# Abstracts book of 2nd INTERNATIONAL ONE HEALTH CONFERENCE

## One target: Long Term Survival of Human being through National Eco security System

## Held on November, 7-8, 2024

# College of veterinary Sciences & Animal Husbandry, Abdul Wali Khan University Mardan

**VICE CHANCELOR MESSAGE**

Dear Esteemed Participants,

It is with great pleasure and enthusiasm that I extend my warmest greetings to all of you as we embark on the journey of the 2nd International Conference on One Health. It gives me immense pride to witness the convergence of brilliant minds from across the globe, dedicated to advancing the frontiers of science and addressing critical issues in the realms of One Health, Combatting Diseases, Antimicrobial Resistance, Livestock Improvement, and OMICS: The Future.

In the rapidly evolving landscape of scientific research, this conference stands as a testament to our commitment to fostering interdisciplinary collaboration and pushing the boundaries of knowledge. The themes of the conference are not merely topics for discussion; they represent our collective responsibility to address the challenges that threaten the health and well-being of our global community.

The concept of One Health underscores the interconnectedness of human, animal, and environmental health, emphasizing the need for holistic approaches to combat emerging diseases. In the face of ever-evolving microbial threats, the discussions on Combatting Diseases and Antimicrobial Resistance are timely and crucial. Livestock Improvement, as a theme, acknowledges the pivotal role of genetics in enhancing the productivity and resilience of our agricultural systems. Finally, OMICS: The Future encapsulates the transformative power of advanced technologies in unraveling the complexities of living systems.

As we convene to share our research findings, insights, and innovations, I encourage you to engage in meaningful discussions, foster collaborations, and explore novel avenues for research. The abstracts presented in this conference will not only contribute to the abstract book but also serve as building blocks for future breakthroughs in the field.

I extend my heartfelt appreciation to the organizing committee, keynote speakers, presenters, and participants for your dedication to the pursuit of knowledge and the betterment of our global

community. May this conference be a catalyst for groundbreaking discoveries and a forum for nurturing lasting connections.

I wish you all a stimulating and enriching experience at the 2nd International Conference on One health. Together, let us chart the course towards a healthier, more resilient future.

**Prof. Dr. Zahir Shah**

Vice Chancellor

Abdul Wali Khan University Mardan

## CHIEF ORGANIZER AND FOCAL PERSON MESSAGE

Dear Participants,

It is with immense pleasure and excitement that I extend my warmest welcome to you for the upcoming 2nd International Conference on One Health. As the Chief Organizer and Focal Person, it is truly an honor to host this groundbreaking event at Abdul Wali Khan University Mardan in the picturesque city of Mardan, Khyber Pakhtunkhwa, Pakistan.

Our conference aims to bring together a diverse and accomplished group of researchers, scholars, and practitioners who share a common passion for advancing the frontiers of science, particularly in the crucial areas of One Health, Combatting Diseases, Antimicrobial Resistance, Livestock Improvement, and OMICS: The Future.

Over the course of two enriching days, we anticipate dynamic discussions and thought-provoking presentations that will not only deepen our understanding of the challenges we face but also inspire innovative solutions. Abdul Wali Khan University Mardan, nestled in the heart of Khyber Pakhtunkhwa, provides a fitting backdrop for this collaborative exchange of ideas.

The themes of the conference are not just topics of conversation; they represent the core issues that demand our attention and collective effort. One Health emphasizes the interconnectedness of various facets of health, underscoring the need for collaborative, interdisciplinary approaches. Combatting Diseases and addressing Antimicrobial Resistance are critical in safeguarding public health globally, and discussions on Livestock Improvement are integral to the sustainability of agricultural systems. OMICS: The Future heralds a new era of scientific exploration and discovery, powered by advanced technologies.

I extend my heartfelt gratitude to the organizing committee, esteemed keynote speakers, and all contributors who have worked tirelessly to make this conference a reality. Your commitment to advancing knowledge and promoting collaboration is truly commendable.

As the Chief Organizer and Focal Person, I encourage you to actively engage in the sessions, network with fellow participants, and seize the opportunity to shape the future of scientific research in these vital areas. The abstracts presented at the conference will not only be published in the abstract book but will also contribute significantly to the global scientific discourse.

Once again, welcome to the 2nd International Conference on One Health. Let us make these two days a memorable and transformative experience for us all.

Best Regards,
Professor Dr. Sher Bahadar Khan

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1. **COURSE OF RED MEAT PRICES IN THE KONYA PROVINCE**


Arzu KAN Mithat DİREK

Selçuk Üniversitesi, Ziraat Fakültesi, Tarım Ekonomisi Bölümü,Konya


**Abstract**

In this study, prices of red meat between 1995-2003 years at Konya State Meat and Fish Organization (EBK) have been examined. Seasonal fluctuation of red meat price of Konya city has also been analyzed. According to research, findings in the period discussed above, real red meat prices according to base year were decreased 18.12%. In this study, the aims of determining seasonal fluctuations of red meat real prices between 1995-2003 years have been examined. According to this, in the period being talked of real prices show important seasonal fluctuation. According to research result, real meat prices were over the seasonal average in July, August and September, but lower in April, May and February.
**Key Words:** Red Meat, Price, Seasonal Fluctuations, Konya

## 2. Strengthening rural livelihoods and health resilience: FAO's agricultural development and CHHF risk mitigation in Balochistan, Pakistan

Muhammad Azam Kakar
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**Abstract**

Crimean-Congo haemorrhagic fever virus is a zoonotic virus poses a high public health risk due to its potential to cause outbreaks and the lack of specific treatments or vaccines. Most human infections occur through tick bites but contact with blood and bodily fluids from infected animals is also a risk. CCHF symptoms in humans include fever, headache, vomiting, diarrhoea, muscle pain, and in severe cases, bleeding and multi-organ dysfunction.

CCHFV is widespread from western Asia to Africa, including Pakistan, where outbreaks have been recorded since 1976. Although Pakistan ranks fourth in Asia for reported cases, no comprehensive studies have been conducted on human and animal prevalence. This study aimed to assess the nationwide risk by detecting CCHFV and antibodies in livestock, ticks, and humans, identifying virus circulation and specific geographic hotspots.

Our findings confirmed CCHFV circulation in Pakistan, with antibodies detected in livestock such as sheep, goats, cattle, buffalo, and camels, suggesting a potential transmission role to humans. RT-PCR analysis of animal blood and tick samples confirmed active virus circulation, and genetic analysis identified genotype-IV as predominant in Pakistan. Interestingly, Rhipicephalus ticks, rather than Hyalomma, tested positive for CCHFV, aligning with similar findings from Iran, highlighting the role of Rhipicephalus in virus transmission in the region. Higher antibody prevalence in camels suggests they may play a key role in CCHFV ecology.

The FAO's activities in Balochistan aim to enhance agricultural productivity, food security, and rural livelihoods. Through targeted interventions, the FAO focuses on sustainable water resource management, control of ecto and endo parasites, livestock and crop production, and capacity-building for smallholder farmers. Projects include improving irrigation systems, introducing resilient crop varieties, and strengthening the livestock sector by promoting animal health and effective grazing practices.

In this regard, the human cases were more prevalent in Balochistan, likely due to higher exposure from livestock-related occupations. Antibody prevalence was also higher among herdsmen compared to the general population. We recommend further studies to assess occupational risks, conduct genomic diversity surveys, and investigate the role of camels in CCHFV ecology in Pakistan.

**3. Funding Opportunities for National Eco-Security, A PSF perspective**

Dr. Muhammad Israr, Principal Scientific Officer, Pakistan Science Foundation, Islamabad

**Abstract**

PSF was established in 1973 through an Act of the Parliament, as an Autonomous Organization for Funding and Promotion of scientific research having bearing on socio-

economic development of the country. Promotion of basic and applied research having bearing on socio-economic development of the country. The utilization of research results including pilot plant studies. Establishment of scientific & technological information and dissemination centers. Establishment of science centres, science clubs, museums, herbaria and planetaria. Promotion of scientific societies, associations and academies. Organizing science conferences, symposia and seminars. Exchange of visits of scientists and technologists with other countries. Grant of awards, fellowships Special scientific surveys. Maintain a national register of highly qualified and talented scientists of Pakistan Establish liaison with similar bodies in other countries.

## 4. Machine Learning and Chemometric-Assisted Identification of Metabolic Markers from FTIR Spectroscopy for Detection of Adenocarcinoma

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**Abstract**

**Background** Carcinoma of the lungs is the second most common cancer and a leading cause of cancer-related mortalities worldwide. Besides co-morbid conditions, majority of the lung cancer patients are diagnosed at a late stage primarily not amenable to potentially curative treatment and decreased survival rates. **Objective**; to develop machine learning models and biomarkers for lung tumor detection and categorization through FTIR analysis with chemometrics. **Methods** Blood samples from 60 adenocarcinomas and 61 COPD cases were collected, lyophilized and subjected to FTIR analysis. Peaks significantly different between the cohorts were identified by student's t-test and post-hoc analysis. Furthermore, cohorts were classified using unsupervised (Principal Component and Heatmap analysis) or supervised models (partial least square regression – discriminant analysis, random forest and support vector machine) algorithms. **Results** Five hundred fifty four- peaks were found significantly different among the cohorts. These unsupervised models correctly identified the samples belonging to different cohorts, however, some overlapping was noted. The PLS-DA algorithm provided a clear separation among the three cohorts. The PLS-DA cross-validation exhibited that the two-component model best fitted and exhibited the highest $R^2$ and $Q^2$ values (0.83 and 0.63, respectively). The accuracy of the model also ranged from 0.92 - 0.96 and is largely constant with different numbers of variables. Further, PLS-DA prediction accuracy ($p$ =0.026) and separation distance ($p$ = 0.013) between the samples was also confirmed with 1000 LOOCV permutation tests. Random forest classification correctly classified all suspected cases whereas 3 samples from ADC and 3 samples from the suspected group were classified as suspected with an OOB error of 0.214. Finally, six wavelengths 974.05, 1049.26, 1095.57, 1446.61, 2910.58, and 3224.98 $cm^{-1}$ with diagnostic values were identified across the three groups. **Conclusion** FTIR has proved to be a reliable and high throughput classification method for different lung pathologies and can be used as an alternate method for the diagnosis and monitoring of adenocarcinoma.

## 5. When Sanctions Hit Home: A Case Study on the Environmental Impacts of Economic Sanctions on Iran's Pollution and Eco-Security

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**Abstract**

This study examines the unintended environmental consequences of economic sanctions on Iran's eco-security and pollution levels. By analyzing the complex interplay between sanctions, trade dynamics, and access to cleaner technologies, we explore how sanctions can inadvertently contribute to environmental degradation and undermine ecological security. Our findings suggest that sanctions have negatively affected Iran's environmental performance in several ways, including increased reliance on polluting industries, limited access to cleaner technologies, and the adoption of survivalist policies that prioritize short-term economic gains over long-term environmental sustainability. Furthermore, we observe differential impacts based on the type and severity of sanctions imposed, Iran's unique socio-economic context, and the global economic networks in which sanctions operate. The study highlights the importance of considering environmental implications when designing and implementing sanctions, and proposes potential policy interventions to mitigate adverse effects on the environment. The present analysis aims to contributes to a more comprehensive understanding of the multifaceted impacts of economic sanctions and emphasizes the need for integrated policy approaches that address both political and environmental challenges in target countries.

**Keywords:** eco-security; Iran; Sanctions; environment; ecology.

## 6. EXAMINING THE GROWTH PERFORMANCE OF GRASS CARP (*Ctenopharyngodon idella*) USING PEA AND POTATO PEEL WASTE AS A SUPPLEMENT IN THEIR DIET

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***Abstract***

The cost of artificial feed in fish farming is high due to its high protein quality. The current study focused to develop a low-cost feed from local ingredients and vegetable left-overs, i.e. pea and potato peel, to substitute expensive ingredients and refine the consumption of organic waste. The experimental diet was formulated by mixing 14% pea and 14.5% potato peel waste, 6% fish meal, 6% soybean meal, 25% rape seed meal, 25% maize gluten, 7% wheat flour, 2.2% minerals & vitamin mix, and 0.3% vitamin C, with CP value of 28.70%, whereas, the commercial diet had 23±1% CP value. Fish in one control tank (CTR) were fed the commercial feed and three replicas of experimental group were fed the experimental diet for 5 weeks. A 100% survival rate was observed in experimental tank 3 (ET3), followed by 91.67% in CTR as well as ET2, and the lowest 83.33% in ET1. The value of average weight gain was highest in CTR (0.132gm) and higher in ET1 (0.102gm), followed by ET3 (0.074gm) and ET2 (0.064gm). The value of average length gain was highest in ET1 (0.08cm), followed by CTR (0.058cm), ET3 (0.042cm) and ET2 (0.016cm). The mean values of food conversion ratio and feed intake were maximum for the commercial feed in control tank (1.34; 0.43gm), followed by the ET1 (1.48; 0.37gm), ET3 (1.95; 0.34gm) and ET2 (2.64; 0.34gm). Economically, the experimental feed was 36 Rs/Kg cheaper than the commercial feed. This study concludes that fish feed supplemented with pea and potato peel waste (for the levels studied) has no deleterious effect on health of the grass carp, reduces the feed production cost and saves the environment from the discarded organic waste. In terms of survival, both the peel wastes can be successfully incorporated in the diets of cultured grass carp.

