisalabad, Pakistan 2-Department of Physics, University of Agriculture, Faisalabad, Pakistan 3-Department of Pharmacy, The University of Lahore, Pakistan
56.	**Recovery of mineral acid from Industrial Wastes** Muhammad Ahmad Muhsan and Sadia Ilyas

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57.	**Antibacterial and antioxidant screening of *Calotropis procera l.*** Naima Kanwal, M. Altaf Hussain, Sana Qasim and Raja Tahir Mahmood Department of Biotechnology, Mirpur University of Science and Technology (MUST), Mirpur-10250 (AJK) Pakistan
58.	**Antimicrobial potential of selected medicinal plants against pathogenic bacteria** Sidra Ashraf, Hina Fatima and Muhammad Shahid Department of Biochemistry, University of Agriculture Faisalabad
59.	**Synthesization of bio-active silver nanoparticles by using cumin extract** Rabeea Muzaffar[1], Afsar Bano[2]*, Tahira Iqbal[1], Rafia Rehman[3] and M. Shahid[1] [1]Department of Biochemistry, University of Agriculture, Faisalabad, [2]Department of Physics, COMSATS Institute of Information Technology, Islamabad *[3]Department of Chemistry, University of Agriculture, Faisalabad, Pakistan* *Bano_afsar@yahoo.com
60.	**Electrochemical Sensing of Amino acid at the 2, 4-Dinitrophenyl Hydrazine Modified Carbon Paste Electrode: A Cyclic Voltammetric Study** Rahat Nawaz, Taniya Iqbal, Saadat Majeed* Division of Analytical Chemistry, Institute of Chemical Sciences, Bahauddin Zakariya University Multan, Pakistan *Corresponding author: saadat.majeed@bzu.edu.pk
61.	**Biological and Chemical Profile of Endophytic Microbes under salt stress** Hina Fatima[1], M. Shahid[1], M. Nauman Gulzar[1], Muhammad Zubair Ghouri[2,3] and Aftab Ahmad[1,2]. [1]Department of Biochemistry, University of Agriculture, Faisalabad (UAF). Pakistan [2]Center for Advanced Studies in Agriculture and Food Security (CAS-AFS), University of Agriculture Faisalabad (UAF), Pakistan. [3]Centre of Agricultural Biochemistry and Biotechnology (CABB), University of Agriculture Faisalabad (UAF), Pakistan. Correspondence: hinafatimauaf@yahoo.com
62.	**Characterization of Mango (*Mangifera indica L.*) fruit's transcriptome and metabolome during development** Zainab Khanum,[1] Martín E. Tiznado-Hernández,[2] Syed Ghulam Musharraf,[1] Arslan Ali,[1] Ishtiaq A. Khan*[1] [1]International Center for Chemical and Biological Sciences, University of Karachi, Karachi- 75270, Pakistan.

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63.	**DNA barcoding: A Useful Taxonomic Tool for Specie Identification** Rana Hamid Ali Nisar,[1]*, Muhammad Sohail Sajid[1, 2], Mahvish Maqbool[1], Muhammad Abdullah Malik[1] [1]Department of Parasitology, University of Agriculture, Faisalabad, Pakistan [2] Center for Advanced Studies in Agriculture and Food Security (CAS-AFS) University of Agriculture, Faisalabad, Pakistan Corresponding author: Email: drhamidali2010@gmail.com; Cell: 03216651213
64.	**Antibacterial and antioxidant screening of *Cannabis sativa l*** Sana Qasim, M, Altaf Hussain, Naima Kanwal Department of Biotechnology, Mirpur University of Science and Technology (MUST), Mirpur-10250 (AJK) Pakistan
65.	**Bioprocessing of low grade chalcopyrite** Shafaq Masud and Sadia Ilyas* Mineral and Material Chemistry Laboratory, Department of Chemistry, University of Agriculture Faisalabad (UAF) 38040, Pakistan
66.	**Synthesis of Starch Based Bioplastic from Mango Seeds Reinforced with Carboxy Methyl Cellulose (CMC) using Sorbitol as a Plasticizer** Sarmad Ahmad Qamar[1, *], Muhammad Asgher[1], Nimrah Khalid[1], Muhammad Jahangeer[2] [1] Industrial Biotechnology Lab., Department of Biochemistry, University of Agriculture, Faisalabad, Faisalabad-38000, Pakistan [2] Department of Biochemistry, Government College University Faisalabad, Faisalabad-38000, Pakistan *Correspondence: **Sarmad Ahmad Qamar** (Research Associate), sarmad_qamar@live.com
67.	**Biological Pretreatment of Rice Straw by Ligninolytic Bacillus Sp. Strains for Enhancing Biogas Production** Tawaf Ali Shah[ab], Charles C. Lee[c], William J. Orts[c] and Romana Tabassum [ab*] [a]National Institute for Biotechnology and Genetic Engineering (NIBGE), Faisalabad, Pakistan [b]Pakistan Institute of Engineering and Applied Science (PIEAS), Islamabad, Pakistan [c] USDA-ARS-WRRC, Bioproducts Research Unit, 800 Buchanan Street, Albany, CA, 94710, USA **Corresponding author**: * Tawaf Ali Shah, Corresponding author at: National Institute for Biotechnology and Genetic Engineering (NIBGE), NIAB Colony Jhang Road 3800, Faisalabad, Pakistan E-mail address: tawafbiotech@yahoo.com.
68.	**Phytochemical and therapeutic investigations of citrus paradisi (grape**

