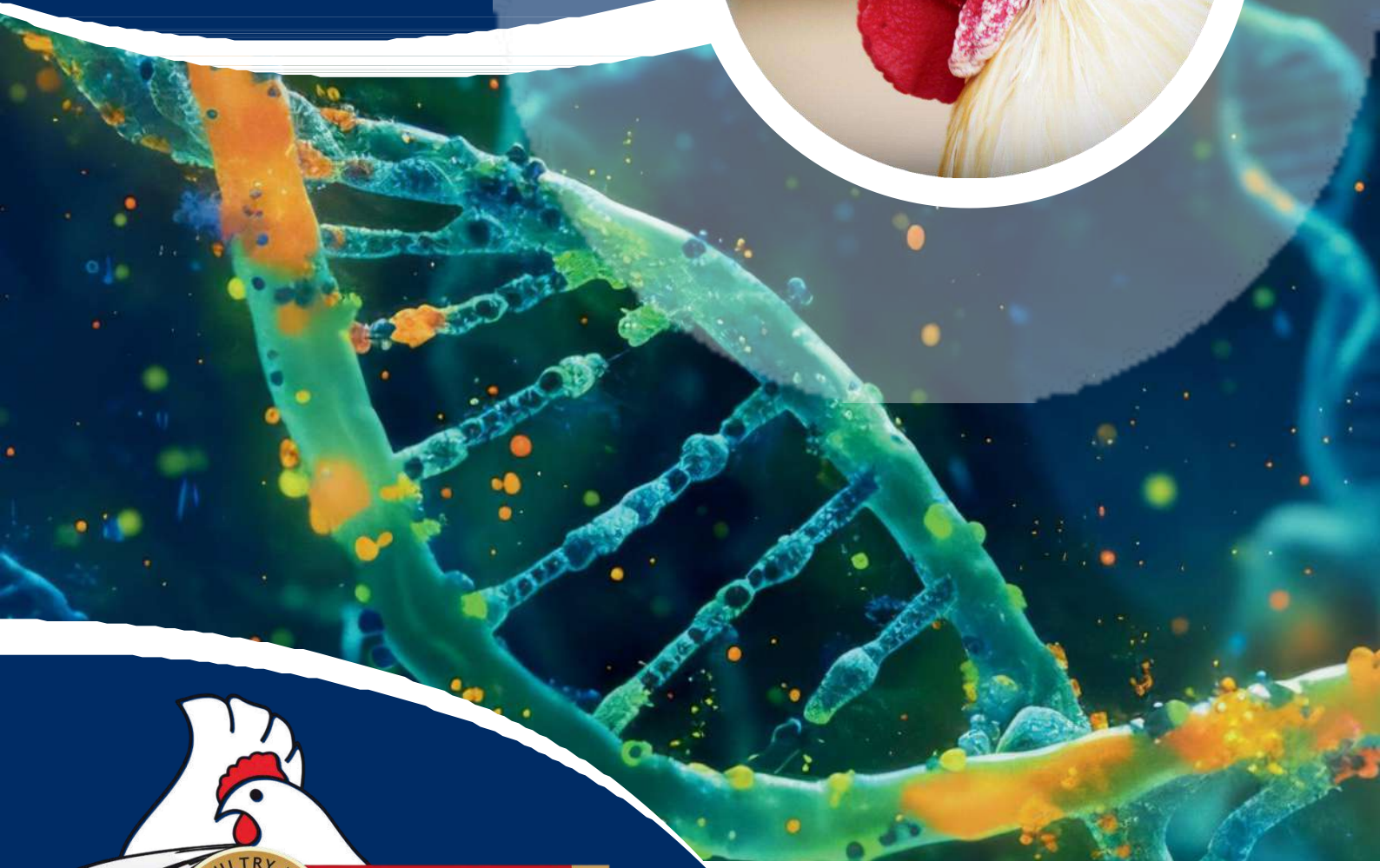
POULTRY SCIENCE CONFERENCE

2025

(PSC@IPEX2025)

23rd October, 2025



International Poultry Expo October 23-24-25 2025 IPEX

ORGANIZED BY:

UVAS UNIVERSITY OF VETERINARY AND ANIMAL SCIENCES LAHORE

ppa

Pakistan Poultry Association (PPA)

and University of Veterinary and Animal Sciences, Lahore, Pakistan

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ABSTRACT BOOK

POULTRY SCIENCE CONFERENCE

(PSC@IPEX-2025)

INTERNATIONAL POULTRY EXPO
OCTOBER 23-25, 2025

ORGANIZERS

UNIVERSITY OF VETERINARY AND ANIMAL SCIENCES, LAHORE

COLLABORATOR

PAKISTAN POULTRY ASSOCIATION

Message of the Vice Chancellor

It is a privilege to extend heartfelt congratulations to all participants, organizers, and stakeholders of this year's Poultry Expo—a landmark initiative that celebrates innovation, resilience, and progress in one of Pakistan's most dynamic agro-based industries. Since its inception in 1962, Pakistan's commercial poultry sector has grown into a vital pillar of the livestock industry. With investments exceeding PKR 1,056 billion, the sector now produces over 2,160 metric tons of chicken meat and 23.8 billion table eggs annually, while providing employment to more than 1.5 million individuals nationwide. This industry not only helps stabilize red meat prices but also strengthens agricultural sustainability and contributes significantly to national food security.

Despite its impressive growth, the poultry sector continues to face multifaceted challenges—including disease outbreaks, feed price volatility, logistical inefficiencies, and market irregularities. These issues underscore the need for innovation, collaboration, and knowledge exchange to ensure long-term resilience. Pakistan's per capita poultry consumption remains below global benchmarks. With average daily animal protein intake at just 17 grams—far short of the WHO's recommended 27 grams—our collective responsibility extends beyond production. We must promote education, accessibility, and innovation to bridge the nutritional gap and improve public health outcomes.