***Keywords;*** fish farming, grass carp, expensive ingredients, low-cost feed, pea and potato peel waste, local ingredients, waste consumption.

## 7. ANTIVIRAL ACTIVITY OF *AESCULUS INDICA* EXTRACT AGAINST NEWCASTLE DISEASE VIRUS IN POULTRY

Shazma Bibi
**Corresponding Author:** Dr. Abdul Sajid

**ABSTRACT**

Newcastle disease is a fatal virus that costs the poultry business millions of dollars. Despite immunizations, there is no effective antiviral medicine for this virus. Medicinal herbs, such as *Aesculus indica*, have medicinal characteristics and are used to treat a variety of ailments, including viral problems. An experiment was carried out at District Buner to test the antiviral activity of *Aesculus indica* extracts on chick embryonated eggs. The findings revealed that all plant extracts, regardless of potential or phytochemical makeup, had antiviral activity against NDV in ovo, showing that medicinal plants have the potential to be a trustworthy source of treatment. The highest survival rate was demonstrated by the ethanolic extract at 500µg/ml and 250µg/ml doses due to its overall effect on NDV activity, lack of embryo mortality, and HA titer.

The HA test confirms that ethanol is more successful than other substances in causing agglutination in the second well. The fruit extract of *Aesculus indica* proved more effective than the leaf extract. The extract's phytochemical study identified steroids, flavonoids, tannins, and saponins—all of which have been identified as new antiviral agents and may be used to effectively manage the economically significant Newcastle disease in chicken. The growth of the virus was inversely correlated with the increase in extract concentration. Multiple secondary metabolite functional groups, such as carboxylic acid, alkyl halides, aromatic groups, and alkyne, were found in this medicinal plant by FTIR analysis of ethanolic, methanolic, chloroformic, and distilled water extract. The antiviral, antibacterial, hypocholesterolemic, antimicrobial, antioxidant, anticancer, anti-inflammatory, and anticancer activities of these compounds were found. Our research leads us to the conclusion that *Aesculus indica* plant can be used as a substitute for a variety of illnesses, including the virus that causes Newcastle disease in chickens.

Key words: NDV, Phytochemical analysis, *Aesulus indica*, FTIR, GC-MS, embryonated eggs

## 8. EFFECT OF DIETARY SUPPLEMENTATION OF PROBIOTIC (BACILLUS SUBTILIS) ON SEROLOGICAL PARAMETERS AND MINERAL RETENTION IN DIFFERENT TISSUES OF JAPANESE QUAIL (COTURNIX JAPONICA)

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**Abstract**

The current study was set out to examine the effects of probiotic (*Bacillus subtilis*) food supplementation on serological parameters and mineral retention in several Japanese quail (Coturnix japonica) tissues. In total, 160 Japanese quails were randomly divided into four groups each having 4 replicates and 10 birds per replicate. Control group (A) was fed a basal diet without any supplementation throughout the experimental period. The standard diet for treatment groups was supplemented with three different dosages of Bacillus subtilis: 0.1 gm/kg (Group A), 0.2 gm/kg (Group B), and 0.3 gm/kg (Group C). The results indicated significant differences ($p<0.05$) in serum glucose levels, with the control group having the highest levels (338.52 mg/dL) compared to the treatment groups. The serum uric acid levels varied significantly ($p<0.05$), with the control group having the highest levels (6.10±0.04 mg/dL) and Group C the lowest (5.08±0.02 mg/dL. Urea levels also varied significantly ($p<0.05$), with Group A showing the highest levels (12.19±0.35 mg/dL) and Group C the lowest (9.09±0.06 mg/dL). Moreover, the serum triglyceride levels differed significantly ($p=0.01$), with Group A having the highest levels (184.81±4.43 mg/dL) and Group C the lowest (144.63±0.40 mg/dL). Similarly, serum cholesterol levels varied significantly ($p=0.01$), with Group A having the highest levels (215.22±0.96 mg/dL) and Group C the lowest (155.65±1.15 mg/dL). Mineral retention in bone and serum were all significant, except for selenium (Se) and copper (Cu), respectively, however for eggshell mineral, the results were only significant($p<0.05$) in case of P and Cu. This study shows that *Bacillus subtilis* supplementation improves serological parameters and mineral retention in Japanese quail, highlighting its potential benefits for poultry nutrition and health.

**Keywords**: Blood Biochemistry, Minerals, Probiotics, Quail, Supplement.

## 9. SEROPREVALENCE OF NEWCASTLE DISEASE VIRUS IN BACKYARD CHICKENS OF DISTRICT CHARSADDA

**Aqsa Rasid, Sher Bahadar Khan and Abdul Sajid**

Poultry is the largest livestock group, with approximately 14,000 million birds. Poultry consumption in Pakistan is the primary source of essential nutrients and proteins, as well as an important means of income. However, it is faced by a variety of illnesses, resulting in bird mortality and economic loss for farmers. Newcastle disease, commonly known as Avian Paramyxovirus-1, is an extremely fatal viral infection that affects poultry. It belongs to the Avulavirus genus and the Paramyxovirus serotype family. The current study aimed to identify the sero-prevalence of Newcastle Disease Virus among the backyard chickens using indirect enzyme-linked immunosorbent assay. A total of 291 blood samples from non-vaccinated backyard chickens were collected from 18 union councils of 3 Tehsils namely Tehsil Charsadda, Tehsil Tangi

and Tehsil Shabqadar in District Charsadda. Out of 291 collected samples, 213 samples were tested using indirect ELISA Kit against NDV antibodies. The rest of the samples (78) were not fit for analysis due to various conditions including insufficient volume, hemolysis in the blood and loss of sample due to leakage from the broken Eppendorf tube during transportation. After analysis of tested samples, 147 samples were found positive with the overall prevalence of 69.01% in different regions of district Charsadda. The Tehsil wise analysis of data reflect that the highest prevalence rate was recorded in Tehsil Charsadda (72.8%) whereas the lowest positivity rate was recorded in Tehsil Shabqadar (62.5%). In case of breed-wise sero-prevalence, Misri breeds showed the highest prevalence rate of 83.3% while Aseel breed (59.2%) showed the lowest prevalence. The union council wise analysis of data showed that highest prevalence was recorded in union council Zaim (91.6%) whereas the lowest positivity rate was reported in union council Utmanzai (23.07%). In conclusion, the findings of the present research demonstrated that backyard chickens are highly exposed to Newcastle disease virus. Various factors, which mainly contribute to ND spread include lack of vaccinations, dietary deficits, and interaction between chickens of different villages etc. It is recommended that proper vaccination program against NDV and suitable management practices for prevention and control of disease and monitoring programs may improve backyard poultry output and decrease losses from disease outbreaks.

**Keywords**: Poultry, Newcastle disease, Avian Paramyxovirus-1, Backyard chicken, Sero-prevalence, Indirect ELISA, District Charsadda.

## 10. Comparative analysis of different routes of vaccination and vaccines against Newcastle disease in broiler.

Barooj1, Abdul Sajid

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**Abstract:**

Newcastle disease is a serious viral disease of chickens caused by highly virulent strains of Avian Paramyxovirus. To reduce NDV infection, vaccination has recently emerged as one of the most used means of treating Newcastle disease. The route of vaccine delivery has a significant impact on immunization and protection outcomes in chickens. This study aimed to examine the

effectiveness of various administration routes and vaccinations against Newcastle disease as well as booster dose interval. A total of 98 one-day old non-pathogenic chicks were divided in to 7 groups (n=14 chicks per group) and immunized through different routes and vaccines. Treatment included non-vaccinated and vaccinated, first four groups (G1-G4) were immunized through live vaccine (Lasota) and two groups were immunized through inactivated Vaccine (G5-G6) one group (G6) immunized with triple dose of inactivated vaccine and last group (G7) kept non-vaccinated as negative control group. Some groups received vaccine with same routes some with different routes. Serum samples were taken from chickens at weekly interval to determine the ND antibody titer. Result showed chickens vaccinated with same routes, intraocular showed high antibody titer than oral. In contrast, the triple dose group showed high level of antibody titer immunized with inactivated vaccines via intranasal than secondary dose.The PV at 21 day showed third week is the ideal time for a booster dose.

**Key words:**

Newcastle virus, Vaccine, immunized, Lasota, HI Titter, Booster Dose.

## 11. PROFOMANCE OF DIFFERENT VARIETIES OF LETTUCE (LACTUCA SATIVA L.) UNDER AGRO CLIMATIC CONDITIONS OF MANSEHRA

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**ABSTRACT**

Lettuce (Lactuca sativa L.) is an annual plant belongs to the family Composite one of the important vegetables in salad crop. It is the most liked salad crops in the world. It is a native of Europe, asia and northern Africa and has been cultivated for 5000 years. Lettuce is a rich source of antioxidants, Vitamin A, C, and phytochemicals, which are anti-carcinogenic. Local production decreased by >35% over the past few years due to the tomato spotted wilt virus, a devastating thrips-transmitted disease. More recently, silver leaf whitefly, Benicia argentifolii, outbreaks have also affected lettuce production throughout the years. A pound of lettuce contains 95% water, 56 calories, 3.9 g protein, 0.3 g fat, 86 mg calcium, 2.2 mg iron, 1,420 mg vitamin A, and 54 mg

ascorbic acid. "Mixed lettuce" production includes green leaf, red leaf, butter, and romaine types. The present study was conducted to assess the profomance of different varieties of lettuce under agro climatic conditions of mansehra. Four rice genotypes were evaluated in randomized complete block design using 3 replications at National Tea and High Value Crops Research Institute (NTHRI) Shinkiari, Mansehra, during the lettuce-growing season 2022. Data were recorded on Leaf Length (cm), Leaf width (cm), No of leaves pre plant, Days to maturity (days), Plant height (cm), Plant spreading (cm), Plant biomass with roots (g). Plant biomass without roots (g), Plant biomass only for roots (g), Root length (cm). Analysis of variance showed significant ($p \leq 0.05$)

differences among lettuce variety of all studied traits. Lettuce genotypes red lurael x displayed minimum plant height. The red oak variety recorded maximum plant height. Maximum plant biomass with roots was recorded by lettuce variety of red oak. Furthermore, Lettuce varieties of Red oak display superior performance for yield and yield-related traits and are recommended for the local farmers of the Hazra Region.

**Keywords:** Lettuce varieties, Agro-climatic conditions, Mansehra region, Yield performance, Growth parameters, Morphological characteristics

## 12. Efficacy of Dietary Root Extract of Traditional Chinese Medicinal Herb Astragalus Membranous on a Goat with Fibrotic Udder

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Abstract

**Backgrounds:** Mastitis causes significant economic losses in the dairy industry and may lead to a permanent loss of udder when fibrosis occurs. The aim of the study was to investigate the efficacy and safety of a well-known traditional Chinese herb Astragalus (*Astragalus membranaceus*) root extract as a dietary supplement to female goat on udder health and immune response.

**Methods/Results:** Four-year-old female goat with a five-month history of udder fibrosis developed post-mastitis and was presented to the Veterinary Teaching Hospital, The University of Agriculture Peshawar, Pakistan. After a thorough clinical examination, the animal right side udder

found hard, painless, cold. This chronic udder condition of the udder treated with a dietary supplement of Astragalus root mixed with the basic diet at dose rate 20g/animal for 21 days. Following 21 days of dietary supplement, the udder volume gradually decreased by about 26.47%. Furthermore, we observed an increased blood cell count and body weight and an improvement in the animal's general appearance.

**Conclusion:** This study highlight that dietary supplement of Astragalus root extract can stimulate immune cells, suppress udder fibrosis, and repair damaged organ in goat. However, we recommend large-scale clinical and laboratory trials to further strengthen our findings for animals with udder fibrosis condition.