	fruit) peel essential oil Yahya Amjad[1] , Faqir Muhammad[*1], Bushra Akhtar[1], Muhammad Irfan Anwar[2], Bilal Aslam[1], Junaid Ali Khan[1], Muhammad Naeem Faisal[1] 1-Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, Faisalabad, Pakistan 2-Faculty of Veterinary Science, Bahauddin Zakariya University, Multan, Pakistan Yahyaamjad40@gmail.com, faqir@uaf.edu.pk, bushra.akhtar@uaf.edu.pk, bilal.aslam@uaf.edu.pk, junaidali.khan@uaf.edu.pk
69.	**DNA Barcoding: A new insight into biodiversity of organisms** Usman talib[1*], Muhammad Sohail Sajid[1,2], Muhammad Abdullah Malik[1], Muhammad Uzair Asgahr[1] Tean Zaheer[1], Sami Ullah Khan Bahadur[3] [1]Department of Parasitology, University of Agriculture, Faisalabad. [2]One Health Laboratory, Center for Advanced Studies in Agriculture and Food Security (CAS-AFS), University of Agriculture, Faisalabad [3]Department of Pathology, University of Agriculture, Faisalabad. *Corresponding Author: usmangill007@gmail.com Cell No. +92 333 8758 644
70.	**Extraction of bioactive compounds from Mentha arvensis L. using Choline chloride and ethylene glycol (EG) based eutectic solvent: Optimization and biological activities** Zubera Naseem[1], Muhammad Zahid[*1], Muhammad Asif Hanif[1], Muhammad Shahid[2] 1 Department of Chemistry, University of Agriculture, Faisalabad 2 Department of Biochemistry, University of Agriculture, Faisalabad rmzahid@uaf.edu.pk
71.	**Isolation of pathogenic bacteria in burn patients of Rawalpindi** Muhammad Muzammal Saeed & Muhammad Shaheez Ahmad Supervisor: Muhammad Javaid Asad Gamil: muzammalsaeed143@gmail.com
72.	**Comparison of serum resistin levels in obese and non-obese patients of polycystic ovarian syndrome** Zara Hussain*[,1], Mateen Abbas[2], Abdul Muqeet Khan[3] and Muhammad Ahsan Iqbal[4] [1,2]Quality Operations Laboratory (QOL), University of Veterinary and Animal Sciences (UVAS), Lahore, Pakistan.

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73.	**Detection of organophosphate pesticide residues in tomato collected from Mardan district, KPK** Babar Naseem*[,1], Mateen Abbas[2], Abdul Muqeet Khan[3] and Zara Hussain[4] Quality Operations Laboratory (QOL), University of Veterinary and Animal Sciences (UVAS), Lahore, Pakistan. mateen.abbas@uvas.edu.p
74.	**Quantitative determination of Pyrethroid residues in tomato collected from Khyber Pakhtunkhwa** Abdul Muqeet Khan*[,1], Mateen Abbas[2], and Zara Hussain[3] Babar Naseem[4] Quality Operations Laboratory (QOL), University of Veterinary and Animal Sciences (UVAS), Lahore, Pakistan. mateen.abbas@uvas.edu.p
75.	**Dendritic Cells: Promising candidates for immunity in Avian Coccidiosis** Zeshan Zulfiqar*, Shahid Ur Rehman, Sidra Bashir, Muhammad Khalid Bashir, Umar Farooq, Muhammad Ashraf, Muhammad Farooq Khalid University of Agriculture Faisalabad, Sub Campus Toba Tek Singh Centre for Applied Molecular Biology & Forensic Sciences University of the Punjab ***Presenter Email**: 4zeshan@gmail.com
76.	**Polycyclic aromatic hydrocarbons in food and food materials-A review** Hira Zikar[1], Zahid Mahmood[2] , Muhammed Shahid[1], M. Muneeb Abbas[3] [1]Department of Biochemistry, University of Agriculture, Faisalabad. [2]Department of Biochemistry, Government College University, Faisalabad. [3]Department of Applied Chemistry, Government College University, Faisalabad. Corresponding Email: hirazikar19@gmail.com

77.	**Impact of postharvest vapour heat treatment on biochemical and antioxidant properties of mango** Muhammad Suliman Shah[1], Aman Ullah Malik[1], Mahmood Ul Hasan[1], Ahmad Sattar Khan[1], Muhammad Shahid [1]Postharvest Research and Training Centre, Institute of Horticultural Sciences, University of Agriculture, Faisalabad. [3]Department of Biochemistry, University of Agriculture, Faisalabad. Presenting author: ss.shahgee11@yahoo.com
78.	**Optimization and Characterization of Pleurotus eryngii laccase Immobilized on chitosan beads** Sadia Aslam, Muhammad Asgher, Zinayyera Subhani, Tanzila Sahar Department of Biochemistry, Government College Women University, Faisalabad, Pakistan. Department of Biochemistry, University of Agriculture, Faisalabad
79.	**Evaluation of agro industrial wastes against oxidative stress** [a*] Farkhanda Arshad, [a] Razia noreen, [b] Huma ambreen & [c] Iqra aslam [a]Government College University Faisalabad, [b] Government College Women University Faisalabad, *Presenting author: [a*]Farkhandaarshad77@gmail.com
80.	**Enhanced Nitrogen use efficiency by using different urease and nitrification inhibitors combination in wheat crop** [a]Zill-e-Huma, [a]Nazish Jahan and [b]Khalil-Ur-Rehman [a]Department of Chemistry, University of Agriculture, Faisalabad, Pakistan [b]Department of Biochemistry, University of Agriculture, Faisalabad, Pakistan **Corresponding author:** zilehuma098@gmail.com **Revised**
81.	**Effect of different levels of moringa oleifera leaf meal on growth performance and carcass characteristics of chicks** Faiza Mukhtar and Aftab Ahmad [1]Department of Zoology, University of Agriculture, Faisalabad fairfaizafsd@gmail.com