As a leading public sector institution, the University of Veterinary and Animal Sciences (UVAS) remains committed to advancing high-quality academic programs and research that support safe food production and sustainable economic development. We view research not merely as an academic pursuit, but as a driver of innovation, commercialization, and societal impact. To enhance institutional efficiency and transparency, UVAS has embraced digital transformation across multiple domains. Key initiatives include systems for financial tracking, tutorial grouping, faculty workload analysis, internship coordination, milk distribution, and online funds management. Extension services continue to support disease control and farmer education, while procurement processes adhere to PPRA guidelines via ePad. At Ravi Campus, FMD vaccine production has been upgraded, and a Uniform Academic Calendar ensures synchronized departmental operations. These efforts reflect our unwavering commitment to modernization, academic excellence, and responsive governance.

This Expo serves as a beacon of collaboration, uniting academia, industry leaders, policymakers, and consumers to shape the future of poultry science and food equity. As Vice Chancellor, I commend the vision and dedication that define this event and reaffirm UVAS's commitment to sustainable development, scientific advancement, and inclusive growth. Let this gathering be a catalyst for transformative solutions that uplift communities and nourish the nation. May the ideas exchanged here pave the way for a more resilient, efficient, and inclusive poultry sector—one that contributes to a healthier and more prosperous Pakistan.

Meritorious Prof. Dr. Muhammad Younas Rana
(DLA.I, T.I)
Vice Chancellor,
University of Veterinary and Animal Sciences,
Lahore.

Message of Dr. Hanif Nazir Chaudhry

On behalf of the Pakistan Poultry Association, it is my distinct honor to warmly welcome all our distinguished guests, brilliant researchers keynote speakers, oral presenters, dedicated farmers, aspiring students, and every participant to the Poultry Science Conference 2025 (PSC@IPEX2025). Held in conjunction with the premier International Poultry Expo – 2025, this conference is our vital platform for bridging the gap between academia and the poultry industry and for championing essential indigenous research.

Pakistan's poultry sector is a powerhouse of economic activity, demonstrating tremendous potential and exponential growth. With new technologies constantly being integrated to enhance profitability and efficiency, our industry is evolving faster than ever. This conference is designed to serve as a beacon, creating awareness among our young researchers and students about the latest global and local advancements in the poultry sector. It is also an invaluable opportunity for students to directly interact with industry leaders and experts who are showcasing their innovations at the exhibition stalls.

Bringing all stakeholders of the poultry ecosystem together under one roof significantly benefits every industry partner. The pace of change is rapid, and with an increasingly supportive marketplace and government policy environment, our moment to accelerate growth is now. By continuing this integrated format and strengthening this critical relationship, we look to solidify our shared vision and goals for the industry's collective prosperity. Recognizing the crucial need for our broad industry community to collaborate, the Poultry Science Conference aims to deliver maximum impact. By hosting various commodity sectors alongside a unique trade show, cutting-edge education sessions, and an industry gala, we anticipate increased exposure and significant attendance growth for everyone involved.

On behalf of the entire Conference team, with special acknowledgment to the VC UVAS, Chief Organizer IPEX 2025, and our diligent organizing committee members, I extend my sincerest gratitude. Thank you to all our generous sponsors, committed exhibitors, insightful speakers, and most of all, the delegates who are here today to learn, share, and contribute to the future of Pakistan's poultry industry.

Dr. Hanif Nazir Chaudhry
Convener,
Poultry Science Conference (PSC@IPEX 2025),
Pakistan Poultry Association, PPA.

Message of Prof. Dr. Aamir Ghafoor

The poultry industry in Pakistan has become a pillar of our agricultural economy, contributing to food security, job creation, and national growth. Employing more than 1.7 million people and attracting investments above PKR 1,250 billion, this sector reflects both resilience and confidence in its future.

Yet, sustaining progress in today's competitive world requires more than size—it requires science as the foundation of the knowledge economy. Science provides the tools to enhance productivity, ensure food safety, improve animal health, and meet the demands of global markets. Without embracing scientific innovation, the poultry sector cannot achieve long-term sustainability or global competitiveness.

The themes of this year's conference embody this vision: safeguarding Pakistan's HPAI-free status, exploring entrepreneurship, applying artificial intelligence in production, advancing food safety with focus on antimicrobial resistance, and adopting modern tools for disease control. Each reflects the need to embed scientific knowledge into practical solutions for industry and society.

As Convener of PSC, I take pride in this collaborative platform where academia, industry, and farmers unite. Our responsibility is to shape a poultry sector guided by science, technology, and innovation—a sector that strengthens Pakistan locally and positions it globally.

I encourage all participants to engage actively and contribute to this journey. Together, we can turn challenges into opportunities and shape the future of poultry science for Pakistan and beyond.

Warm Regards

Prof. Dr. Aamir Ghafoor
Convener, Organizing Committee,
Poultry Science Conference (PSC@IPEX 2025),
University of Veterinary and Animal Sciences, Lahore.