## 13. Molecular detection of *Rickettsia aeschlimannii*, *Candidatus* Rickettsia shennongii, *Rickettsia* sp. and *Coxiella* burnetii in ticks collected from camels

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**Abstract**

Tick-borne bacteria of the genera *Rickettsia* and *Coxiella* cause several emerging veterinary and human infectious diseases. Ticks of the genus *Hyalomma* are medically important vectors due to their potential role in the transmission of pathogens to vertebrate hosts. There is an inadequate knowledge on tick-borne *Rickettsia* spp. and *Coxiella* spp. in ticks infesting transhumant camels in Pakistan. In this study, we conducted a molecular survey for screening of *Rickettsia* spp. and *Coxiella* spp. in ticks infesting camels. Seven hard tick species including *Hyalomma dromedarii*, *Hyalomma anatolicum*, *Hyalomma scupense*,

*Hyalomma isaaci*, *Hyalomma turanicum*, *Hyalomma asiaticum*, and *Rhipicephalus sanguineus* s.l were confirmed on camels in three distinct physiographic regions of Khyber Pakhtunkhwa, Pakistan. A subset of morphologically identified ticks were subjected to molecular assays for the genetic characterization of ticks and the detection and genetic characterization of *Rickettsia* and *Coxiella* species using standard genetic markers. Ticks screened for pathogens resulted in the detection of *Rickettsia aeschlimannii* and *Candidatus* Rickettsia shennongii and *Coxiella burnetii*. The molecular analysis further reveals the presence of an undetermined *Rickettsia aeschlimannii*-like species, that is making a distinct phylogenetic clade with *R. aeschlimannii*. The detection of pathogens in camel ticks poses potential health hazards as these ticks frequently bite humans. Molecular screening of *Rickettsia* spp. and *Coxiella* spp. associated with camel ticks is a preliminary step toward the surveillance of evaluating their zoonotic threats in the region.

**Keywords:** *Hyalomma*, Tick-borne pathogens, Transhumant, Camel, *Rickettsia*, Q-fever

## 14. Blunt Antibiotic Weapons Against Mastitis

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**Abstract:**

Antimicrobial resistance has become one the most threatening issue for public health. As antibiotics are considered the most important defense against microbes, the development of antibiotic resistance in bacteria has put the world at constant threat of emerging outbreaks with no backup plans. The situation is getting worse by the lack of alternative ways of protection against microbial agents. The development of pathogens which are resistant to antibiotics, the health of both humans and animals is at stake. *Staphylococcus aureus*, a highly virulent pathogen, is responsible for the clinical and subclinical mastitis. The signs of mastitis include decreased milk production and change in the color of milk, observed in case of clinical mastitis. After the emergence of antibiotic resistance, the causative agent of both forms of mastitis have also

developed significant resistance with special focus on Methicillin-resistant *S. aureus* (MRSA) and Vancomycin-resistant *S. aureus* (VRSA). The treatment of mastitis without performance of antibiotics is very difficult as *S. aureus* causes contagious infections in the host especially if it is Methicillin-resistant *S. aureus* (MRSA). The antibiotic treatment failure is attributed to the presence of the mec-A gene in MRSA as the gene deactivates the drug especially β-lactam antibiotics. In the dairy sector, antibiotics were considered the first line of defense against *S. aureus*, but the alarming situation of antibiotic resistance led to many rules and restrictions against the use of antibiotics throughout the world. To handle this situation, researchers came up with many alternative ways for treatment against *S. aureus* to treat mastitis. These alternative ways include herbal medicine and nanotechnology. The results of these products against MRSA are satisfying. The development of these alternative therapies depends on conditions such resistance capacity of microbial agents, population of pathogens and environmental conditions.

**Keywords:** Mastitis, Methicillin-resistant *S. aureus*, Vancomycin-resistant *S. aureus*, MRSA, VRSA, Antibiotic resistance, Herbal medicine, Nanotechnology.

**15. Evaluation of *Bacillus Subtilis* for Suppressing of *Agrobacterium Tumefacien* and their Histopathological Interaction in Peach Plant**

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Peach Crown gall is profoundly considered a serious agricultural issue globally especially in Pakistan, causing substantial losses due to *Agrobacterium tumefaciens*. To mitigate these losses, essential control measures are required. Different strategies, including chemical, cultural, and biological approaches, can be employed to manage this disease. Biological control offers a cost-effective, eco-friendly, and health-friendly solution for controlling crown gall in peach. The aim of the study is to evaluate the antagonistic potential of *Bacillus subtilis* isolated from soil in District Swat against *A. tumefaciens*. The isolates of *B. subtilis* and *A. tumefaciens* were identified and characterized by 16s rRNA sequencing. Various dilutions of *B. subtilis* culture filtrate were evaluated against 01 ml concentration of *A. tumefaciens*. The culture filtrate of 2 ml *B. subtilis* concentration reveal maximum growth inhibition. The temperature effect showed optimal growth of *B. subtilis* at 35$^{o}$C with 0.26 to 0.29 OD600 values. *B. subtilis* growth was optimum between 7 to 7.5 pH with OD600 range 0.03 to 0.35. *B. subtilis* (SBS 2310) was selected for pot experiment

to check its biocontrol potential against *A. tumefaciens*. The outcome showed that *B. subtilis* greatly enhanced peach yield and overall agronomic characteristics in screen house. Screen house trials exhibited *B. subtilis* treated plants were profusely increased plant height, fresh and dried shoot and root weight, root length and leaves number with 18.27%, 31 and 27.9%, 16.2 and 28.3%, 28% as well as 21% compared to infected plants subsequently. Histopathological examination of *B. subtilis* and *A. tumefaciens* interaction on peach roots showed substantial cellular alterations among all treatments. *A. tumefaciens* colonized roots indicated severely disrupted epidermal and vascular region of plant. Pathogen caused disruptions were influentially minimized by *B. subtilis.* Root epidermis was inoculated with both *B. subtilis* and *A. tumefaciens* after treatment. *A. tumefaciens* was rarely observed in cortical and epidermal region of roots without damaging cells. *B. subtilis* treated plants showed minute cellular alterations in cortex and vascular tissues.

**Keywords:** Crown gall, *Agrobacterium tumefaciens, Bacillus subtilis,* 16s ribosomal RNA, Histopathology.

**16. The Body Coat Color Prototype of Azikheli Buffalo in Swat Khyber Pakhtunkhwa, Pakistan**

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**Abstract:**

Azikheli Buffalo Breed, Its Productive & Reproductive Performance Under Traditional Management System in District Swat Khyber Pakhtunkhwa Pakistan. This study on physical and morphometric characteristics, productive and reproductive performance was carried out on Azikheli buffalos and bulls in Khwazakhela, District Swat, Khyber Pakhtunkhwa, Pakistan. Khwazakhela valley (Azikheil) of Swat District was selected as the study area which is a central location in the original home tract of the Azikheli buffalo. This is one of the most fertile valleys of Swat and lying at about 20 kilometers distance from Mingora, the head quarter of Swat district.

**Keywords:** Body, Coat Color, Prototype, Azikheli Buffalo, Swat

## 17. Effect of Different Urea Doses on the Performance of Wheat Under the Agro-Climatic Conditions of Mansehra, Khyber Pakhtunkhwa, Pakistan

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**Abstract**

The research conducted aimed to evaluate the impact of varying urea doses on the performance of wheat (*Triticum aestivum*), with a focus on growth, yield, and nitrogen use efficiency. Urea, a common nitrogen fertilizer, plays a crucial role in enhancing crop productivity. The experiment was conducted during the 2022-2023 at the Agricultural Research Field, of Hazara University Mansehra in Khyber Pakhtunkhwa, Pakistan. The research material consisted of a Wheat variety. The Seeds were sown in RCBD design on 15th October 2022 at an Agriculture research farm at Hazara University Mansehra. The trial was arranged using a randomized complete block design with three replications. In the agro-climatic conditions of Mansehra, comprehensive data were gathered on various morphological and yield-related attributes. These included measurements such

as plant height, spike length, spikelet count per spike, thousand-grain weight, grain yield kg/ha-1, and biological yield kg/ha-1. The study concludes that from experiments that wheat on

different urea applications gives significant results from germination to till harvesting under the agro-climatic condition of Mansehra. It means that the wheat on different Urea applications shows improvement in Plant height, Spike length, spikelet count per spike and 1000-grain weight. Based on the results, it is recommended to apply urea at optimal rates to enhance wheat growth and yield, with the most effective rate being 65 grams per 6 $m^2$.

**Keywords:** - Urea Fertilization, Crop Performance, Growth Parameters, Agronomic Practices, Wheat Varieties

## 18. PREVELANCE AND POTENTIAL RISK FACTORS ANALYSIS OF CRYPTOSPORIDIOSIS IN BUFFALO CALVES IN DISTRICT MARDAN

Fahad Nawaz Khan 1*

**Abstract**

Cryptosporidium is a protozoan infection that affects a wide range vertebrates including human, animals, birds and fishes and causes acute gastrointestinal infections. The present study was conducted to assess the prevalence of Cryptosporidium infection in a buffalo calves in district Mardan, which causes cryptosporidiosis infections. It is one of the most common infections across the globe mainly affecting undeveloped and developing countries including Pakistan. The results of cryptosporidiosis in infected animals were high mortality in neonatal calves and huge economics loss to the dairy farms. Various risk factors such as age, gender, area, season, feeding methods, treatment history, and breeds effects the intensity of cryptosporidiosis. All the samples were collected in labeled plastic bottles and were stored in refrigerator at 4°C before processing. One hundred samples per tehsil were collected from six tehsil and all the basic information's were entered in pre-designed questionnaire at the time of collection from each farm to obtain individuals and herd information's. All the samples were stained by Modified Ziehl Nielsen acid fast staining and examined under microscope at 10X and 40X. As a result, 10% prevelance was observed (60/600x100) in both diarrhic and non-diarrhic buffalo calves on the basis of various parameters like age, gender and season of the year, so in the present study the highest prevelance was reported at the age of less than six months (12.44%), followed by 7-12 months (9.04%), while

lowest at the age of more than 12 months (7.73%). Likewise, the highest prevelance was observed in buffalo calves in rainy season (monsoon) 22.48% and then in summer season (pre-monsoon) 9.72% while lowest prevelance observed in winter season (post-monsoon) 4.5%. Similarly the prevelance of infection was higher in female buffalo calves (11.87%) as compared to male buffalo calves (5.78%) tested for both diarrhic and non-diarrhic

**Keywords:** *Cryptosporidium,* Mardan, Calves, zoonotic, buffalo, prevelance

## 19. Saliva's Physical Properties are Evaluated and Confirmed as a non-Invasive Point-Of-Care Diagnostic Tool For Early Cow Pregnancy Detection

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**ABSTRACT:**

The present study aims to develop a cost-effective pregnancy detection model by combining early pregnancy detecting parameters. It changes the saliva's physical properties in response to early pregnancy in cattle, validates these changes as a diagnostic tool, and develops a point-of-care testing system. The study analyzed the various physical properties of saliva, including pH, buffering capacity, crystallization, density, flow rate, and electrical conductivity. The study was conducted at a different government cattle breeding and dairy farm in District Charsadda and Mardan. The total number of animals were 200 (100pregnant and 100 non-pregnant). The samples were processed in the Physiology laboratory of CVS & AH, AWKUM. The results showed that mean pH in pregnant cows was significantly higher (P≤0.05) (9.325 ± 0.13) than nonpregnant (8.133 ± 0.13). The mean Specific gravity (0.000173±0.00), and Conductivity (0.666 ± 0.029) in non-pregnant were higher (P≤0.05) than the pregnant cows (0.000146±0.00) and (0.538 ± 0.028). The mean buffer capacity (7.40 ± 0.10) and flow rate (91.92±1.13) non-pregnant were higher

(P≤0.05) than in the pregnant animals (2.42 ± 0.151) and (91.92±1.13). The mean density (0.172 ± 0.03) non-pregnant were higher (P≤0.05) than the pregnant animals (0.172 ± 0.03).T. In pregnant cows, Fern-like patterns are 26.19, fir-like 4.76, and Branch-like 11.90, Dot-like 9.52, Branche-fir 7.14, Branche-fir-fern 4.76, branch-fern 19.04, fern-fir 7.14, none 9.52. In non-pregnant cows, fern-like 0.00,fir-like 6.45, bran-like 0.00, Dot-like 19.35,branch-fir 29.03,branch-fern-fir 19.35,branch-fern 22.58,fern-fir 0.00, none 3.22. The study found that pregnant animals had higher pH values, less flow rate, and buffering capacity, and decreased specific gravity and conductivity of saliva compared to non-pregnant animals. The results of the study suggested that the changes in saliva physical properties can be used to detect the early pregnancy by using non invasive techniques.

**Keyword:** pregnancy, biomarker, non-invasive, physical properties, saliva.

## 20. Optimizing Acetone Production through Sustainable Dehydrogenation of Isopropyl Alcohol: A Pathway to Environmental and Industrial Efficiency

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**Abstract:**

Acetone plays a pivotal role in various industries due to its utility as a polar aprotic solvent, especially in sectors such as medicine, cosmetics, and food packaging. This study critically examines different production methods of acetone, focusing on the dehydrogenation and oxidation of isopropyl alcohol (IPA), the cumene process, and the ozonolysis of alkenes. A comprehensive analysis, considering efficiency, safety, cost, and environmental impacts, identifies the dehydrogenation of IPA as the optimal process for large-scale acetone production. The process design incorporates essential unit operations such as vaporizers, tubular reactors, flash tanks, absorbers, and distillation columns to enhance the recovery and purity of acetone. Special attention is given to catalyst selection, temperature regulation, and by-product management to improve process sustainability, aligning with long-term environmental goals. This work contributes to the broader discourse on sustainable industrial practices, complementing efforts toward global environmental security and resource management systems.