82.	**Improve nitrogen use efficiency by using 2,5-dichloroaniline and ammonium thiosulphate as nitrification inhibitors** [a]Zeeshan Khadim, [a]Nazish Jahan, [b]Khalil-Ur-Rehman, [a]Zill-e-Huma and [a]Muhammad Asif [a]Department of chemistry, University of Agriculture, Faisalabad, Pakistan [b]Department of biochemistry, University of Agriculture, Faisalabad, Pakistan **Corresponding author**: mianxeeshan2018@gmail.com
83.	**Assessment of lipid production potential of oleaginous yeast isolated from saline habitat** Muhammad Arif Nazir[a], Rizwan Aslam[a, #], Dr. Saima Shahzad Mirza[b], Sultan Ali[a], Ghazanfar Abbas[a], Muhammad Ashraf[a], Hira Jawaid[c], Asma Andleeb[d]. a: Institute of Microbiology, University of Agriculture, Faisalabad b:Punjab Bioenergy Institute, PARS, University of Agriculture, Faisalabad c: Department of Zoology, Punjab University, Lahore d: Department of Zoology, University of Agriculture, Faisalabad #: Corresponding author Address for correspondence: Dr. Rizwan Aslam, Institute of Microbiology, University of Agriculture, Faisalabad, Pakistan. Email: rizwanaslam@uf.edu.pk, Phone +92 333 7616141
84.	**Use of medicinal plant extracts for inhibition of aflatoxins producing fungus and screening of antifungal peptides by SDS-PAGE** Maliha Nawaz[1], Farah Kanwal[2], Muhammad Umar[3], SarfarazHussain[4], Fozia Saleem[5]. [1,2,3,4,5] Department of CABB, University of Agriculture Faisalabad **fozia@ualberta.ca**
85.	**Metabolite Profiling of Healthy and Huanglongbing (HLB) infected Citrus Leaves.** Muhammad Umar[1], Zohaib Hassan[2], Fozia Saleem[3] [1,2,3] Department of CABB, University of Agriculture Faisalabad. **fozia@ualberta.ca**
86.	**Preparation of Apple peel nanosupension and evaluation of Angiotensin Converting Enzyme inhibitory potential**

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87.	**Molecular Detection of Methicillin (mecA) and Vancomycin Resistant (vanA) Staphylococcus aureus from Digestive Tract of Apis mellifera** Ammara Mushtaq[a], Rizwan Aslam[a,*], Muhammad Ashraf[a], Sultan Ali[a], Ghazanfar Abbas[a]. a: Institute of Microbiology, University of Agriculture, Faisalabad *: Corresponding author Address for correspondence: Dr. Rizwan Aslam, Institute of Microbiology, University of Agriculture, Faisalabad, Pakistan. Email: rizwanaslam@uf.edu.pk, Phone +92 333 7616141
88.	**Calcium dependent protein kinase related kinase (CRK1) regulated salt stress response in Arabidopsis.** Khush Bakhat Afzal[*a], Aftab Ahmad[a,b], Muhammad Zubair Ghouri[c], Sultan Habibullah Khan[b,c] and Zulqurnain Khan[d] [a]Cotton biotechnology lab, US-Pakistan Center for Advanced Studies, University of agriculture, Faisalabad [b]Department of Biochemistry, University of Agriculture, Faisalabad [c]Center for Agricultural Biochemistry and Biotechnology (CABB), University of Agriculture, Faisalabad [d]Institute of Plant Breeding and Biotechnology, Muhammad Nawaz Sharif University of Agriculture, Multan. Corresponding author: aftab.ahmad@uaf.edu.pk
89.	**Investigation of Feline Panleukopenia virus antibodies in diarrheic captive felines in district Faisalabad, Pakistan** Farrah Deeba[1]*, Anas Sarwar Qureshi[2], Muhammad Haleem Tayyab[1], Naureen Rana[3], Ayesha Anwar[3], Khurram Ashfaq[1] [1]Department of Clinical Medicine and Surgery, University of Agriculture, Faisalabad [2]Department of Anatomy, University of Agriculture, Faisalabad [3]Department of Zoology, Wildlife and Fisheries, University of Agriculture, Faisalabad