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POULTRY SCIENCE CONFERENCE

PSC@IPEX2025

Main Auditorium Expo Center, Lahore

SCIENTIFIC PROGRAM

Technical Session: 23rd October, 2025 **(Thursday)**

Timings: **10:30 am – 04:00 pm**

INAUGURAL SESSION

10:30 am	Arrival of Chief Guest	
10:35 am	Recitation	
10:40 am	Welcome note and Introduction of Poultry Industry	**Mr. Abdul Haye Mehta,** Chief Organizer IPEX-2025
10:45 am	Empowering the Poultry Industry through Academic Excellence and Innovation	**Prof. Dr. Aamir Ghafoor**
10:50 am	Importance of Poultry Science Conference	**Dr. Hanif Nazir Ch**
10:55 am	Views/ Remarks of Chief Guest	

FORMAL SESSION

11:00 am	Formal Opening of the Poultry Science Conference	**Mr. Abdul Haye Mehta,** Chief Organizer IPEX-2025

TECHNICAL SESSION – 1

Chairman	Meritorious Professor **Dr. Muhammad Younas Rana** (DLA.I, T.I), Vice Chancellor, University of Veterinary & Animal Sciences, Lahore
Co-Chairman	**Dr. Sajjad Arshad**, Ex-Chairman of PPA
Co-Chairman	**Prof. Dr Faqir Muhammad**, Dean Faculty of Veterinary Science, Bahauddin Zakriya University, Multan

Moderator: Dr. Farhan Afzal

Time	Topic	Presenter
11:05 am - 11:20 am	**Key Note Speaker "STRATEGIC ARTIFICIAL INTELLIGENCE (AI) INTEGRATION FOR PAKISTAN'S POULTRY INDUSTRY"**	**Mr. Farhan Murtaza**
11:20 am - 11:30 am	TARGETING MYCOTOXIN AND NECROTIC ENTERITIS-INDUCED GUT DYSBIOSIS IN POULTRY USING BACILLUS LICHENIFORMIS	Maria Jamil
11:30 am - 11:40 am	PHYSIOLOGICAL PROPERTIES OF INDIGENOUS LYTIC BACTERIOPHAGES AS MONOPHAGE SUSPENSION AND COCKTAIL AGAINST POULTRY-ADAPTED TYPHOIDAL *SALMONELLA* VARIANTS	Rida Haroon Durrani
11:40 am - 11:50 am	EFFECT OF DIFFERENT STORAGE DURATION ON PHYSIO-CHEMICAL PROPERTIES AND SENSORY ATTRIBUTES OF	Smile Manzoor

	COMMERCIAL EGGS	
11:50 am - 12:00 pm	EFFECT OF DIFFERENT LIGHT COLOUR CORRELATED TEMPERATURES (CCT) ON DRESSING PERCENTAGE, BLOOD PROFILE, AND GROWTH HORMONES OF BROILERS	Khurshid Ahmad
12:00 pm - 12:10 pm	IMPACT OF MALE BODYWEIGHT ON SEMEN CHARACTERISTICS AND HATCHABILITY IN BROILER BREEDERS	Muzamal Tariq
12:10 pm - 12:20 pm	MOLECULAR CHARACTERIZATION AND PATHOLOGY OF FOWL ADENOVIRUS SEROTYPE-2 (FADV-2) IN BROILERS	Sharoze Shabbir
12:20 pm - 12:30 pm	CALIBRATING FUNCTIONAL CARBOHYDRATES AND SHORT CHAIN FATTY ACIDS BLEND TO REDUCE *SALMONELLA INFANTIS* PROPAGATION IN BROILER CHICKENS IN ANTIBIOTIC FREE FEED PRODUCTION SYSTEM	Zeshan Aslam
12:30 pm - 12:40 pm	DEVELOPMENT OF AN ARTIFICIAL INTELLIGENCE-BASED DIAGNOSTIC MODEL FOR THE AVIAN NEWCASTLE DISEASE VIRUS BY USING PROVENTRICULUS IMAGES OF POULTRY	Faiza Arshad
12:40 pm - 12:50 pm	EFFECT OF INSOLUBLE FIBER INCLUSION WITH OR WITHOUT EXOGENOUS NSPASE ENZYMES ON GROWTH PERFORMANCE, CARCASS QUALITY, NUTRIENT DIGESTIBILITY AND INTESTINAL HISTOLOGICAL FEATURES OF BROILERS	Safdar Hassan
12:50 pm - 01:00 pm	DETECTION OF CO-INFECTION OF CHICKEN ANEMIA VIRUS AND *ESCHERCIHIA COLI* IN COMMERCIAL POULTRY FLOCKS IN DISTRICT LAHORE, PUNJAB, PAKISTAN.	Shahan Azeem
01:00 pm - 02:00 pm	**LUNCH AND PRAYER BREAK**	

TECHNICAL SESSION – 2

Chairman	**Prof. Dr. Talat Naseer Pasha** Director General, PAFDA, Punjab
Co-Chairman	**Prof. Aneela Zameer Durrani**, Dean Faculty of Veterinary Science, UVAS, Lahore
Co-Chairman	**Prof. Dr. Arfan Yousaf**, Dean Faculty of Veterinary Science, ARID Agriculture University, Rawalpindi

Moderator: Dr. Farhan Farooq

02:00 pm - 02:10 pm	EFFECT OF ESSENTIAL OILS BLEND ON INTESTINAL HEALTH IN EXPERIMENTALLY CHALLENGED BROILER	Mah Noor
02:10 pm - 02:20 pm	PLANT DERIVED ENDOPHYTES OF *OCIMUM TENUIFLORUM* AND *AZADIRACHTA INDICA* AS ANTIMICROBIAL AGENTS AGAINST POULTRY PATHOGENS	Irfan Ali
02:20 pm - 02:30 pm	PCR-BASED DETECTION AND MUTATION DYNAMICS OF FUSION PROTEIN GENE OF ORTHOAVIULA VIRUSES SEQUESTERED DURING 2024 FIELD OUTBREAKS IN PAKISTAN	Muhammad Ismail
02:30 pm - 02:40 pm	EFFECTS OF ENCAPSULATED BUTYRIC ACID ON GROWTH PERFORMANCE, CARCASS CHARACTERISTICS AND NUTRIENT DIGESTIBILITY IN BROILER	Saleh Shahbaz
02:40 pm - 02:50 pm	PUERARIN ATTENUATES THIRAM-INDUCED CYTOTOXICITY IN CULTURED CHICKEN GROWTH PLATE CHONDROCYTES: INSIGHTS INTO THE IN VITRO THERAPEUTIC EFFICACY BY MODULATING	Muhammad Waqas