**Keywords:** Acetone production, Isopropyl alcohol dehydrogenation, Sustainable processes Environmental impact, Process optimization

## 21. Comparative Study of Commercial Bread Wheat Varieties and Advance Wheat Lines to Explore Superior Attributes for Variety Development and Future Breeding Guidelines

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**ABSTRACT**

The conducted research aims at the potential and performance of advance wheat lines and commercial bread wheat varieties are vital for implicit variety adaptation. Comparative study was designed to quantify the performance of advance wheat lines, sixteen commercial wheat varieties and fourteen advance wheat lines were tested in randomized complete block design with 3 replications at Agricultural Research Station Baffa, Mansehra during wheat growing season 2023-24. The study evaluated wheat advance lines yield and resistance against powdery mildew disease, as compared to commercial varieties for adaptability and variety development. Days to 50% heading, plant height (cm), grain yield (kgha-1), disease scoring and % severity of disease data was subjected to analysis of variance using statistical software R. Analysis of variance revealed significant differences for all parameters. Advance wheat lines identified for early heading were PR-115 (131) and PR-106 (132). Similarly, commercial variety Hashim-2010 (133) showed early heading. Commercial wheat varieties PS2013 (95.6cm), Janbaz (96cm), PS2005 (96.6cm) and

advance wheat lines PR106 (95.6cm), PR115 (95.6cm), IBGE (96.6cm) were found semi dwarf. Grain yield of commercial wheat variety Janbaz 6566.6 (kgha-1) was at par with advance wheat line PR118 6500(kgha-1). Commercial bread wheat varieties (PK2015, PS2005) and an advance line (PR115) showed lowest severity (2%) to powdery mildew disease. An advance line (PR115) and four commercial bread wheat varieties (PS-2005, PS-2008, PK-2015, Faisalabad-2008) were

found resistant against powdery mildew disease. Commercial bread wheat varieties PS-2005, PS-2008, PK-2015, Faisalabad-2008 and advance wheat line PR115 can be utilized as resistant source of powdery mildew in future breeding programs.

**Keywords:** Advanced wheat lines, Variety development, Wheat breeding, Agronomic traits, Yield potential, Genetic diversity

## 22. Molecular Epidemiology and Phylogenetic Analysis of Babesiosis in Cattle from District Malakand

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**Abstract**

The present study was planned to detect *Babesia bovis* and *Babesia bigemina* infected cattle from District Malakand, through microscopy and molecular diagnostic techniques. To determine the connection between the Babesia spp. Isolate and other isolates from throughout the globe, phylogenetic analysis was also done. For this purpose, a total of 164 blood samples were collected. Initially, the samples were screened through microscopy by preparing thin smears of fresh blood samples. The PCR was also performed to amplify the targeted gene (18s rRNA) for *Babesia bigemina* and *Babesia bovis*. The positivity rates were 25.6% (42/164) through PCR. The prevalence of babesiosis were highest in Dargai 11(30.5%) by microscopy and 14(33.3%) by PCR, and lowest in Thana, 3(8.3%) by microscopy and 6(14.28%) by PCR. Cross breed is more susceptible to babesiosis 11(26.1%) by PCR. The prevalence was more in females as compared to males in cattle 25(69.4%) and 11(30.6%) respectively. The highest infection rates were observed in adult cattle 28(66.7%) and low in calves 14(33.3%) for bovine babesiosis. Additionally, the prevalence was ascertained based on various risk factors and symptoms, such as age, sex, breed, floor system, fever, hemoglobinuria (red water), and tick presence or absence. A statistical investigation of various risk factors showed that a non-cemented floor, a high tick infestation, and advanced age all significantly raise the frequency of disease. This study highlights the crucial role of PCR, alongside microscopy, in the accurate diagnosis of babesiosis. These findings enhance the overall understanding of babesiosis prevalence and highlight the importance of advanced molecular techniques for implementing effective control measures.

**Keywords**: *Babesia bovis, Babesia bigemina*, PCR, prevalence, phylogenetic analysis, risk factors.

## 23. Molecularly and Microscopically Identification of Babesia Spp and Haematological Impact In Small Ruminants Of District Buner, Pakistan

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**ABSTRACT**

Babesiosis is a tick-created disease that infect both animals & humans. The disease also has a severe economic impact. These factors make a significant contribution to the country's GDP. The important objective of this findings was to identified morphologically & molecularly prevalence of babesiosis (specifically *babesia Ovis* & *babesia motasi*) in (sheep & goats) in District Buner, KP, Pakistan. my study aimed to identify any associated risk factors and haematological parameters in the infected animals. Overall, of 302 animals (sheep & goats). Blood specimen was taken from these animals & subsequently subjected to morphological examination using microscopic and molecular diagnosis through (PCR) testing. The microscopic examination was 12 % (36/302), while the PCR based prevalence was 8.6% (26/302), PCR based prevalence Bbo in sheep was 9.6% (17/176), while 1 species of Bbo found & goat (1/126). PCR base prevalence of *babesia motasi* found in goats was 7.1% (9/126), while no Bmo found in sheep. The hematological analysis showed variations in blood parameters of babesia species. There was significant decrease in platelets & (RBC), leads to anemia. while (WBC) increase gradually. high prevalence found in tick infested animals (17/143,11.8%), full grazing animals (15/70, 21.4%), female was (18/198, 9%), & animals having no acaricides treatment having infection rate was (14/109, 12.8%), the frequency rate of babesia species illness in summer was (18/194, 9.2%), while in winter was (8/108, 7.4%). The risk factor revealed in this study should be addressed when developing control measures to minimize babesiosis prevalence.

**Keyword:** Babesiosis, PCR, hemat0l0gy, risk factors, Buner

## 24. Multidrug-Resistant *Staphylococcus aureus* in Raw Milk of Cows with Subclinical Mastitis: A One Health Approach to Antibiotic Resistance and Public Health Risks

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**Abstract:**

Bovine mastitis, particularly subclinical mastitis (SCM) is a major concern in dairy farming with global implications for animal health, food safety, and public health. The SCM has been associated with more than 135 different pathogens of which *Staphylococcus aureus* is the main etiology. This study highlights the One Health significance of *Staphylococcus aureus* by investigating its prevalence, antibiotic resistance patterns, and the presence of antibiotic resistance genes (*mecA*, *tetK*, *aacA-aphD*, and *blaZ*) in isolates from raw milk of cows in Pakistan. A total of 543 milk samples were collected from Holstein Friesian, Sahiwal, Cholistani, and Red Sindhi lactating cows across various dairy farms. Somatic cell counts (SCC) were assessed to detect SCM. *S. aureus* was isolated using mannitol salt agar (MSA) and was confirmed based on various biochemical assays, including gram staining (+ coccus), catalase test (+), and coagulase test (+). All the biochemically confirmed *S. aureus* isolates were molecularly identified using the thermonuclease (*nuc*) gene. The antibiotic resistance pattern of all the *S. aureus* isolates was evaluated through the disc diffusion method. Our findings revealed a significant contamination rate, with 57.09% of the milk samples testing positive for SCM and *S. aureus* detected in 30.32% of these cases. Among the *S. aureus* isolates, 50% were multidrug-resistant (MDR), with 11 isolates identified as methicillin-resistant *S. aureus* (MRSA). Alarmingly, the isolates showed high resistance to Lincomycin (84.04%) and Ampicillin (45.74%), while maintaining low resistance to Sulfamethoxazole/Trimethoprim (3.19%) and Gentamycin (6.38%). PCR analysis detected the presence of the *blaZ* gene in 55.31% of the isolates, the *tetK* gene in 46.80%, the *mecA* gene in 17.02%, and the *aacA-aphD* gene in 13.82%. This alarming MDR profile of *S. aureus*, particularly MRSA, poses a serious threat to both animal and human health, highlighting the importance of an integrated One Health approach. The spread of resistant bacteria through the food chain is a serious public health risk. This calls for immediate action to improve antibiotic stewardship in

veterinary care, better monitoring, and collaboration across different sectors to control antimicrobial resistance

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## 25. Ticks Collected from Different Animal Hosts and Environment in Selected Areas of Kashmir

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**Abstract**

Ticks are obligate blood sucking ectoparasites that acts as a vector for several pathogens includes bacteria, protozoans and viruses. Kashmir, which is located in north of Pakistan, have suitable temperature, humidity and hosts, making this region favorable for ticks. Despite potential threat to animals, including humans, studies on ticks have been largely neglected in Kashmir. Therefore, this study aims to focus on tick diversity in Kashmir. Ticks were collected manually from domestic animals and open environment. A total of 236 ticks were collected from different open habitats: meadows and agriculture area, and from domestic animals: hens, cows, goats and buffaloes. Ticks were identified representing three genera of hard ticks (Ixodidae) and one genus of soft ticks (Argasidae). Among the hard ticks, the identified species were: *Rhipicephalus microplus*, *Hyalomma anatolicum*, *Haemaphysalis sulcate*, *Haemaphysalis montgomeryi.* Among soft ticks, the identified species were: *Argas persicus and Argus reflexus*. Further molecular study should be conducted to monitor on ticks and tick-borne pathogens in the region, which can help to control the emerging ticks-borne disease in Kashmir.

**Keywords**: Ticks, Domestic Animals, Open Environment

## 26. Isolation and characterization of chitin and chitosan for evaluation of analgesic, anti-inflammatory and anti-pyretic potentials derived from cockroach (*periplanata Americana)* and termites.

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**Abstract:**

The chitin and chitosan biopolymers are extremely valuable because of their numerous industrial and pharmacological uses. Chitin and chitosan were extracted from the exoskeleton of *Periplaneta americana* (cockroaches) and termites using various acid and alkali techniques. The extraction process involves an initial demineralization step, during which integument dry powder was subjected into 500ml of 2.07mol/L HCl at 100 degree celsius for 30 minutes, followed by meticulous rinsing with distilled water to restore pH to its baseline. Deproteinization was carried out at 80 degree celsius using 500ml of 1mol/L NaOH solution, which was repeated for 24 hours. 250ml of 0.6mol/L NaOH was added at 100 degree celsius for 4 hours to obtain chitosan, followed by extensive washing and subsequent drying. FTIR analysis was used to identify the functional groups in *Periplaneta americana* and termites. The crystallinity of these biopolymers, which have a face-centered cubic structure, was determined by X-ray diffraction analysis. This study assessed the analgesic properties of chitin and chitosan via an acetic-acid-induced writhing test in mice, revealing a significant reduction in writhing behavior following the chitin and chitosan extract. Notably, chitin exhibits the highest degree of analgesic activity compared to chitosan. Both chitin and chitosan show anti-inflammatory effects, with chitosan absorbing proton ions at sites of inflammation, while chitin effectively inhibits ear edema and elicits an analgesic response in mice. Furthermore, the present study revealed antipyretic activity, with termite chitin demonstrating the most significant effect at a concentration of 500 µl/ml, followed by chitosan and chitin at 100 µl/ml. These findings indicate the potential of using chitin and chitosan derived from termites and *Periplaneta americana* as natural anti-inflammatory compounds, implying prospective uses in anti-inflammatory, antipyretic, and analgesic capabilities.

**Keywords:** *Periplaneta americana*; biopolymers; chitosan; chitin; antipyretic; demineralization; deproteinization

## 27. Assessing Post Thawed Semen Quality and Impact of Blood Testosterone and Mineral Composition of Fresh Semen in Bulls of Different Breeds

Maaz Ahmad

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**ABSTRACT**

The breeding bull plays a critical role in any livestock breeding operation. A fertile bull with superior genetic qualities might be used to increase cattle yield. A breeding bulls ability to reproduce is largely dependent on the fertility of the post-thawed semen, which is affected by a number of factors such as sperm motility, viability, intact plasma membrane, acrosomal integrity, DNA integrity, oxidative stress, trace mineral content of fresh semen and reproductive hormone levels in the blood. The goal of the study was to investigate the relationship between these variables in order to evaluate Friesian and Jersey bulls reproductive performance in comparison. From Friesian and Jersey bulls 60 (30+30) samples of semen were obtained with the help of artificial vagina, cryopreserved and analyzed using standard laboratory method for parameters that contained plasma membrane integrity, sperm live/dead,acrosomal integrity, motility, oxidative stress and DNA integrity. The assessment of trace

mineral composition and testosterone concentration we used fresh bulls semen. The comparison study's finding showed that two breed bulls differed significantly in several aspect of post-thawed semen characteristics and trace mineral ratios. By showing significantly greater sperm viability, plasma membrane integrity numerically higher motility and reduced oxidative stress than their Jersey counter parts, Friesian bulls demonstrated superior reproductive performance. Zinc and Potassium concentration in fresh semen much greater in Friesian bulls, according to trace mineral analysis that suggesting correlation with observed higher live/dead, plasma intactness of membrane and acrosomal integrity. Contrarily, the concentration of serum testosterone showed non-significant differences between the two breed. The study highlights the multi-faceted interplay between bull fertility and diverse influencing factors including post-thawed semen quality, trace minerals composition of fresh semen and reproductive hormones for demonstrating the reproductive performance of breeding bull. In our research results identified that in terms reproduction the two breeds Jersey and Friesian are distinct from each other. The best sperm present is found in thawed semen during breeding of Friesian bull. In Jersey bull trace mineral

iron are numerically higher as compared to Friesian bull. The study revealed non-significant differences in the concentration of serum testosterone hormone between two breeds. Further research studies are required to explore the potential correlation of reproductive hormones with seminal trace mineral composition of seminal plasma and fertility aspects of spermatozoa.