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90.	***In vitro* antibacterial potential of selected medicinal plants against some gram negative and gram positive bacteria** Javaria Hafeez[1*], Fatma Hussain[1] [1] Clinico-Medical Biochemistry Laboratory, Department of Biochemistry, Faculty of Sciences, University of Agriculture, Faisalabad-38040, Pakistan. *corresponding author: javaria.hafeez@yahoo.com Tel.: +92-41-9200161-170 (Ext. 3304)
91.	**Heterologous Expression of Archaeal Fructosyltransferase Gene** Komal Ghauri[1], Nayla Munawar[2,*], Hazrat Ali[1], M. Afzal Ghauri[1] and Munir A. Anwar[1] [1] Industrial Biotechnology Division, National Institute for Biotechnology & Genetic Engineering, Faisalabad. [2] Department of Biochemistry, University of Agriculture, Faisalabad. * Presenting Author
92.	**Hindrences and scope of vaccine development in parasitic diseases** Muhammad Usman Naseer[1,2]*, Zia ud Din Sindhu[1], Muhammad Imran[1] [1]Department of Parasitology, University of Agriculture, Faisalabad-38040, Pakistan [2]Department of Pathobiology, University of Illinois at Urbana-Champaign, Urbana, IL-61802, USA *Corresponding author's Email: usmanshani717@gmail.com, munaseer@illinois.edu
93.	**Genotypic markers associated with resistance to parasitism in goats: an overview** Muhammad Imran[1]*, Muhammad Sohail Sajid[1], Muhammad Usman Naseer[1,2], Asim Shamim[3], Fatima Yousaf[4] [1]Department of Parasitology, University of Agriculture, Faisalabad-38040, Pakistan, [2]Department of Pathobiology, University of Illinois at Urbana-Champaign, Urbana, IL-61802, USA, [3]Department of Pathobiology, University of Poonch Rawalakot, Azad Jammu and Kashmir, [4]Department of Biochemistry, University of Agriculture, Faisalabad-38040, Pakistan

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94.	**Artemisia scoparia an unexplored secret of nature** Toseef Fatima[1]*, Khalid M. Khan[1], Khalil-ur-Rahman[1], Nazish Jahan[2] and Asma Yaqoob[1] Department of Biochemistry, Department of Chemistry[2], University of Agriculture, Faisalabad. 38000. Pakistan Corresponding author* Mobile# + 923046841117 Email: Toseef_Fatima27@yahoo.com
95.	**The physiochemical composition of date palm fruits at three different edible stages** Muhammad Waseem*[a], Summar Abbas Naqvi[a], Muhammad Jafar Jaskani[a], Muhammad Shahid[b] Hina Fatima[b], Iqrar Ahmad Khan[a] [a]Pomology Laboratory, Institute of Horticultural Sciences, University of Agriculture, Faisalabad 38040, Pakistan; [b]Protein Molecular Biology Laboratory, Department of Biochemistry, University of Agriculture, Faisalabad, Pakistan. ***Corresponding author:** wasimm45@gmail.com
96.	***In vivo* investigation of Ceftazidime induced oxidative stress in liver kidney and gills of *Labeo rohita*** Abubakar Siddique[1], Kashif Jilani[2] **[1]Department of Zoology and Fisheries** [2]Department of Biochemistry, University of Agriculture, Faisalabad E-mail: kashif.jillani@uaf.edu.pk
97.	**Comparison of synthetic yield of biodiesel through photocatalytic and catalytic processes using Cu doped lime coated over metal sheet** Sehrish Naz [a], Ijaz Ahmad Bhatti [a], Maryam Yousaf [a], Hafiza Wajiha Umer Farooq [a], Muhammad Mohsin [a], Muhammad Tahir Hussain [b] **[a]** Department of Chemistry, University of Agriculture, Faisalabad [b] Department of Applied Sciences, National Textile University, Faisalabad Corresponding author: sehrishnaz1576@gmail.com
98.	**Phytochemical Screening & Pharmacological Evaluation of *Senegalia modesta* (WALL) P. J. H. Hurter** Sana Gul*[1], Hidayat Ullah Khan[1], Nisar Khan[2] [1]Department of Chemistry, University of Science and Technology Bannu (28100), KP, Pakistan.

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99. 1	**Evaluation of Cephridine triggered oxidative stress in liver kidney and gills of *Cirrhinus mrigala*** Humaira Sharif[1], Kashif Jilani[2] **[1]Department of Zoology and Fisheries** [2]Department of Biochemistry, University of Agriculture, Faisalabad E-mail: kashif.jillani@uaf.edu.pk
100.	**Determination of Moxifloxacin induced oxidative stress in liver kidney and gills of *Cyprinuscarpio*** **Nabila Akbar[1], Kashif Jilani[2]** **[1]Department of Zoology and Fisheries** [2]Department of Biochemistry, University of Agriculture, Faisalabad E-mail: kashif.jillani@uaf.edu.pk
101.	**Immunomodulatory action of neem (*Azadirachta indica*) in newcastle disease infected brolier chicks** Shazia Nusrat, Farzana Rizvi, Shah Nawaz*, Ayesha Ramzan and Muhammad Shahzad Shafiq Department of Pathology, Faculty of Veterinary Science, University of Agriculture, Faisalabad Corresponding author: malikshahnawaz786@gmail.com
102.	**Prevalence of fatty liver in obesity and in liver diseased patient** Fatima Ilyas, Sadia Sana and Naheed Akhter College of Allied Health Sciences, GCUF. Corresponding email: sadiasana@gcuf.edu.pk
103.	**Evaluation of agro industrial wastes against oxidative stress** Farkhenda Arshad, Razia Noreen, Huma umbreen, Kiran Aftab, Iqra…….. GCUF **Aeomarkaz helan** **aeomarkaz.helan.f@gmail.com**
104.	**Evaluation of the Bioactive role of indegenous *Viola odorata* Leaf Extracts** Tehreem Sikander, Aqsa Anum Bhatti and Zahid Mushtaq*