02:50 pm - 03:00 pm	EFFECT OF SODIUM BUTYRATE AND CALCIUM BUTYRATE AS ALTERNATIVES TO ANTIBIOTIC GROWTH PROMOTERS ON BROILER PERFORMANCE TO SUPPORT ORGANIC MEAT PRODUCTION IN PAKISTAN	Beenish Abbas
03:00 pm - 03:10 pm	UNMASKING THE MECHANISM: HOW *SALMONELLA GALLINARUM* TRIGGERS PBMC DEATH TO CRIPPLE INNATE AVIAN IMMUNITY, AS MAPPED BY ADVANCED FLOW CYTOMETRY	Noor Ul Ain
03:10 pm - 03:20 pm	DEVELOPMENT AND EVALUATION OF PROTECTIVE EFFICACY AND SAFETY OF GAMMA-IRRADIATED INACTIVATED VACCINE AGAINST FOWL TYPHOID	Minahil Ashraf
03:20 pm - 03:30 pm	IMPACT OF VARIOUS BROILER HOLDING PERIODS IN THE OPEN MARKET ON MEAT QUALITY, SENSORY PROPERTIES AND ECONOMIC LOSSES IN WINTER	Muhammad Asad
03:30 pm - 03:40 pm	EFFECTS OF MULTI-WALLED CARBON NANOTUBES ON PATHOGENIC *ESCHERICHIA COLI.*	Uzma Batool
03:40 pm - 03:50 pm	**Q/A Session**	

Distribution of "Prof. Dr. Aftab Ahmad Anjum Research Award" by Mr. Abdul Basit, Chairman PPA
And
Distribution of Runner up award by Mr. Malik Sharif, Vice Chairman PPA

Concluding Remarks:

Formal Closing

Mr. Abdul Haye Mehta,
Chief Organizer, IPEX-2025

END OF FORMAL SESSIONS

Judges PSC@IPEX2025

1. **Prof. Dr. Khalid Naeem Khawaja**,
   Ex-Director, National Reference Lab for Poultry Diseases, Islamabad
2. **Dr. Hamid Irshad**,
   Program Leader, NRLPD, Animal Sciences Institute, National Agricultural Research Centre, Islamabad
3. **Dr. Muhammad Danish Mehmood,**
   Director Technical, Ottoman Pharma, Lahore.

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DETECTION AND RISK FACTOR ANALYSIS OF AVIAN COLIBACILLOSIS ASSOCIATED WITH COLISTIN-RESISTANT *ESCHERICHIA COLI* AND *KLEBSIELLA PNEUMONIAE*

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2025-PSC-01	**Abstract**

Colibacillosis caused by colistin-resistant avian pathogenic *Escherichia coli* (APEC) poses a serious threat to food security and public health. The horizontal transmission of mobilized colistin-resistance (mcr) genes may promote the co-emergence of other resistant pathogens like *Klebsiella pneumoniae*. This study investigated the prevalence, molecular characteristics, antibiotic resistance profiles, and associated risk factors of colistin-resistant *E. coli* and *K. pneumoniae* in broiler chickens across three districts in Punjab, Pakistan. A total of 230 visceral organ samples were collected from 13 poultry farms in Sargodha, Jhang, and Toba Tek Singh. Isolates were screened for phenotypic colistin resistance using broth microdilution, and *mcr-1* and *mcr-2* genes were detected via PCR. Antimicrobial susceptibility was assessed using the Kirby-Bauer disk diffusion method. Relevant host, farm, and environmental risk factors were analyzed. Colistin-resistant *E. coli* and *K. pneumoniae* were found in 24.78% and 3.04% of samples, respectively. Prevalence of *E. coli* varied by district: Jhang (42%), Sargodha (23.61%), and Toba Tek Singh (5.55%). The *mcr-1* gene was detected in 42.1% of resistant isolates, significantly more common than *mcr-2* (14.03%). Phylogenetic analysis revealed high similarity to the *mcr-1.5* variant. High levels of resistance were observed to amoxicillin-clavulanic acid (84.21%), cefotaxime (70.17%), and trimethoprim-sulfamethoxazole (73.68%). Logistic regression identified prior respiratory viral infection as a significant risk factor (OR = 4.808, $p < 0.01$), while daily culling of dead/diseased birds was protective (OR = 0.308, $p = 0.01$). These findings highlight the increasing burden of colistin resistance in poultry pathogens, complicating colibacillosis control and posing a zoonotic risk through potential transmission to humans.