### 28. Adsorption properties of locally available *Debregeasia saeneb* plant used as adsorbent for the removal of crystal violet (CV) dye from aqueous solution

**Maria Jadoon**

Water pollution through synthetic toxic dyes is considered as a serious worldwide environmental problem. Effluents from dyeing industries is a challenging issue. The presence of dyes in wastewater effect human beings as well as aquatic life. Among the multiple strategies to treat dye-contaminated water, adsorption is considered superior because of low cost, flexibility, ease of operation and low energy consumption. The purpose of this study was to check the adsorption properties of locally available *Debregeasia saeneb* plant used as adsorbent for the removal of crystal violet (CV) dye from aqueous solution. CV dye is toxic and carcinogenic its presence in water is hazardous for both terrestrial and aquatic life. Experiment on *Debregeasia saeneb* was performed to check its efficiency, the leaves showed greater removal. Therefore, leaves of *Debregeasis saeneb* were used as an adsorbent. The adsorption of CV dye on adsorbent was confirmed by UV/Vis spectrophotometer study. Effect of concentration, time, pH, adsorbent dose, ionic strength, temperature and industrial water on adsorption process was studied. The maximum removal of CV dye was 93% when the initial concentration was 60 ppm, the adsorbent dose 0.05 g, solution pH 9, time duration 20 minutes by shaking at 200 rpm and temperature range was 50℃. The equilibrium adsorption data was further examined by Langmuir and Freundlich isotherm models. The Freundlich model provided the best correlation coefficient of the experimental data. The pseudo-second order model better described the adsorption kinetic model of CV. The effect of ionic strength was also tested on the adsorption efficiency. The adsorption efficiency of the adsorbent decrease in presence of salts (NaCl, KCl) due to competitive effect of ions. The adsorption efficiency of adsorbent was higher in distilled water as compared to tap water and filter water. Another success of the study was that the adsorbent was used without chemical treatment or any other processes. *Debregeasia Saeneb* is eco-friendly, easy to regrow and widely available. It can be readily used for purification of wastewater.

**Keywords:** Adsorption, crystal violet, *Debregeasia saeneb,* wastewater, UV/Vis spectrophotometer

## 29. Navigating Ethical Challenges in AI Deployment for Biomedicine Therapeutics, Research, and Diagnostics

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**Abstract**:

Artificial Intelligence (AI) focuses on creating systems and algorithms capable of performing tasks that typically require human intelligence. In biomedicine, AI has made significant strides, revolutionizing research, treatment, and diagnostics. This presentation delves deep into the ethical challenges that come with deploying AI in the field of biomedicine. Covering research, treatment, and diagnostics, it explores the delicate balance between accessing patient data and ensuring privacy. The talk dives into the complexities of AI-driven diagnostics, touching on issues of bias, fairness, explainability, transparency, and accountability. Moving beyond individual concerns, the discussion broadens to the societal impact, focusing on how AI might inadvertently worsen healthcare disparities. Key areas of emphasis include the necessity of diverse training data, ensuring fair access, and ongoing evaluations to prevent biases. The presentation is geared towards guiding stakeholders in the biomedical field towards responsible AI deployment, aiming for transparency, fairness, and equitable progress in the dynamic intersection of AI and biomedicine.

Keywords: *Artificial Intelligence, biomedicine, Ethical Challenges*

## 30. Pakistan AMR Watch (AMRWatch.pk): Pakistan's First Cloud-Based Active AMR Surveillance Initiative

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**Abstract**

Antimicrobial resistance (AMR) is the ability which enables the bacterial pathogens to survive despite the antibiotic treatment. In recent years misuse and over-prescription of antibiotics have resulted in this phenomenon to become a pandemic lurking in the shadows.

On the directives of WHO the Government of Pakistan adopted the National Antimicrobial Resistance Action Plan in 2017. This plan emphasizes the need for development of an integrated antimicrobial surveillance system for monitoring of AMR situation in the country. Contemporary surveillance and reporting systems which collect, analyze and report the antibiotic resistance data, these do not provide a complete picture of the spread of resistance in the developing countries. These systems lack the capabilities of real-time data collection and analysis of the resistance data from remote healthcare setups and diagnostic labs.

Pakistan AMR Watch (https://AMRWatch.pk/) is Pakistan's first cloud-based active AMR surveillance initiative. This platform offers to the System for Standardized Monitoring & Reporting of Antimicrobial Resistance Threats [SMART]. Pakistan AMR Watch provides free access to updated CLSI resistance breakpoint to its users and provides a national platform for standardized reporting output based on WHO guidelines.

SMART is designed to cater to the needs of AMR surveillance in lower & middle income countries (LMICs) which lack appropriate resources and infrastructure particularly in remote areas. It has been designed in accordance with WHO guidelines and is capable of issuing early warning alerts for resistance epidemics in any locality, community and/or healthcare setup(s) associated with this system. Pakistan AMR Watch will enable the researchers to not only estimate the resistance inclinations and the physicians in prescribing more effective antimicrobial treatment options but will also enable them to predict the future resistance trends.

**Keywords:** Infectious Diseases, Antimicrobial Resistance, Surveillance, Monitoring & Reporting

## 31. Design and Optimization of Bio-Inspired Nano-Catalysts for Efficient $CO_2$ Reduction: A Biophysical Chemistry Perspective

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**ABSTRACT:**

**Introduction:** The rising concentration of atmospheric $CO_2$ has driven an urgent global need for sustainable and efficient methods of converting $CO_2$ into useful products, particularly renewable fuels. Bio-inspired nano-catalysts, which mimic the efficiency of natural enzymatic systems involved in carbon fixation, represent a promising avenue for $CO_2$ reduction.

**Objectives:** This research aims to design, synthesize, and optimize bio-inspired nano-catalysts, focusing on earth-abundant transition metals (Fe, Cu, Co) incorporated into organic and metal-organic frameworks (MOFs). These catalysts are tailored for the selective conversion of $CO_2$ into methanol and other carbon-based fuels.

**Methodology:** Taking inspiration from enzymes like carbonic anhydrase and nitrogenase, nano-catalysts were developed with nitrogen-doped carbon supports and customized ligand environments around metal centers. These modifications are intended to enhance multi-electron transfer processes, crucial for effective $CO_2$ reduction. The catalysts were tested in electrochemical setups to determine Faradaic efficiencies, alongside stability tests conducted over a continuous 100-hour operation.

**Key Findings:**

- The bio-inspired nano-catalysts achieved Faradaic efficiencies of over 85% for $CO_2$ reduction, with a strong preference for methanol production.
- Fe-based catalysts demonstrated a turnover frequency (TOF) of 120 $s^{-1}$ for methanol, marking a 40% improvement compared to standard catalysts.

- Operando spectroscopic techniques (X-ray absorption and infrared spectroscopy), helped identify reaction intermediates and monitor the evolution of catalytic sites. These results confirmed the enhanced catalytic turnover and the reduction in activation energy compared to conventional metal catalysts.
- Computational studies using density functional theory (DFT) provided further insights into ligand modifications and the electronic tuning of metal centers, leading to improved $CO_2$ adsorption and activation.

**Conclusions:** Bio-inspired nano-catalysts show great promise for the selective and efficient reduction of $CO_2$ into renewable fuels. By replicating natural enzymatic processes and utilizing advanced material chemistry, these catalysts provide a scalable and environmentally friendly approach to carbon capture and utilization, addressing the urgent need for technologies to mitigate climate change.

**Future Work:** Future studies will aim to further enhance catalytic efficiency, stability, and scalability for industrial applications. Ongoing research will refine bio-inspired designs through an iterative process of computational modelling and experimental validation.

**Keywords:** Bio-inspired catalysts, $CO_2$ reduction, renewable fuels, nano-catalysts, transition metals, metal-organic frameworks (MOFs)

## *32.* Evaluation of *calotropis procera* and *moringa oleifera* supplements as feed additives on intestinal health in *Oryctolagus cuniculus*

Kashif Khan

**Abstract**

Raising rabbits, or cuniculture, is important and beneficial for different reasons, making it a valuable farming practice, rabbits have a high reproductive rate and nutrient-rich meat. Exploring the impact of herbs on animals, commonly known as phytotherapy or herbal medicine for animals, involves using botanical elements and their derivatives for various applications. The present study aims to explore the potential impacts of two locally occurring plants, *Calotropis procera* and *Moringa oleifera*, as feed additives on the intestinal health of the New Zealand White breed (*Oryctolagus cuniculus*). The experimental trial (6 weeks) was carried out at Safe Rabbit Farm in Abbottabad Pakistan, 56 days-old rabbits (n=64), were assigned randomly to four groups, each having 4 replicates, and containing 4 rabbits in each replicate. The groups are designated as follows: Group A (Control), Group B (0.8% *Calotropis procera* powder per kg of feed), Group C (0.8% *Moringa oleifera* powder per kg of feed), and Group D (0.8% *Calotropis procera* powder + 0.8% *Moringa oleifera* powder per kg of feed). Body weight (BW), weight gain (BWG), feed consumption (FI), and feed conversion ratio (FCR) were documented weekly. On day 42, two rabbits from each replicate were slaughtered then collected and examined samples of intestinal segments (duodenum, jejunum, and ileum) in Histology and Microbiology laboratories in CVS &AH, we stained tissue samples using an H&E method (hematoxylin and eosin stain). The BW, BWG, FCR and length, and weight with /without ingesta of small intestine were increased ($p<0.05$) in rabbits (*Oryctolagus cuniculus*) fed with 0.8% MOLP as compared to group B, D, and non-supplemented group. The values of villus height (VH), width (VW), and villus surface area (VSA) of all segments of the small intestine were significantly improved ($p<0.05$) by 0.8% MOLP (group C) compared with the control group. The villus height crypt depth ratio of the duodenum and muscularis mucosa thickness of duodenum and jejunum both were high ($p<0.05$) in rabbits fed with 0.8% MOLP as compared to the control group, lamina propria thickness and muscularis externa thickness of jejunum were high ($p<0.05$) in group C (MOLP 0.8%) as compared to the control group. The crypt depth was high ($p<0.05$) in rabbits fed with 0.8% MOLP+0.8% CPLP compared with the control group. Based on the findings of the current study, feed additives of MOLP 0.8% promote gut/intestinal health and production performance of rabbits.

## 33. Lifestyle, Dietary Trend and Decline in Male Reproductive Health

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**Abstract**

There is growing evidence that modern lifestyle and dietary habits are contributing to a global decline in male reproductive health. This study investigates the correlation between lifestyle factors and dietary trend (such as smoking, alcohol consumption, electromagnetic radiation, obesity, psychological stress, and oxidative stress) that cause male infertility. A comprehensive review of the existing literature was conducted, covering studies on lifestyle in association with male infertility. Data was extracted from main text and tables of the studies. Findings of the current study reveals that smoking (15-20%), reduces sperm viability, volume and motility, Alcohol consumption (10-15%) causes sperm DNA damaging. Exposure to electromagnetic radiation was found (10-15% globally) to causes oxidative stress and genotoxicity that was associated with reduced sperm mobility and sperm anomalies. Psychological stress and depression were found to be linked infertility in 30-40% couple. These findings emphasize the need for targeted public health interventions and lifestyle modifications to mitigate these risks. Future research should focus on developing comprehensive strategies to address these factors, with a particular emphasis on regional differences and their implications for tailored healthcare solutions.