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105.	**Determination of anti-eryptotic potential of *Piper Nigrum L.* (Black pepper) plant extracts in Ciprofloxacin treated erythrocytes** **Kashif Shabbir, Kashif Jilani** Department of Biochemistry, University of Agriculture, Faisalabad E-mail: kashif.jillani@uaf.edu.pk
106.	**Evaluation of actinomycin D induced eryptosis and anti eryptotic activity of *Withania somnifera* and *Camellia sinesis* extracts** Mehroze Javed, Kashif Jilani Department of Biochemistry, University of Agriculture, Faisalabad E-mail: kashif.jillani@uaf.edu.pk
107.	**Potential of *Mangifera indica* Seeds and its Composites for the Removal of Direct yellow-50 and Reactive green-5 from Aqueous media** Asma Jabeen[a] and Haq Nawaz Bhatti[b] [a] Department of Chemistry, University of Agriculture Faisalabad, Pakistan [b] Department of Chemistry, University of Agriculture Faisalabad, Pakistan *Email:* asmajabeen7861@gmail.com (Asma Jabeen) hnbhatti2005@yahoo.com (Haq Nawaz Bhatti)
108.	**Synthesis and characterization of nanoparticles from *Eucalyptus Camaldulensis* and their application on cotton fabric for medical purposes.** Hira Munir, Asima Mumtaz and Muhammad Talha Zubair* Department of Biochemistry and Biotechnology University of Gujrat, Pakistan hira.munir@uog.edu.pk
109.	**STUDY OF BODY MASS INDEX AND MICRONUTRIENTS IN POST-MENOPAUSAL OSTEOPOROTIC WOMEN** **Ambreen Awan, Feroza Hamid Wattoo** Department of Biochemistry, PMAS Arid Agriculture University Rawalpindi, Pakistan ambreenawan286@gmail.com
110.	**Plant Diseases diagnosis and characterization through PCR** Saher Naveed[1], Muhammad Hassan[1], Muhammad Waseem Sarwar[1], Ayesha Younus[2], Muhammad Shah Nawaz ul Rehman[1] and Muhammad Mubin[1]*, Virology Lab, Center of Agricultural Biochemistry and Biotechnology, University of Agriculture, Faisalabad, Pakistan; Department of Plant Pathology, University of Agriculture, Faisalabad; [2]Laser matter interaction and Nano-sciences Lab, Department of Physics, University of Agriculture, Faisalabad Pakistan ***mmubin@uaf.edu.pk (**Virology Lab, Center of Agricultural Biochemistry and Biotechnology, University of Agriculture, Faisalabad, Pakistan; Department of Plant Pathology, University of Agriculture, Faisalabad)
111.	**Plant Flavonoids are Potential Inhibitor of Newcastle Disease Virus V Protein**

	Muhammad Waseem Sarwar[1], Saher Naveed[1], Muhammad Hassan[1], Ayesha Younus[2], Muhammad Shah Nawaz ul Rehman[1] and Muhammad Mubin[1]*, Virology Lab, Center of Agricultural Biochemistry and Biotechnology, University of Agriculture, Faisalabad, Pakistan; Department of Plant Pathology, University of Agriculture, Faisalabad; [2]Laser matter interaction and Nano-sciences Lab, Department of Physics, University of Agriculture, Faisalabad Pakistan ***mmubin@uaf.edu.pk (**Virology Lab, Center of Agricultural Biochemistry and Biotechnology, University of Agriculture, Faisalabad, Pakistan; Department of Plant Pathology, University of Agriculture, Faisalabad)
112.	**NUTRITIONAL COMPARISON OF IRRIGATED AND RAIN FED WHEAT VARIETIES OF PAKISTAN** **Naila Niaz. Feroza Hamid Wattoo. Shehla Begum.** Department of Zoology/Biology, PMAS Arid Agriculture University Rawalpindi, Pakistan nailaniaz338@gmail.com
113.	**miRNA: A multidisciplinary approach from diagnosis to therapy** Zeshan Zulfiqar*, Shahid Ur Rehman, Sidra Bashir, Muhammad Khalid Bashir, Umar Farooq, Umair Mahmood, Marium Zehra, Muhammad Farooq Khalid *University of Agriculture Faisalabad, Sub Campus Toba Tek Singh* *Centre for Applied Molecular Biology & Forensic Sciences University of the Punjab* **Corresponding Author's email: 4zeshan@gmail.com*
114.	**Revolution in non-viral delivery system of CRISPR genome editing tool** Zeshan Zulfiqar*, Shahid Ur Rehman, Sidra Bashir, Muhammad Khalid Bashir, Umar Farooq, Umair Mahmood, Marium Zehra, Muhammad Farooq Khalid *University of Agriculture Faisalabad, Sub Campus Toba Tek Singh* *Centre for Applied Molecular Biology & Forensic Sciences University of the Punjab* **Corresponding Author's email: 4zeshan@gmail.com*
115.	**Epidemiology of bloodstream bacterial infections among human immunodeficiency virus (HIV) infected patients in Punjab Pakistan** Zara Sabir[1], Sultan Ali[1*], Ghazanfar Abbas[1], Muhammad Ashraf[1], Rizwan Aslam[1], Umar Khalid[1] and kashaf Yaseen[1]. [1]Institute of Microbiology, University of Agriculture, Faisalabad. * sultanali@uaf.edu.pk
116.	***Selenium N-Heterocyclic carbene (Se-NHC) adducts as potent chemotherapeutic agents*** *Amna Kamal[1], Muhammad Adnan Iqbal[1,3,†], Haq Nawaz Bhatti[1,*], Aqsa Habib[1]* *[1]Department of Chemistry, University of Agriculture, Faisalabad, Pakistan* *[2] Department of Pharmacology, School of Pharmaceutical Sciences, Universiti Sains Malaysia, Minden, 11800-Pulau Penang, Malaysia*