Key Words:	*Escherichia coli, Klebsiella pneumoniae,* MCR, Risk factors, Avian colibacillosis

CRISPR/CAS GENE EDITING IN *ASPERGILLUS FUMIGATUS* REDUCES ITS PATHOGENICITY IN BROILERS

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2025-PSC-02	**Abstract**

Gliotoxin of *Aspergillus fumigatus* has been extensively studied for its role in pathogenesis in animals and humans. It triggers pathogenesis by its immunosuppressive and cytotoxic effects. Biosynthetic gene cluster (BGC) consisting of 13 genes regulates its biosynthesis. We targeted gliZ, gliP and gliA genes of this BGC using CRISPR/Cas9 system in a multigene editing approach to check the pathogenesis in broilers. crRNAs were designed using EuPaGDT and 3 single guide RNAs (sgRNA) were commercially synthesized. Each sgRNA was combined with Cas9 to form ribonucleoprotein complexes which were then used for simultaneously transfecting fungal protoplasts. Thin-layer chromatography showed the absence of gliotoxin on silica plate and DNA sequencing showed various indels in target genes. Regenerated protoplasts were matured to form fungal hyphae and spore production was induced. These spores were inoculated intra-air sac in broiler chicks. During one-week infection trial, birds inoculated with RNP-treated spores showed mild clinical signs, while birds infected with wild-type spores showed morbidity and mortality. Histopathological analysis of lungs showed necrosis and congestion, and presence of mixed population of inflammatory cells in wild-type infected birds, while no such lesions were seen in birds infected with RNP-treated spores. These results show that multigene editing approach was successful in creating indels simultaneously in 3 gliotoxin genes which resulted in amino acid substitution which negatively impacted gliotoxin biosynthesis and export. In vivo experiment results show that RNP-treated fungal spores were unable to cause *A. fumigatus* pathogenicity in broiler. Targeting gliotoxin biosynthesis could thus be a promising approach to develop antifungal therapy.

Key Words:	Gliotoxin, *Aspergillus fumigatus* , CRISPR, Histopathology

HOW WE CAN GET MORE REPRODUCTION RATE AND EGG PRODUCTION BY USING ARTIFICIAL INSEMINATION

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2025-PSC-03	Abstract

Artificial Insemination (AI) is gaining traction in Pakistan's poultry industry as a cost-effective method to enhance genetic quality, increase egg and meat production, and reduce disease transmission. With rising demand for poultry products, traditional breeding methods face challenges such as low fertility rates, inbreeding, and high costs of maintaining male flocks. AI addresses these issues by enabling selective breeding with superior genetics, improving flock productivity by up to 20%. In Pakistan, AI is primarily used in breeder farms for broilers and layers, where semen from high-quality roosters is collected and inseminated into hens. This method ensures consistent hatchability and reduces reliance on natural mating, which can be inefficient and risky due to disease spread . Small-scale farmers are increasingly adopting AI with support from government initiatives like the Poultry Research Institute in Rawalpindi, which trains technicians in semen collection and storage techniques. However, challenges persist, including lack of awareness, high initial costs of equipment, and limited cold chain infrastructure for semen preservation . Despite these barriers, AI's potential to boost Pakistan's poultry exports—such as fertile eggs and high-yield breeds—makes it a key focus for agricultural modernization. Future advancements, including sex-sorted semen and genomic selection, could further revolutionize the sector, ensuring food security and economic growth.

Key Words:	Artificial Insemination, Poultry, Reproduction Rate

EVALUATION OF ANTIBIOTIC RESISTANCE PROFILE AND MULTIPLE ANTIBIOTIC RESISTANCE INDEX IN AVIAN-ADAPTED *SALMONELLA ENTERICA* SEROVAR GALLINARUM ISOLATES

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2025-PSC-04 **Abstract**

The emergence of antibiotic resistance owing to the imprudent use of antibiotics in food-producing animals has been associated with huge costs and threats, particularly in countries with comparable farming practices like Pakistan. The present study evaluated the efficacy of 10 antibiotics using their standard concentrations against *Salmonella enterica* serovar Gallinarum biovar Gallinarum and Pullorum from three districts of Punjab province in Pakistan. Surprisingly, 66.7% of the isolates were resistant to the *β*-lactam potentiator, amoxicillin-clavulanate. On the contrary, 23.3 and 33% of the isolates were resistant to the two III-generation aminobenzyl penicillins, amoxicillin and ampicillin, respectively. 56.6% of isolates were found to be resistant to the II-generation aminoglycoside Gentamicin, and 100% resistance was observed against Nalidixic Acid, Ciprofloxacin, or Levofloxacin. A high degree of susceptibility to Sulfamethoxazole-Trimethoprim and Doxycycline was observed. The antibiotics exhibited statistical significance, via correlation and cluster analysis. Conclusively, the study reports the multitude of multidrug resistance in host-adapted *Salmonella*, emphasizing the importance of continued research and monitoring into the use of antibiotics in agro-food animals on a national level.

Key Words: Antibiotic Resistance, *Salmonella Gallinarum*, *Salmonella Pullorum*

PLANT DERIVED ENDOPHYTES OF *OCIMUM TENUIFLORUM* AND *AZADIRACHTA INDICA* AS ANTIMICROBIAL AGENTS AGAINST POULTRY PATHOGENS

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2025-PSC-05 **Abstract**

Medicinal plants are valuable sources of therapeutic compounds and host a wide variety of endophytic microorganisms, particularly actinomycetes, known for their antibiotic-producing capabilities. This study aimed to isolate and evaluate endophytic actinomycetes from *Ocimum tenuiflorum* (Tulsi) and *Azadirachta indica* (Neem), two ethnomedicinal plants traditionally used in South Asia. A total of 28 isolates were recovered from surface-sterilized tissues, 22 from Tulsi and 6 from Neem predominantly from roots (59% and 83.3%, respectively). Over half (57%) of the isolates produced melanin, while 43% utilized all seven tested sugars. In preliminary screening, 12 strains showed notable antibacterial activity against *Escherichia coli* (14 mm), *Staphylococcus aureus* (18 mm), and *Bacillus subtilis* (17 mm). Ethyl acetate extracts of selected strains exhibited significant inhibition zones against multidrug-resistant poultry pathogens, including *Salmonella enteritidis* (17.6 mm) and *Campylobacter jejuni* (13.6 mm). These findings highlight the promising antimicrobial potential of plant-derived endophytes and support their further investigation as candidates for novel antibiotic discovery targeting veterinary pathogens.