## 34. Adaptation of field Foot and Mouth Disease Serotype O viruses on Fetal Goat Tongue ZZR-127 cell line in Khyber Pakhtunkhwa Pakistan

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**Abstract:**

Foot and Mouth Disease (FMD) is a highly contagious and economically devastating viral disease that affects cloven hoofed animals such as cattle, sheep, goat, deer, pigs and other species. Vaccination remains the most effective tool for controlling the spread of FMD. However, the continuous evolution and genetic mutation of field virus strains cause a serious challenge to the long-term efficacy of vaccines. To address this problem, regular adaptation of the field virus is required. Baby Hamster Kidney (BHK-21) cell line is the cell line of choice for the propagation of FMD virus (FMDV) for vaccine production. But for the adaptation of FMD virus isolates, ZZR-127 cell line is considered most sensitive. Previously, many challenges were faced in adapting field FMD virus on the BHK-21 cell line. This study focuses on the adaptation of field isolates of the FMDV first on Fetal Goat Tongue (ZZR-127) and subsequently on BHK-21 cell line for the propagation of virus for vaccine production. A total of nineteen (19) samples diagnosed on ELISA of serotype O were obtained from the Virology Section Veterinary Research Institute (VRI) Peshawar for adaptation. All the samples were processed for three passages on ZZR-127 and subsequently on BHK-21 cell line. The samples were confirmed serologically by sandwich ELISA and molecularly by Reverse Transcriptase PCR. Among these, twelve (12) samples of serotype O adapted successfully on the ZZR-127 cell line and then cultured on BHK-21 cell line. Further research is necessary to verify these findings and enhance the adaptation process.

**KEYWORDS:** Baby Hamster Kidney (BHK-21 cell line); Cellular Adaptation; Cytopathic effect Fetal Goat Tongue (ZZR-127) cell line; FMD virus

## 35. Genetic Polymorphisms in Trappc9 Gene are Associated with Mastitis Resistance and Milk Productions Traits in Different Pure Dairy Cattle Breeds of Pakistan

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**Abstract**

The present study was designed to investigate the effects of single nucleotide polymorphisms (SNPs) in the TRAPPC9 gene on the milk production and mastitis related traits in dairy cattle. Blood and milk samples were collected from 406 lactating dairy cattle of four breeds, i.e. Holstein Friesian (HF), Achai (A), Red Sindhi (RS) and Sahiwal (S) maintained at well- established dairy farms in across Pakistan. Three SNPs, i.e. SNP 1 (T>C, rs210148032), SNP 2 (T>C, rs135128681), and SNP 3 (T>C, rs377935625) in TRAPPC9 were screened through Chinese Cow's SNPs Chip-I (CCSC-I) and genotyped in a population of 406 dairy cattle. The results were analyzed using the general linear model in SAS 9.4. Of the three SNPs, SNP 3 did not obey Hardy-Weinberg equilibrium (P<0.01), while SNP 1 and SNP 2 were found to be in strong linkage disequilibrium and allele T was highly prevalent compared to allele C in these SNPs. In SNP 1, the TC genotype was associated with significantly (P<0.01) higher annual milk yield (AMY). whereas in SNP 2, the CC genotype was significantly (P<0.01) associated with higher lactose percentage (LP) compared to the other genotypes. SNP 3 was found significantly associated with the frequency of mastitis (FOM), fat percentage (FP), protein percentage (PP) and LP (p<0.05). Altogether, our findings suggested that the SNPs of TRAPPC9 gene could be useful genetic markers in selection for milk production improvement and mastitis resistance phenotypic traits in dairy cattle.

**Keywords**: association analysis, dairy cattle, mastitis, milk production traits, SNP

## 36. Molecular Detection of Emerging Tick-Borne Bacterial Fauna of Ticks from Pakistan

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**Abstract**

Ticks pose serious threats to the health of humans and animals, as they are significant transmitters of numerous infections. The function of newly developing bacterial infections in tick populations is still poorly understood, despite a great deal of study on well-known tick-borne infections. Environmental factors significantly contribute to the spread of tick populations in Pakistan, which underscores the need for further study. This study explored the genetic diversity and presence of emergent bacterial species that are within tick populations in various locations all over Khyber Pakhtunkhwa. The collected tick species from different ecological zones, including woodland, farmland, and cattle grazing land. Upon tick collection, the samples were cleaned and kept in 100% ethanol to retain the quality of the DNA. Since morphological identification requires the use of taxonomic keys, only the recognized were utilized to accurately describe tick species. To facilitate DNA extraction and produce accurate samples for further analysis, the phenol-chloroform method was used. The molecular identification of tick species and bacteria species was based on PCR using the 16S rDNA and cox1 genes and groEl gene respectively. Sanger sequencing was used to bidirectional sequence the PCR products, and SeqMan software was used to trim and purify the sequences. After the sequences trimming, they were put for BLAST analysis to determine the closest matches. The sequences with the highest identity scores were picked for the phylogenetic analysis. By using MEGA-11 software, the phylogenetic relationships and genetic diversity among bacterial species within tick hosts evaluated using a maximum likelihood method. These investigations identify a spectrum of bacterial pathogens including, Enterobacter sp., Enterobacter hormaechei, Pantoea agglomerans, Klebsiella pneumoniae and Psychobecter species in Pakistani tick populations, which indicate new associations between ticks and emerging, zoonotic, or invasive bacteria species. The phylogenetic analysis shows their closed similarities with the same species reported from neighboring countries. The goal of the research was to illuminate, by showing, what these infections may do to public health if they emerge in nature, something that has probably been under-examined so far as their distribution and heterogeneity are concerned. The current study provides a major help in the diseases carried by ticks, particularly in Pakistan. Filling critical gaps in our knowledge, the study was of a high level of importance for future research and public health policies aimed at reducing tick-borne infection by focusing on ticks as well as investigating their neglected clades of bacterial species. The findings update strategies to mitigate the risks of emerging tick-borne pathogens.

**Keywords**: Ticks, Bacteria, pathogens, Khyber Pakhtunkhwa, Pakistan

## 37. Detection of Bio-Active Compounds of *Senecio Nudicaulis* and their antibacterial Activity Against Selected Pathogenic Bacteria

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**ABSTRACT**

For improving human health, on one hand antibiotics are one of the most successful family of drugs being used. But on the other side its overwhelming use introduced the phenomena of multi-drug resistance in many strains of bacteria which kill millions of people every year. To overcome or minimize this problem of resistance to antibiotics plant extracts and compounds are of new significance as anti-microbial agents in the field of medicine. *Senecio nudicaulis* (Local name Boote) are known plant for its aromatic and medicinal properties localy used for the treatment of many diseases like bacterial illnesses and used by diabetic patient in different districts of Khyber Pakhtunkhwa. The present study investigated the antimicrobial activity of mentioned plant extracts against human bacterial pathogens including *S-typhi*, *E-coli*, *S- epidermidis* and *S- aureus*. Four different solvents namely ethanol, methanol, chloroform and distal water were used for plant extract preparations against mentioned bacterial pathogen through agar well diffusion method. Phytochemical analysis GC-MS and FTIR were done to find out bioactive compound of leaves and roots extracts in different solvents. The antibiotic disks used as a positive control include levofloxacin, gentamicin, oxacillin and ofloxacin. For the antibacterial activities, two different concentrations (70µl and 60µl) of leaves and roots crude extracts were used. By comparing the solvent based activities, the extract prepared in methanol showed best activity than other three solvents. The highest zone of inhibition were recorded from leaves methanolic extract of *Senecio nudicaulis* plant at concentration of 70µl against all selected pathogen. The zone of inhibition recorded against of *S- epider midis, S-typhi, S- aureus* and *E. coli* were (29.99mm), (25.97mm), (21mm) and (26mm), respectively. Lowest zones (11.998mm) were recorded against *E. coli* by the chloroformic extract of leaves. Similarly bacteria showed high sensitivity to methanolic root extract but not like that of leaves extract. Based on docking score and interaction analysis, compound CID_5282754 were predicted as the most potent which revealed the best docking score (-6.60Kcal/mol).

While analyzing the data received from the phytochemical analysis, the GC-MS analysis showed 22 to 54 number of compound in both roots and leaves. In FTIR analysis, different functional groups of compound were detected in both roots and leaves including, metabolites which are aromatics compounds, nitro compounds, alkyl halides, alcohols, carboxylic acids, esters, ethers, aliphatic amines, carboxylic acids, 1˚, 2˚amines, alkanes, alkenes, alkynes, phenols, 1˚, 2åmides. In the current study it was observed the plant *Senecio nudicaulis* have the potential to be used as alternative to antibiotics if properly handled and formulated.

**Key words:** Zone of inhibition, Antibiotic disk, Antibacterial activity, well diffusion, Agar, Bcterial strain, Extract, FTIR and GC-M

## 38. Seroprevalence, Molecular and Histopathological Study of NDV in Broiler of District Mardan

Hina Gul, Abudl Sajid, Ahmad Sohail, Natasha Kashif, Sunbal, Barooj, Shazma Bibi, Aqsa Rashid, Fazeela Naz, Fawad Khan

**Abstract**

Newcastle Disease (ND) is a contagious and fatal viral disease that affects all bird species. It is one of the most infectious poultry diseases in the world. In un-vaccinated poultry flocks, a death rate of almost about to 96% can occur and even cause death in vaccinated poultry. Clinical symptoms observed during the study include depression, anorexia, greenish-white diarrhea, torticollis, the number morbidity and mortality, type, and chicken age. The current work was based to study the histological changes in organs infected by Newcastle disease virus in broiler chicken. The present study was aimed to detect the distribution of NDV in the tissue and score the lesions caused by the virus in different organs of the broiler. For this purpose, 52 infected birds (broilers) from five poultry farms at district Mardan were collected for histopathological study. During slaughtering blood serum were collected from the clinically positive samples of 48 chickens for the conformation of ND virus by using indirect ELISA. Farther more different organs were collected at postmortem and were processed accordingly. Before The histopathological study, the collected organs were tested through PCR. The tissues were sectioned via microtome and were mounted on slides. The tissues were stained with H & E stain and studied under microscopic using 10X objective lens. In the heart cells degeneration, mononuclear cell infiltration and myocardium necrosis were noted. In tracheal samples Hyperemia, infiltration, edema and deciliation were documented. Similarly, in kidney samples, interstitial nephritis and loss of renal architectures due to severe necrosis with marked mononuclear cells infiltration were observed. Histopathological section of spleen of (NDV) infected chickens showed multifocal lymphocytic aggregation and macrophages infiltration. Histopathological section of lung of (NDV) infected chickens shows necrosis, fibrosis and infiltration of mononuclear cells and ruptured alveoli. Microscopic examination liver showed multifocal infiltration of inflammatory cells and congestion. Severe necrosis, increased sinusoidal spaces and hemorrhages in hepatic tissues were associated with degenerative changes in the liver sections. The histopathology of intestine revealed the presence of lymphoid hyperplasia, mononuclear cell infiltration and congestion with sloughing of villi. The poultry farm wise analysis of data shows that the Bilal poultry farm was the most affected one while the lowest infection was documented in Modern poultry farm. Furthermore, the based on the lesion scoring analysis it was noted that liver and heart were the most infected organs, while spleen and trachea were the lowest affected organs.

**Keywords**: Histopathology, poultry, Newcastle disease virus

**39. Effect of Inorganic Selenium Supplementation on Thyroid Hormone and Redox Status in Broiler under Dexamethasone-Induced Stress**

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**Abstract**

Poultry industries are facing to many challenges which have made it a big problem for humans and birds. One of the major problems is oxidative stress which causes free radical damage and imbalance of thyroid functions. The research experiment was performed to check the effect of orally inorganic selenium on redox status and thyroid hormones of broilers under dexamethasone induce stress. Day old 100 chicks was purchased from trading hatchery and divided randomly in five different groups having four replicates (n=5) in each groups. Broiler chickens feed with starter and finishing commercial corn based basal diet with different concentration of selenium powder. Basal diet (BD) was fed to Group A, which kept as negative control group and no dexamethasone (DE) was be offered. Group B was considered as (+ve control group) fed with (BD+15mg DE/kg). The group C, fed by (BD+0.2mg Se + 15mg DE/kg). Similarly, group D was feed by (BD+0.3mg Se+15mg DE). Group E, fed with (BD+0.4 Se+15mg/kg feed). At the end of the trail, two birds were randomly selected for slaughtering and collect samples of liver, muscles, kidney and whole blood. The whole blood was centrifuges for further analysis. The redox status and thyroid hormones were measured through commercially available kits. This current study resulted that selenium supplementation improved($P \leq 0.05$) the catalase level in the liver and muscles which fight against the free radical and reduce oxidative stress. In the blood serum the catalase and MDA both shows significant ($P \leq 0.05$). In conclusion I assume that 0.3mg/kg of selenium supplementation in redox status and thyroid hormone show better results in comparison to the control group.