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117.	**Production and characterization of biodiesel from *Spirogyra elongata* algae** Aasma Saeed, Muhammad Asif Hanif and Muhammad Waqar Azeem *Department of Chemistry, Faculty of Sciences, University of Agriculture, Faisalabad-38040-Pakistan* **drmuhammadasifhanif@gmail.com*
118.	**UTILIZATION OF COMPLEX COMPOUNDS AS CATALYST FOR BIODIESEL PRODUCTION** Abeer Aslam, Muhammad Asif Hanif and Rasheed Ahmad Khera *Department of Chemistry, Faculty of Sciences, University of Agriculture, Faisalabad-38040-Pakistan* **drmuhammadasifhanif@gmail.com*
119.	**RECTIFICATION OF NATURAL FRAGRANCES IN FRANKINCENSE OIL** Adeesha Beig, Muhammad Asif Hanif, Haq Nawaz Bhatti and Muhammad Zahid *Department of Chemistry, Faculty of Sciences, University of Agriculture, Faisalabad-38040-Pakistan* * *drmuhammadasifhanif@gmail.com*
120.	**FABRICAION OF BIO-NANOCOMPOSITES BY UTILIZING BIOMASS (AGRO WASTE AND AQUATIC WASTE) FOR HMs REMOVAL FROM WASTE WATER** Author; Muhammad Adil, M. phil. Scholar, Department of Chemistry, University of Agriculture, Faisalabad. muhammadadil507@gmail.com
121.	**Meta Quantitative Trait Locus (QTL) Analysis of Fiber Quality and Agronomic Traits in Upland Cotton.** **Ayesha Jabbar, Zahid Mustaq*, Muhammad Jamshed*.** *Department of Biochemistry, University of Agriculture Faisalabad.
122.	**Comparative study of phytochemicals and anti-oxidant potentials from native and gemmo-modified cardio-protective nutritious plants** Hina Aslam[a], Pro. Dr. Khalil-ur-Rehman[a], DR. Kauser Parveen[b], Dr. Nazish Jahan[a], Dr. Nusrat Shafiq[b], Zara Jabeen[a] and Habiba Akram[a] [a] University of Agriculture Faisalabad, faculty of Sciences, Department of Biochemistry [b] Government College Women University, Faculty of Sciences, Department of Biochemistry **Corresponding author email**: hinaaslam381@gmail.com

123.	**Investigation of Hepatitis B, prevalence and associated risk factors among pregnant women at Tertiary care Hospital** Hira Manzoor[a], Rizwan Aslam[a, *], Muhammad Ashraf[a], Sultan Ali[a], Ghazanfar Abbas[a]. a: Institute of Microbiology, University of Agriculture, Faisalabad *: Corresponding author: Email: rizwanaslam@uf.edu.pk, Phone +92 333 7616141
124.	**Synthesis and characterization of aromatic isocyanates-based polyurethanes** Zahra Akram*, Ijaz Ahmad Bhatti, Maryam Yousaf, Nawal Aslam, Misbah, Muhammad Mohsin. Department of Chemistry, University of Agriculture, Faisalabad. E.MAIL: ibrahimaq131@gmail.com
125.	**Complexing of micronutrients and development of slow release nano fertillizers** Marium Khaliq[1], Muhammad Asif Hanif*[,1] and Zahid Mushtaq[2] [1]Department of Chemistry, Faculty of Sciences, University of Agriculture, Faisalabad-38040-Pakistan [2]Department of Biochemistry, Faculty of Sciences, University of Agriculture, Faisalabad-38040-Pakistan *drmuhammadasifhanif@gmail.com
126.	**Evaluation of taramira oil for the synthesis of biodiesel: pretreatment and optimization study using disulfide based photo-catalyst** Muhammad Ali, Sana Sadaf, Javid Iqbal
127.	**Preparation of novel support for catalysts in biodiesel production** Rida Tariq and Muhammad Asif Hanif Department of Chemistry, Faculty of Sciences, University of Agriculture, Faisalabad-38040-Pakistan *drmuhammadasifhanif@gmail.com
128.	**Production of highly stable fatty acid methyl esters** Shafaq Nisar, Muhammad Asif Hanif Department of Chemistry, Faculty of Sciences, University of Agriculture, Faisalabad-38040-Pakistan *drmuhammadasifhanif@gmail.com
129.	**Design and synthesis of eugenol derivatives as potent antioxidants** Suman Tahir, Muhammad Asif Hanif and Muhammad Irfan Majeed Department of Chemistry, Faculty of Sciences, University of Agriculture, Faisalabad-38040-Pakistan *drmuhammadasifhanif@gmail.com
130.	**Effect of lead-resistant rhizobacteria on growth amelioration of *Zea mays* L. in lead contaminated soil** Zain Fatima and Ambreen Ahmed* Department of Botany, University of the Punjab, Quaid-e-Azam Campus, Lahore 54590, Pakistan