Key Words: Endophytes, Medicinal Plants, Poultry

PHYSIOLOGICAL PROPERTIES OF INDIGENOUS LYTIC BACTERIOPHAGES AS MONOPHAGE SUSPENSION AND COCKTAIL AGAINST POULTRY-ADAPTED TYPHOIDAL *SALMONELLA* VARIANTS

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2025-PSC-06 **Abstract**

The emergence and rapid spread of multi-drug resistance among pathogens in the agro-food sector has intensified the search for alternatives to conventional antibiotic therapy. This study investigated the physiological characteristics and population dynamics of lytic bacteriophages targeting avian-adapted *Salmonella*. From 28 positive environmental samples, four bacteriophage isolates—SalØ-ABF37, SalØ-RCMPF12, SalØ-MCOH26, and SalØ-DNLS42—were selected based on their lytic efficacy against bacterial test strains. These phages were active against closely related D1 serotypes, *Salmonella Enteritidis* and *Salmonella Typhimurium*, and exhibited no lytic activity against *Escherichia coli* ATCC 25922 or *Staphylococcus aureus* ATCC 23235. Both monophage suspensions and phage cocktails significantly suppressed bacterial growth compared to the untreated control. After 400 minutes of co-incubation, bacterial turbidity was reduced to 0.244 at λ600, compared to 0.669 in the control. The recorded latent periods were 25, 35, 25, and 30 minutes for SalØ-ABF37, SalØ-RCMPF12, SalØ-MCOH26, and SalØ-DNLS42, respectively, with corresponding burst sizes of 73, 97, 132, and 75 PFU cell^{-1}. The phages demonstrated optimal lytic activity at 37–42 °C and retained stability across a pH range of 3–9. All isolates were confirmed to possess double-stranded DNA. These findings support the potential of lytic bacteriophages as effective biocontrol agents against multidrug-resistant *Salmonella*. The physiological profiling and growth inhibition assays presented herein contribute valuable parameters toward the development and standardization of phage therapy strategies in the agro-food sector.

Key Words: Bacteriophages, Multidrug resistant, Phage therapy, *Salmonella*

PROTECTIVE EFFECT OF PROBIOTICS IN COMBINATION WITH VACCINATION ON ANTIBODY RESPONSE, BIOCHEMICAL AND HEMATOLOGICAL INDICES IN BROILERS

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2025-PSC-07 **Abstract**

In this study, the effect of multi strain probiotics was studied on antibody response, blood chemistry and hematological parameters in combination with vaccination. A total of sixty day-old broiler chicks were equally divided into four groups: Control, Probiotic, Vaccine and Probiotic + Vaccine. Probiotics were offered at 2g/500ml of water for 5 days/week up to 6 weeks. NDV vaccine was given by eye drops at 0.025ml/bird at day 7. At 21st day NDV Lasota vaccine was offered in drinking distil water at 0.50ml /bird. IBDV vaccine was administered by drinking water at 10th, 22nd and 30th day of experiment. Blood samples were collected at 15, 30 and 45 days to measure antibody response, blood chemistry and hematological parameters. Antibody titer against NDV vaccine and IBD vaccine showed decline in control and probiotic groups. In case of NDV vaccine, there was no significant difference in Vaccine group (GMT=log2 7.33) and Probiotic + Vaccine group (GMT=log2 7.66) at day 45th of experiment. For IBDV vaccine, there was significant difference at 45th day in ELISA titer of vaccine group (2233) and Probiotic+Vaccine group (4206). Cholesterol and ALT showed significant decrease in PV group at 45th day. Significant increase in WBC count was observed in PV group. Level of significance was $P \leq 0.05$. Probiotics when administered along with vaccine showed improvement in antibody titer but no harmful increase or decrease in blood chemistry and hematological parameters was observed.

Key Words: Antibody response, IBDV vaccine, Multi strain probiotics, NDV vaccine

ENTREPRENEURSHIP OPPORTUNITIES FOR PROFESSIONALS: A NEW FRONTIER IN INNOVATION AND IMPACT

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2025-PSC-08 **Abstract**

In today's fast-evolving global economy, professionals from various disciplines are finding new opportunities to apply their expertise beyond traditional roles by stepping into the world of entrepreneurship. This abstract highlights the growing trend of professionals—including veterinarians, engineers, healthcare workers, educators, and IT specialists—who are launching innovative ventures to address sector-specific gaps and meet emerging market demands. Professional entrepreneurship is no longer an exception—it is quickly becoming a viable and attractive pathway for career growth and societal impact. Professionals are uniquely equipped with technical knowledge, critical thinking skills, and specialized training, which positions them well to identify industry challenges and craft targeted, sustainable solutions. These ventures range from tech-enabled services and consultancy models to digital platforms, agri-businesses, and social enterprises. For example, veterinarians in rural regions are creating mobile animal health clinics and telemedicine services, while educators are building online learning platforms tailored to local needs. A combination of factors is fueling this shift. The rise of digital tools, greater internet access, and the expansion of mobile and financial technologies have significantly lowered the barriers to starting a business. In many developing countries, the public sector has struggled to meet the growing needs of populations—creating space for professional entrepreneurs to fill in with private and community-based solutions. Additionally, dissatisfaction with rigid job markets and a desire for autonomy are encouraging many professionals to explore business ownership as a way to take control of their careers and make a broader impact. Governments and institutions are increasingly recognizing this potential and are beginning to respond with supportive policies, funding programs, and business incubation services. In many regions, professionals now have access to innovation hubs, seed grants, and entrepreneurship training programs designed to help them transition from employment to enterprise. Many professionals have limited exposure to business and management skills, making it difficult to run and grow successful enterprises. Access to financing—especially at the startup stage—is another major obstacle, particularly for women and professionals in rural areas. Regulatory hurdles and lack of mentoring also continue to slow down progress in many regions. To support the continued growth of professional entrepreneurship, a holistic approach is needed. Education systems should incorporate business training into professional degree programs. Governments should simplify business regulations, create gender-inclusive financial services, and incentivize innovation through tax benefits and funding programs. Cross-sector partnerships between academia, industry, and civil society can also play a key role in supporting professionals at every stage of the entrepreneurial journey.