**Key word:** Avian, Antioxidant, Redox status, Selenium, Thyroid hormone.

## 40. EVALUATION OF PHYSICAL PROPERTIES OF SALIVA AS NON-INVASIVE AND POINT-OF-CARE DIAGNOSTIC TOOLS FOR EARLY PREGNANCY DETECTION IN COW

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**Abstract**

The study aims to design a cost-effective pregnancy detection model by combining early pregnancy predicting parameters, altering saliva's physical properties in response to early pregnancy in cattle, and developing a point-of-care testing system. The study analyzed the physical properties of saliva in 100 pregnant and 100 non-pregnant cows at Government Cattle Breeding and Dairy Farm, Harichand, Sucha Dairy Farm and Jaan dairy farm at district Charsadda, Khyber Pakhtunkhwa Pakistan. The samples were collected through pre-weighed sponges that were attached to a thin, flexible metal rod, into the cows mouth for 30 seconds and processed at the respective farms. The results showed that mean pH in pregnant cows was significantly higher (P≤0.05) (9.325 ± 0.13) than non-pregnant animals (8.133 ± 0.13). The mean Specific gravity (0.000173±0.00), and Conductivity (0.666 ± 0.029) in non-pregnant were higher (P≤0.05) than the pregnant cows (0.000146±0.00) and (0.538 ± 0.028) respectively. The mean buffer capacity (7.40 ± 0.10) and flow rate (91.92±1.13) of non-pregnant were higher (P≤0.049) than in the pregnant animals (2.42 ± 0.151) and (91.92±1.13). The mean density (0.172 ± 0.03) non-pregnant cow were higher (P≤0.05) than the pregnant cow (0.172 ± 0.03).The study examined cows' salivary crystallization patterns during the pregnancy. Six different patterns were identified, including branches, ferns, fir dot none and a combination of these patterns. In pregnant cows, Fern-like patterns are 26.19, fir-like 4.76, and Branch-like 11.90, Dot-like 9.52, Branche-fir 7.14, Branche-fir-fern 4.76, branch-fern 19.04, fern-fir 7.14, none 9.52. In non-pregnant cows, fern-like 0.00,fir-like 6.45, bran-like 0.00, Dot-like 19.35,branch-fir 29.03,branch-fern-fir 19.35,branch-fern 22.58,fern-fir 0.00, none 3.22. The significant and numerical variations in the physical aspects of pregnancy seem to be influenced by hormonal fluctuation pregnancy. Further investigations are required to validate these variations for early pregnancy diagnosis in cattle and other animal species.

**Keyword:** Biomarker, Non-invasive, early Pregnancy, Saliva

## 41. Morphological modulation of broiler gut in response to *Moringa oleifera* leaf powder supplements under dexamethasone induce stress

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**Abstract**

The current research study was designed to explore the effects of *Moringa oleifera* leaf powder (MOLP) on gut histomorphology and production performance in broiler chickens under dexamethasone induce oxidative stress. Broiler chicks (100) were weighted and distributed into five groups, four replicates (n=5) in each group. Group-I (negative control group) fed only with basal diet (BD), Group-II (positive control group), supplemented with BD+DEX (15mg/kg); Group-III was given BD+DEX+0.8%MOLP; Group-IV was given BD+DEX+1.2%MOLP, Group-V was given BD+DEX+1.6%MOLP. On day 35$^{th}$ of the trail, two birds from each replicate were randomly chosen and slaughtered. Intestinal samples such as duodenum, jejunum and ileum were collected and fixed in 10% neutral buffered formalin. Dehydration was performed through a series of increasing alcohol concentration and processed with paraffin embedding technique. The tissues were stained with hematoxylin-eosin staining technique. The results showed that body weight, body weight gain, feed intake significantly increased ($p \leq 0.05$) in a group supplemented with 1.2% MOLP. Similarly, feed conversion ratio (FCR) was also improved in all MOLP supplemented groups as compared to positive control group. Moreover, MOLP 1.2% supplementation increase surface area in all segments of small intestine in comparison to positive control group. It was observed from the current research trial, that *Moringa oleifera* leaf supplementation improved the growth parameters and gut histomorphology under oxidative stress in broilers.

**Keywords:** Broiler, dexamethasone, growth, gut health, phytobiotics.

## 42. INVESTIGATION ON THE PREVALENCE OF ENTEROTOXIGENIC *STAPHYLOCOCCUS AUREUS* IN FARMS AND RETAILERS BULK MILK SAMPLES IN PESHAWAR METROPOLIS

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## Abstract

Staphylococcal food poisoning may lead to serious gastrointestinal illness, originates by the utilization of contaminated food with enterotoxigenic *Staphylococcus aureus* enterotoxins (SEs) and have been reported globally. Enterotoxigenic *S. aureus* produce a wide range of SEs ranging from A to U. In view of secondary data on the occurrence of enterotoxigenic *S. aureus* in milk, the proposed study was conducted to investigate the magnitude of prevalence, and antimicrobial susceptibility enterotoxogenic of *S. aureus* of bulk tank milk sample originating from different sources in Peshawar. To do this end, 58 milk samples were taken from various retail milk outlets, households, milk handlers and farm. The isolation of *Staphylococcus aureus* from the collected samples reached by biochemical and molecular characterization of *staphylococcus aureus* isolates. The prevalence estimates *S. aureus*/SEs was presented in percentiles and association SEs production with different variables was reached by Chi square test. Isolation and identification of *S.aureus* was 76% prevalence in shops and 88% prevalence in dairy farms, antimicrobial susceptibility was carried out following standard microbiologic method, *Staphylococcus aureus* isolates showed resistant against 35% antimicrobial agents which include oxacillin (OX) (1ug), vancomycin (VAN) (30ug), linezolid (LNZ) (10ug), ciprofloxacin (CIP) (5ug), pencillin (PCN) (1ug), oxytetracycline (OTC) (30ug), novobiocine (NB) (3ug) and augmentin (AMC) (30ug). 55% antimicrobial agents showed complete susceptibility along with the 10 % intermediate susceptibility. The *Staphylococcus* enterotoxogenicity was determined by commercially available SEs assay, according to the manufacturing guidelines and zero prevalence rate was determined. A comparatively large amount of species are also susceptible to the antibiotic frequently used in many natural and pet diseases therapy procedure. This research emphasizes the need for continuous monitoring of *Staphylococcus aureus* antibiotic awareness model in order to select suitable treatment.

**Keyword:** Antibiotic, Bacteria, Disease Milk

### 43. Effect of Inorganic Selenium on Blood Biochemistry under Induced Stress in Broiler Chicken

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**Abstract**

This study was conducted to detect the effect of inorganic selenium on the liver enzymes, kidney function and changes in biochemical parameters of broiler chicken under dexmetasone (DEX) induce stress. The day old, two hundred (n=200) chicks were bought from commercial hatchery and randomly divided into five groups with eight replicas(n=5) in each group. Broiler chickens were fed with starter and finishing commercial corn based basal diet (BD) with different doses of inorganic Se powder. Group-A was kept positive control provided with BD twice aday. Group-B was negative control group fed with 15mg DEX/kg twice/day. The group-C was fed with BD+0.2mg Se+15mg DEX/kg. Similarly, Group-D was fed with BD+0.3mgSe+15mgDE. Group-E was fed with BD+0.4Se+15mg DEX/kg. Two chicks were randomly slaughtered from each replicate and blood glucose level, kidney function and liver enzyme were examined. Blood was collected after slaughtering in falcon-tube and EDTA-tube for serum and whole blood respectively. At room temperature the tube contain blood tube was leaning position for clotting. In refrigerator the tube was place overnight at 4°C. The blood was centrifuged for 15 minutes for collection of serum at 1000 rpm. The serum was stored at -20°C until further analysis. and all the biochemical parameters were measured through commercially available kits. r.The result of the current study the value of ALT, AST and ALP were significantly higher (P≤0.05) in negative control group (B) as compare to the group C, D and E. The level of uric acid, creatinine and blood urea were significantly higher (P≤0.05) in B group ( negative control) (P≤0.05) as compared to the group A (positive control), C, D, and E. The blood cholesterol level and LDL in group B (negative control) significantly higher (P≤0.00) higher the group A (positive control) and SE supplemented group C, D and E.

**Keyword:** Birds, Biochemistry Glucocorticoid, Kidney, Trace minerals

## 44. Effect of Selenium on Morphology, Mineral Retention of Tibia Bone and Muscle Health of Broiler under Dexamethasone-Induced Stress

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**Abstract**

In current research study, the antioxidant activity of inorganic selenium (Se) for broilers under induced stress was determined to improve the muscle and tibia bone health as well as tissue mineral retention. The poultry industry is playing a vital role in fulfilling the protein requirement globally. This was obtained by rearing broilers with standard farming which produce good quality meat. Sometimes the meat quality is affected when the broilers are coming into stressed during farming and transportation. To minimize the effect of stress over the broilers growth the free radicles in the body are neutralized with the help of antioxidants. This research study was designed to introduce the broilers by induced stress by inclusion of dexamethasone in their diet. To cope with their detrimental effect, inorganic selenium was provided in different concentrations to birds. A day-old 200 were distributed in five groups having eight replicas with 05 chicks per replicate. The dietary plan for the chicks was as follows. Group A (Negative control) was supplemented with only a basal diet. Group B (Positive control) was supplemented with dexamethasone 15mg /kg diet. Group C, D and E were supplemented with 0.2mg, 0.3mg, and 0.4mg Se /kg of the diet, respectively. This research study concluded that adding 0.3mg of inorganic selenium/kg of diet improved the calcium and phosphorous deposition in tibia bone, tibia bone morphology, as ash content, and muscle histomorphometry.
**Key Words:** Broilers, Bone, Dexamethasone, Muscle, Stress, Trace mineral

## 45. EFFECT OF *MORINGA OLEIFERA* LEAF POWDER SUPPLEMENTATION ON SERUM PARAMETERS, GUT MICRO-FLORA, MUSCLE AND BONE HEALTH IN BROILERS UNDER DEXAMETHASONE-INDUCED STRESS

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**ABSTRACT**

This research investigates the impact of *Moringa oleifera* leaf powder (MOLP) supplementation on broilers subjected to dexamethasone-induced stress. 200-day-old chicks were distributed into five groups (A, B, C, D and E), each group was divided into four replicates (ten chicks/replica). Negative control group (A) received only basal diet, positive control group (B) exposed to dexamethasone (day 21$^{st}$ onward), group C, D, and E received 0.8% ,1.2%, and 1.6% MOLP respectively. Results indicate significant ($P \leq 0.05$) improvements in liver health, evidenced by decreased levels of alanine aminotransferase (ALT), aspartate aminotransferase (AST), and alkaline phosphate (ALP) in MOLP-treated groups, urea and creatinine levels remained non-significant. Obvious alterations in gut microbiota composition, with positive ($P \leq 0.05$) changes in Escherichia coli, Bifidobacteria, and Lactobacilli in MOLP-treated birds, indicating potential benefits for gut health. Mineral content analysis revealed higher ($P \leq 0.05$) phosphorus % in MOLP-administered groups, ash% and Ca% were non-significant. Bone morphological parameter demonstrated significant ($P \leq 0.05$) improvements in tibia length, weight, tibiotarsal index and weight/length index in 1.2% and 1.6% MOLP groups, diaphysis diameter, medullary canal diameter, medial wall diameter, lateral wall diameter and robusticity index of tibial bones were non-significant. MOLP supplements significantly ($P \leq 0.05$) changed muscle fascicle diameter and muscle fascicle cross-sectional area, while muscle fiber diameter, muscle fiber cross-sectional area and muscle fiber density were non-significant. It was noticed that up to 1.6% MOLP in broiler feed improves broilers health.

**Keywords:** Broiler, Dexamethasone, Gut health, Muscle, Tibia

**Title: Pakistan Biosecurity issues, Challenges and solutions through academic, governmental and industry linkages**

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Abstract:

Biosecurity refers to measures aimed at preventing, controlling, and mitigating risks associated with biological threats to human, animal, and plant health, as well as to the environment. In Pakistan, several biosecurity issues exist across various sectors, including agriculture, public health, and environmental conservation. Pakistan's agriculture sector faces threats from pests, diseases, and invasive species that cause significant crop losses and disrupt food production. Livestock diseases such as foot-and-mouth disease, avian influenza, and brucellosis pose risks to animal health, food security, and livelihoods in Pakistan. Contamination of food and water with pathogens, toxins, and chemical contaminants lead to foodborne illnesses and public health emergencies. Introduction of invasive alien species have detrimental effects on native ecosystems, biodiversity, and ecosystem services. Pakistan faces risks from emerging infectious diseases, zoonotic diseases, and potential bioterrorism threats. Addressing biosecurity issues in Pakistan requires a comprehensive approach involving government agencies, research institutions, industry stakeholders, and community participation. By implementing proactive measures, building capacity, and fostering collaboration, Pakistan can enhance its biosecurity preparedness and resilience to biological threats, thereby safeguarding human, animal, and environmental health. Implementation of biosecurity measures in farms and markets to prevent disease transmission in plants, animals and human being. Strengthening of surveillance and diagnostic capabilities, enhance vaccination programs, and promote good animal husbandry practices can play a pivotal role in animal and public health. Improvement in collaboration between government agencies, academia, extension services, and industry can manage disease outbreaks effectively. Risk assessments for new species and prioritize early detection and eradication are some of the key elements to implement invasive species management.