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131.	**Hypoglycemic, antioxidant, antihyperlipidemic, renoprotective and hepatoprotective potential of *Allium sativum* L. rhizomes Investigated in diabetes rat models** Sajila Sharif, Fatma Hussain, Muhammad Shahid
132.	**Biogenic synthesis, photocatalytic and antimicrobial activity of manganese nanoparticles** Urooj Kamran[1], Haq Nawaz Bhatti[1*], Munawar Iqbal[2,], Saba Jamil[1] and Muhammad Zahid[1] [1]Department of Chemistry, University of Agriculture, Faisalabad, Pakistan [2]Department of Chemistry, University of Lahore, Lahore, Pakistan *Corresponding Author E-mail: hnbhatti2005@yahoo.com; haq_nawaz@uaf.edu.pk
133.	**Antioxidant analysis of root bioactives of canola plant exuded in response to abiotic stress** Saba Ghufran, **Bushra Sultana***, Sadaf Yaqoob, Tehmina Sharif, Zunaira Jabeen Department of Chemistry, University of Agriculture, 38040 Faisalabad, Pakistan. bushrasultana2005@yahoo.com
134.	**Virtual analysis of heat stress transcription factor in plants by SNPs identification** **[1]Sumaira Rasul**, Muhammad Shahzad Anjum1***,** Farha Anwer1 **,** Kashif Aslam1, Fozia Saeed2, Rehana Iqbal11 and Hamid Manzoor, *1Institute of Molecular Biology and Biotechnology, Bahauddin Zakariya University, 60800 Multan, Pakistan.* ***Corresponding author:** Dr. Sumaira Rasul (dr.sumaira@bzu.edu.pk)
135.	**Potential of different generations of Cephalosporins to inhibit biofilm of Staphylococcus aureus and Escherichia coli** Jawaria Aslam, Muhammad Shahid, Hina Fatima Department of Biochemistry, University of Agriculture, Faisalabad *Correspondence: hinafatimauaf@yahoo.com
136.	**A comprehensive study on growth sustainability of microalgae and unlocking of its multilayered advantages** Haq Nawaz Bhatti[1], Munazza Maqbool[1], Sana Sadaf[2], [1]Department of Chemistry, University of Agriculture, Faisalabad-Pakistan

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137.	**Optimization of quercetin loaded PLGA nanoparticles, their antibacterial potential and comparative pharmacokinetics** Aroosa Fazalillahi, Faqir Muhammad*, Bushra Akhtar Institute of Pharmacy, Physiology and Pharmacology, University of Agriculture, Faisalabad, Pakistan Aroosafazalillahi1403@gmail.com, faqir@uaf.edu.pk, bushra.akhtar@uaf.edu.pk
138.	**Bioactive and therapeutic potential of *Smilax china* l. roots** Fatma Hussain and Sunder Unab [1]Department of Chemistry, University of Agriculture, Faisalabad-Pakistan fatmauaf@yahoo.com
139.	**Bioactive and therapeutic potential of *glycyrrhiza glabra* l. roots** Fatma Hussain and Irum Iqbal [1]Department of Chemistry, University of Agriculture, Faisalabad-Pakistan fatmauaf@yahoo.com
140.	**A study of level of vitamin d, calcium, phosphorous and parathyroid hormone in school children** Nazia Akhtar, Muhammad Faizan and Tahira Iqbal Department of Biochemistry, University of Agriculture, Faisalabad, Pakistan Corresponding author (e-mail): najiasial@gmail.com
141.	**Technetium-99m labeled ibuprofen: development and biological evaluation using sterile inflammation induced mice model** Naeem-Ul-Haq Khan[1], Syed Ali Raza Naqvi[1,] Samina Roohi[2] [1]Department of Chemistry, Government College University, Faisalabad-38000, Pakistan [2]Isotope Production Division (IPD), Pakistan Institute of Nuclear Science and Technology (PINSTECH), Nilore, Islamabad-Pakistan Email: naeemulhaqk@student.unimelb.edu.au
142.	**Real-time expression and validation of microRNAs for non-invasive diagnosis of HCV related liver cancer** Awais Altaf[1*], Freeha Fiaz[2], Azra Quraishi[2], Iqra Khalid[2], Ashir Ibrahim Dutt[2] and Amer Jamil[2] [1]Government College University, Faisalabad-Pakistan [2]University of Agriculture, Faisalabad-Pakistan *awaisaltaf362@yahoo.com
143.	**Iron oxide nanoparticles based surface-enhanced raman spectroscopic (SERS) protocol for diagnosis of hepatitis C** Muhammad Irfan Majeed*, Haq Nawaz, Muhammad Kashif, Saifullah and Saqib Ali Department of Chemistry, University of Agriculture Faisalabad, Pakistan.