Key Words: Professional Entrepreneurship, Innovation, Digital Transformation

BROADER USE OF ARTIFICIAL INTELLIGENCE IN POULTRY PRODUCTION

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2025-PSC-09

Abstract

In recent years, artificial intelligence (AI) has steadily made its way into the field of poultry production, transforming the industry in ways that were once hard to imagine. From monitoring bird health in real-time to optimizing feed conversion ratios, AI technologies are now being used to boost efficiency, reduce disease outbreaks, and improve overall flock management. Smart sensors, computer vision, and machine learning models are helping farmers make quicker, more informed decisions—often predicting problems before they occur. This shift not only enhances productivity but also supports animal welfare and sustainable farming practices. As challenges like rising feed costs, climate change, and biosecurity threats grow more complex, AI offers a powerful toolkit to navigate them with greater precision and confidence. This paper explores the expanding role of AI in poultry systems, highlighting its potential to reshape the future of poultry farming from hatch to harvest.

Key Words: Artificial Intelligence, Poultry Farming, Precision Agriculture, Smart Monitoring

CLIMATE-INDUCED RISK OF MYCOTOXIN CONTAMINATION IN STORED POULTRY FEED IN PAKISTAN

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2025-PSC-10 **Abstract**

Mycotoxin contamination in poultry feed presents a serious threat to bird health, productivity, and food safety. In Pakistan, the incidence of mycotoxin contamination has emerged as a growing concern, particularly under the influence of climate variability. Rising temperatures, high relative humidity, and extended monsoon periods create optimal conditions for fungal proliferation and mycotoxin biosynthesis during feed storage. These climate-induced changes, combined with inadequate post-harvest handling and poor storage infrastructure, significantly increase the risk of contamination in feed commodities such as maize, cottonseed cake, and wheat bran. Seasonal shifts, especially during and after monsoon, have been associated with elevated levels of aflatoxins, fumonisins, and ochratoxins in feed samples. These toxins adversely affect poultry health by compromising immune function, reducing growth performance, and increasing mortality. Furthermore, chronic exposure to mycotoxin-contaminated feed may result in residue accumulation in meat and eggs, posing potential food safety risks to consumers. This abstract highlights the urgent need for integrated strategies to mitigate climate-driven mycotoxin risks in poultry production systems. Improved storage practices such as moisture control, aeration, and use of antifungal additives along with regular mycotoxin surveillance, are critical to ensure feed safety. There is also a need to raise awareness among poultry farmers and feed manufacturers regarding climate-related contamination risks and preventive interventions. Understanding the link between climatic factors and mycotoxin occurrence can help inform national feed safety policies and adaptation strategies in the context of climate change. With poultry being a major contributor to Pakistan's food security, addressing this hidden threat is vital for safeguarding animal health, ensuring consumer protection, and sustaining the economic viability of the poultry sector.

Key Words: Mycotoxins, Fumonisins, Poultry, Feed, Climate

THE GROWING RISK OF FOODBORNE PATHOOGEN AND NTIMICROBIAL RESISTANCE IN POULTRY FEED AND PRODUCTS

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2025-PSC-11	**Abstract**

The presence of common zoonotic bacteria and the rise of antimicrobial resistance (AMR) pose significant challenges to ensuring the microbiological safety of poultry products. Pathogens such as *Salmonella enterica*, *Campylobacter jejuni*, and avian pathogenic *Escherichia coli* (APEC) are frequently isolated from poultry and are responsible for millions of foodborne illnesses globally each year. In the European Union, *Salmonella* ranks as the second most reported zoonotic agent, with approximately 25% of outbreaks linked to poultry. Similarly, *Campylobacter* is detected on nearly 37.5% of broiler carcasses. Moreover, APEC strains not only cause disease in birds but also harbor drug-resistance genes, increasing the risk of transmission to humans. The extensive use of antibiotics in poultry both for disease prevention and growth promotion has accelerated the emergence of multidrug-resistant strains, creating a critical public health threat. For example, EU surveillance data indicate high levels of fluoroquinolone resistance, particularly ciprofloxacin, among poultry-associated *Campylobacter* isolates. Addressing this issue requires a multifaceted, One Health–aligned strategy. Key measures include enhanced AMR surveillance, improved antimicrobial stewardship, and robust farm-level biosecurity practices such as thorough sanitation and pest control. Vaccination against pathogens like *Salmonella* has shown promise, though an effective commercial vaccine against *Campylobacter* is still lacking. Processing-stage interventions such as Hazard Analysis and Critical Control Points (HACCP), carcass decontamination, and cold chain management further reduce contamination risks. Additionally, alternative approaches such as probiotics (e.g., *Lactobacillus* spp.), bacteriophages, and competitive exclusion cultures are gaining attention. Consumer education on proper handling and cooking of poultry products remains essential as a final barrier to infection. These collective efforts reflect current global regulatory trends, including the EU's ban on antibiotic growth promoters, and aim to curb AMR, protect public health, and preserve the efficacy of existing antimicrobials.