**Title: Exploring the Activities of NESS Pakistan**

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**Abstract:**

Pakistan has emerged as a key player in promoting the National Eco-Security System (NESS) plan, with notable contributions from individuals in the inaugural NESS Congress and the subsequent launch of the Haikou Initiative showcased Pakistan's active participation in this global initiative. Prof. Subhan Qureshi, President, Dairy Science Park; and myself became supporters of Haikou Initiative along with other supporters, furthered this initiative, leading to the establishment of NESS Pakistan and the Preparatory Committee NESS-Pak. Several events have been organized to promote the NESS concept in Pakistan, including online meetings, conferences, workshops, and community drives. These efforts aimed to engage various stakeholders, including research organizations, educational institutions, and government bodies. Notable events include the organizing an international conference on "Recent Trends in Improving Resistance against Diseases using Molecular and Genetic Tools "led to the establishment of NESS-SC Pakistan and NESS-RC, presentations at conferences, hands-on training workshops on biosafety, establishment of preparatory committee, and community drives for cleanliness and tree plantation. The Pakistan initiative of getting collaboration and collaboration on NESS- PAK was prepared and has been sent out to research organizations in Pakistan by April 17, 2024, there are 251 supporters from 122 organizations, including 31 higher education institutions, 4 research institutes and 87 other organizations. Furthermore, Pakistan's active involvement in the NESS initiative is highlighted by the submission of abstracts to international congresses, demonstrating the country's commitment to addressing Eco-security challenges through academic, governmental, and industrial collaborations. Overall, these initiatives signify Pakistan's dedication to promoting eco-security and sustainable development within the region and globally.

**MORPHOLOGICAL AND MOLECULAR IDENTIFICATION OF CYSTIC ECHINOCOCCOSIS IN LIVESTOCK POPULATION OF DISTRICT MARDAN**

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**ABSTARCT**

The smallest canine cestode, belongs to the genus Echinococcus, is the main cause of zoonotic disease known as hydatidosis or cystic echinococcosis (CE). This study investigated the morphological and molecular identification of CE in livestock of District Mardan. A total of 542 animals including buffaloes (n=216), cattle (n=138), sheep (n=82), and goats (n=106) were examined for echinococcosis during March – June 2022 at different slaughter-houses/abattoir in district Mardan. These areas were visited for the collection of Cysts from the infected livestock population. The data was recorded through questionnaire. For the morphological confirmation, the fluid of each collected cyst was examined through microscope. Furthermore, specific (Nad1 gene) targeted in the extracted DNA generated an Amplicon of 200bp by PCR. The overall prevalence of CE was 37.5% (203/542). Microscopically identified rate of fertile hydatid cyst in the positive samples was 157/203 and the rate of sterile hydatid cyst in the positive samples was 46/203. Furthermore, the hydatid cysts were confirmed in 54.7% out of 203 samples by PCR. Among 108 samples of buffalos, 63(58.3%) and 58 samples of cattle, 27(46.6%), while among 23 samples of sheep, 12(52.2%) and 14 samples of goat, 9(64.7%) were detected by PCR for the cystic Echinococcus species. The prevalence were determined in different species of livestock animals which include buffaloes 50% (108/216 is the total number of buffaloes), cattle 42.02% (58/138 is the total number of cattle), sheep 28.04% (23/82 is the total number of sheep), and goats 13.2% (14/106). The infection was relatively more prevalent among females 43.9% (139/316) Buffaloes (73/129), cow (45/93), ewe (16/49) and doe (5/45) than males 28.3% (64/226) Buffaloes (35/87), bulls (13/45), ram (7/33) and bucks (9/61) and animals of older age greater than 5 years. CE cases were more found in rural area 161/314 (51.3%) than urban area 42/228 (18.4%). In this study the overall prevalence of Cystic echinococcosis in livestock population was identified in the lungs 127/542 (23.43%) and the livers are 75/542 (13.83%) so the lungs are more infected than livers. The results of this study can serve as a basis for future research on the epidemiology and control of cystic echinococcosis in the livestock population of Mardan and other similar regions. It is necessary to promote awareness and implement control measures to prevent the spread of this zoonotic disease.

**Keywords:** Cystic echinococcosis, hydatid cyst, zoonotic, Microscopy, PCR

## INVESTIGATION THE EFFECT *CALOTROPIS PROCERA* SUPPLEMENTATION OF BONE HEALTH, MEAT QUALITY, AND MUSCLE TRAITS IN *ORYCTOLAGUS CUNICULUS* RABBITS

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**ABSTRACT**

The current study aims to determine the effect of locally occurring plant, *Calotropis procera*leaves powder (CPLP) as feed additives for bone health, meat quality, and muscle characteristics of New Zealand White rabbits (*Oryctolagus cuniculus)*. A total of 64 Rabbits (56 days old) were randomly divided into four groups having four replicates (n=4) in group each (4 groups ×4 replicates × 4 rabbits). A control group received a standard diet, whereas the other three groups received standard diet supplemented with 0.4%, 0.6%, and 0.8%CPLP. The plant powders were mixed with the commercial rabbit pellet diet to provide a dose of 4g, 6g, and 8g per kg of feed. Body weights and feed intake were properly recorded on a weekly basis. The experiment was conducted in a completely randomized design in a suitable environment. On day 42, two rabbits per replicate were euthanized to collect samples of breast muscle and tibia bone. The CPLP supplementation significantly ($P \leq 0.05$) decreased the pH of breast muscle and ash percentage of tibia bone. The diameter of breast muscle fibers and weight and weight length index of tibia bone significantly ($P \leq 0.05$) decreased with 6 and 8 g/kg CPLP. The water holding capacity (WHC) of breast muscle was significantly ($P \leq 0.05$) higher with 6 and 8 g/kg CPLP; whereas the robusticity index of tibia bone significantly ($P \leq 0.05$) decreased with 6 and 8 g/kg CPLP inclusion compared to the control group. In conclusion, dietary supplementation of *Calotropis procera* leaf powder (8g/kg) Decreased pH, the muscle fiber diameter of breast muscle and also weight, ash percentage, and density indices of tibia bone whereas increased water holding capacity in Rabbits.

**Key points:** Bone Health, Calotropis procera, Fiber, Meat quality, Rabbit

**SEROPREVALENCE AND RISK FACTORS ASSOCIATED WITH CRIMEAN CONGO HEMORRHAGIC FEVER VIRUS (CCHFV) IN HUMAN AND LIVESTOCK POPULATION IN DISTRICT MALAKAND**

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**ABSTRACT**

Crimean Congo Hemorrhagic Fever (CCHF) is a viral zoonotic tick-borne disease mainly caused by CCHF virus and distributed in domestic and wild animals. The transmission of CCHFV is mainly occurs via bite of tick (HylomaSp) to human and animals.The present study was performed to determine the seroprevalence of IgG antibodies to CCHF in human and livestock's population and associated risk factors among both populations. A total 10 union councils were selected in District Malakand in which 54 households/ Farms were visited. Total541 serum samples were collected from both populations. All farmers were extensively interviewed to identify major risk factors. A total 401 serum samples were screened on ELISA for the presence of IgGantibodies in both Populations. A total 29.1% prevalence was recorded in livestock population. Highest ratio was detected in tehsil Batkhela (36.6%). Lowest ratio was recorded in tehsil Dargae. No positive sample was detected infarmers. Goat was highly exposed to CCHFV in present study (43%). Among the major risk factors of CCHF, it was observed that Hyloma ticks being circulating in all households are on the top. All individual were in closed contact with livestock. Most of the participants were unaware of CCHF and its transmission which increased risk of CCHF.On the basis of above factsit is concluded that there is a high ratio of CCHF in livestock population. If proper preventive measures were not adopted on time, it may cause a huge outbreak.

**Keywords:** Crimean Congo Hemorrhagic Fever Virus (CCHFV), Seroprevalance, Cross-sectional, Risk Factors, Livestock, Human.

# Second One Health Conference (#OHC2024)

## Theme: One Targe, Long Term Survival of Human Being through NESS

*Venue: Abdul Wali Khan University (AWKUM), Mardan Pakistan on 7-8 November, 2024*

## Overview and Recommendations of the Conference

### Conference Overview

The Honourable Mr. Muhammad Fakhre Alam, Secretary for Livestock, Fisheries, and Cooperative Department, Government of Khyber Pakhtunkhwa, inaugurated the Conference as Chief Guest, alongside Prof. Dr. Zahir Shah, Vice Chancellor of AWKUM, and Prof. Dr. Sher Bahadar Khan, Principal of the College of Animal Husbandry and Veterinary Sciences (CAHVS). Mr. Khan commended the efforts of the organizers, sharing recent legislative developments, including the "Khyber Pakhtunkhwa Animal Welfare Act, 2024" in addition to three Acts on Livestock Breeding Services, Animal Feed Stuff and Zoonotic Disease Control. He affirmed the provincial government's commitment to support AWKUM in advancing food security, safety, and eco-security in the region. The conference was co-organized by Prof. M. Subhan Qureshi, President NESS-Pak/DSP; Dr. Saeed Khan, President PDF; and Dr. Muhammad Israr from PSF, with institutional support from Prof. Fatima Khanzadi, Dr. Abid Ali, and Dr. Imad Khan.

Prof Dr Jehan Bakht, Vice Chancellor University of Agriculture Peshawar shared his thoughts on Climate Change and the relevant local and international challenges. The Conference successfully gathered a diverse group of national and international experts from government, academia, and industry to explore this year's theme: "Long-Term Survival of Humanity through Eco-Security Systems (NESS)." The event was supported by Higher Education Commission (HEC), Pakistan Science Foundation (PSF), Dairy Science Park (DSP), NESS Pakistan (NESS-Pak), and Poultry Doctors Forum (PDF), Inshal Pharma, Avicenna of Sarhad Traders, UM Enterprises, MB Marketing, and DMG Pharmaceuticals.

OHC2024 featured an Inaugural Session, Plenary Session, and specialized sessions on Health, Poultry, National Eco-Security System, Biosecurity, Agriculture, Industry, Academia-Industry Interaction, and an Industrial Exhibition. Abstracts were submitted online, evaluated by the technical committee, and selected for oral or poster presentations. Poster presentations were assessed for prizes and certificates. The Editorial Committee of NESS convened a hybrid meeting with in-person and remote participants. During the concluding session, chaired by the Vice Chancellor, the conference recommendations were presented by Prof. M. Subhan Qureshi presented as follows:

## Conference Recommendations

1. **Global Ecological Crisis and NESS:** The current ecological crisis poses significant threats to human survival, exacerbated by conflicts, social divisions, and a lack of nified action. The National Eco-Security System (NESS) was highlighted as a crucial international scientific initiative aimed at safeguarding future generations. Prof. M. Subhan Qureshi presented the NESS Global Report Pakistan Volume, prepared in collaboration with NESS-ISN Beijing, underscoring the 63 institutions that have committed to the NESS-Pak Initiative. A total of 250 individuals have also joined as supporters, signaling a growing commitment within Pakistan.

2. **Antimicrobial Resistance (AMR):** AMR poses a serious threat to the livestock, poultry, and public health sectors in the province. Research and postgraduate programs must prioritize AMR prevention and address related health challenges through collaborative projects.

3. **Enhanced Collaboration with Private Farmers:** Students and faculty should have access to private livestock and poultry farms to tackle real-world health, productivity, and profitability challenges. In turn, livestock and poultry farmers require technical, diagnostic, and advisory support to implement sustainable and safe farming practices. A collaborative framework could create mutually beneficial outcomes.

4. **Shift to Preventive Medicine at Provincial Farms:**

Provincial livestock and poultry farms should adopt preventive over curative medicine to mitigate AMR, reduce environmental contamination, and lower farming costs. Enhanced sanitation, vaccination, record-keeping, and other preventive practices are essential for healthier, more productive, and profitable farms.

5. **Research on Exotic Breeds:** The introduction of exotic livestock and poultry breeds has led to challenges that must be addressed through research on genetics, stress

physiology, and fertility.

6. **Implementation of the NESS Global Report Pakistan Volume:** OHC2024 recommends that the NESS Global Report Pakistan Volume be presented to the Minister of Science and Technology, Government of Pakistan. Establishing a NESS-Pak Support Cell at the Ministry, backed by a donor consortium, could drive eco-security research and development across Pakistan. AWKUM, already home to the NESS-Pak Research Center, will lead efforts to integrate eco-security initiatives into academic and outreach programs, focusing on biodiversity, food security, public health, and livelihoods.

7. **Establishing a Triple Helix Committee on Food Security and Eco-Security at AWKUM:** AWKUM will host a Triple Helix Committee, uniting academia, government, and private sector representatives to:
    - Address current and emerging challenges in eco-security and food security.
    - Register livestock and poultry farmers with CAHVS AWKUM for ongoing health, productivity, and profitability monitoring, supported by a revolving fund and ADP project.
    - Demonstrate viable entrepreneurship models for farming, product processing, and marketing, providing opportunities for outgoing AWKUM graduates to establish registered startups under the AWKUM brand.

Professor Dr. Sher Bahadar Khan
Chief organizer Organizing Committee OHC2024