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144.	**Multivariate data Analysis of Raman spectral data of Hepatitis C infected blood plasma samples.** Haq Nawaz [a]*, Muhammad Irfan Majeed [a], Saqib Ali [a], Saifullah[a] and Muhammad Kashif [a] [a] Department of Chemistry, University of Agriculture, Faisalabad, Pakistan. *Corresponding Author: Dr. Haq Nawaz E-mail: haqchemist@yahoo.com
145.	**Detoxification of aflatoxin B_1 by *Lentinula edodes* (Shitake) in Broiler Chicken** Zinayyera Subhani[1], Muhammad Shahid[1], Muhammad Naveed[2], Sadia Aslam[3], Asma Irshad[4], Muhammad Salman Sarwer[1], Shuja-ur-Rehman[1] [1] Department of Biochemistry, University of Agriculture, Faisalabad, Pakistan [2] Institute of Soil and Environmental Sciences, University of Agriculture, Faisalabad, Pakistan [3]Department of Biochemistry, Government College Women University, Faisalabad, Pakistan [4]Center of Excellence in Molecular Biology, University of Punjab, Lahore, Pakistan Email: zainisub@gmail.com
146.	**Determination of metronidazole induce oxidative damage in liver, Kidney and gills of *Oreochromis niloticus*** Asif Saleem[1] and Kashif Jilani[2] [1]**Department of Zoology and Fisheries** [2]Department of Biochemistry, University of Agriculture, Faisal E-mail: kashif.jillani@uaf.edu.pk
147.	**Formulation of Amomum subulatum nanosuspension and evaluation of angiotensin converting enzyme (ACE) inhibition potential** Munazza Rashid[a], Nazish Jahan[a] and Khalil-ur-Rehman[b] [a]Department of Chemistry, [b]Department of Biochemistry, UAF
148.	**The physiochemical composition of date palm fruits at three different edible stages** Muhammad Waseem*[a], Summar Abbas Naqvi[a], Muhammad Jafar Jaskani[a], Muhammad Shahid[b] Hina Fatima[b], Iqrar Ahmad Khan[a] [a]Institute of Horticultural Sciences, [b]Department of Biochemistry, UAF **Corresponding author:** wasimm45@gmail.com
149.	**Evaluation of growth promoting potential of plant growth promoting psychrophiles from Gilgit-Baltistan** Saboor-ul-Hassan and Ambreen Ahmed* Department of Botany, University of the Punjab, Quaid-e-Azam Campus, Lahore 54590, Pakistan

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150.	**Role of endocrine disrupting chemicals in the metabolism of carbohydrates: inserting the association into perspectives** Muhammad Sajid Hamid Akash[1], Shakila Sabir[1,2], Fareeha Fiayyaz[1,3], Kanwal Rehman[4] [1]Department of Pharmaceutical Chemistry, Government College University Faisalabad, Pakistan. [2]Department of Pharmacology, Government College University Faisalabad, Pakistan. [3]Department of Microbiology, Government College University Faisalabad, Pakistan. [4]Department of Pharmacy, University of Agriculture, Faisalabad, Pakistan. **Address for correspondence** Muhammad Sajid Hamid Akash (Email: sajidakash@gcuf.edu.pk/sajidakash@gmail.com) Kanwal Rehman (Email: kanwalakash@gmail.com/kanwal.akash@uaf.edu.pk
151.	**Production of microbial polyhydroxyalkonate as effective drug carrier** Rida Naz[1], Mahwish Salman[1], Muhammad Anjum Zia[2] [1]Department of Biochemistry, Government College University Faisalabad, Pakistan [2]Department of Biochemistry, University of Agriculture Faisalabad, Pakistan Email: ridanaz5969@gmail.com
152.	**Industrial applications of biofilms** Roman Anwar[1], Muhammad Shahid[1]* Department of Biochemistry, University of Agriculture Faisalabad *Corresponding Email: mshahiduaf@yahoo.com
153.	**Frequency of Chronic Complications in Diabetes Type 2, in Rural Areas of Southern Punjab, Pakistan** Maryam Pakiza[1], Muhammad Noman Ishaq[2], Aftab Ahmad[3], Zeeshan Nadeem[2] and Muhammad Hamza Tariq[4] [1]University of Agriculture Faisalabad, Faisalabad, Pakistan **[2]Institute of Biochemistry and Biotechnology, University of the Punjab, Lahore 54590, Pakistan** [3]Centre of Advanced Studied in Agriculture and Food Security, University of Agriculture Faisalabad, Faisalabad, Pakistan [4]Atta ur Rehman School of Applied Biosciences, National University of Science and Technology, Islamabad, Pakistan **Corresponding Author:** Maryampakiza07@gmail.com
154.	**A study of level of vitamin d and other bone markers in female diabetic patients** Iqra Ishfaq, Nazia Akhtar, Tahira Iqbal

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155.	**EVALUATION OF INTEGRONS AMONG CEPHALOSPORIN RESISTANT ESCHERICHIA COLI AND KLEBSIELLA PNEUMONIAE ISOLATED FROM BURN PATIENTS** Hafsa Sandhu, Muhammad Faizan, Nazia Akhter, Tahira Iqbal, Department of Biochemistry, University of Agriculture Faisalabad, Pakistan. Corresponding author. **hafsasandhu72@gmail.com**