Key Words: *Salmonella*, *Campylobacter*, *Escherichia coli*, Antimicrobial Resistance

USE OF ORGANIC ACIDS AS SUSTAINABLE AGENTS TO REDUCE MYCOTOXIN CONTAMINATION IN FEED

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2025-PSC-12 **Abstract**

Mycotoxins such as ochratoxins, fumonisins, and aflatoxins are toxic secondary metabolites that are produced by fungi. They contaminate poultry feed leading to reduced animal productivity, compromised immune function & serious economic losses. There are various traditional detoxification methods such as physical, chemical, or biological. These methods often face limitations such as high cost, toxicity, feed quality reduction, and different environmental concerns. However, different organic acids like citric, acetic, and lactic acids are now recognized as eco-friendly & cost-effective alternatives for feed decontamination. These weak organic acids possess mycotoxin-reducing capabilities through various mechanisms such as alteration in pH, inhibition in fungal growth, deactivation of enzymes, and direct chemical breakdown of toxin structures. Citric acid is effective because of its chelating and antioxidant properties. Acetic acid shows strong antimicrobial activity. Whereas lactic acid contributes to detoxification by acidification and synergistic effects with beneficial gut microflora. Many in-vitro and in-vivo studies have been conducted to highlight the efficacy of individual & combined acid treatments in reducing toxin loads. These acid treatment does not impact availability of nutrient or palatability of the feed. The integration of these organic acids into existing feed management systems aligns with sustainable agricultural practices and One Health initiatives. In conclusion, citric, acetic, and lactic acids shows promising, green alternatives for removing feed mycotoxins. Their inclusion in poultry nutrition not only enhances feed safety but also supports animal welfare and consumer health. Further research is required to improve application protocols, assess long-term effects, and evaluate interactions with other feed additives and probiotics.

Key Words: Mycotoxins, Ochratoxins, Poultry Feed, Detoxification, Organic Acids

ISOLATION, SCREENING AND CHARACTERIZATION OF TETRACYCLINE DEGRADING BACTERIA FROM POULTRY ENVIRONMENT

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2025-PSC-13 **Abstract**

Tetracyclines are broad spectrum antibiotics which are used to improve the growth rate and treat infections. With the irrational use of antibiotics in animals for multiple purposes, the residues of these antibiotics remain in animal waste, meat and milk is an alarming threat for the environmental health. Regarding to public health, tetracycline residues cause allergic reactions, hormonal imbalance, disrupt the gut microbiota and these residues combine with calcium in bones and teeth causes discoloration and delayed bone growth. Tetracycline degrading bacteria isolated from poultry environment provide an alternate bioremediation approach to reduce the environmental pollution and to control the spread of antibiotic-resistant bacteria. The degrading efficiency of isolated bacterial strains was characterized by HPLC, the study concluded that *Bacillus velezensis* strain attained 100% tetracycline at 10µg/ml, 20µg/ml and 30µg/ml concentration while the other *Bacillus stercoris* strain degraded 96-97% at the same concentration within six days.

Key Words: Environmental Pollution, Bioremediation, Tetracycline Degradation, HPLC Analysis

UNDERSTANDING HOST IMMUNE MODULATION DURING COCCIDIAL INFECTIONS IN POULTRY WITH IMPLICATIONS FOR VACCINE STRATEGIES

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2025-PSC-14 **Abstract**

Coccidiosis is caused by various *Eimeria* species. It is one of the most predominant and economically impactful parasitic diseases in poultry worldwide. It primarily affects the intestinal tract which causes enteric lesions, reduction in feed efficiency, poor weight gain, and may result in mortality in severe cases. The anticoccidial drugs and live vaccines are currently used for control. But, the emergence of drug resistance and limitation of vaccines requires deeper understanding of host immune modulation to inform next-generation vaccine strategies. There exist a complex interaction between *Eimeria* parasites and the host immune system. This interaction is mainly focused on both innate and adaptive responses. Upon infection, the host initiates a cascade of immune events. During coccidial infection, the host initiates series of immune responses that include activation of pattern recognition receptors, recruitment of antigen-presenting cells, and production of pro-inflammatory cytokines such as IFN-γ, IL-2, and IL-17. However, *Eimeria* spp. have evolved sophisticated mechanisms to evade or suppress these responses. These mechanisms include antigenic variation, inhibition of host cell apoptosis, and modulation of T-cell signaling pathways. Mucosal immunity, particularly the roles of secretory IgA and cytotoxic T lymphocytes, is essential to control infection at intestinal level. This is important in development of recombinant, vector-based, and subunit vaccines which are meant to target specific parasite antigens with localized immune responses. Moreover, the immunomodulatory agents such as probiotics, phytogenics, and dietary additives shows potential to boost vaccine efficacy. In conclusion, a detailed understanding of host immune modulation during *Eimeria* infection is crucial to design effective, long-lasting, and drug-independent control strategies. Identification of key immunogenic targets and optimization of delivery systems should be prioritized in future research. This help to stimulate robust and balanced immune responses in poultry.

Key Words: Poultry Coccidiosis, Eimeria, Immune Modulation, Cytokines

EFFECT OF DIFFERENT STORAGE DURATION ON PHYSIO-CHEMICAL PROPERTIES AND SENSORY ATTRIBUTES OF COMMERCIAL EGGS

Author(s): Smile Manzoor[1], Shazab Aziz[1], Shahid Mehmood[1]

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2025-PSC-15 **Abstract**

This study investigates the effect of different storage duration on the physico-chemical properties, biochemical traits, and sensory attributes of commercial eggs. A total of 720 eggs were stored at 2°C for 0, 1, 2, and 3 months and analyzed monthly. Significant declines ($p < 0.05$) were observed in key quality parameters such as Haugh unit (fresh eggs: 169.22 ± 0.60 vs. 3-month stored eggs: 114.18 ± 9.57), yolk index (fresh eggs: 0.69 ± 0.03 vs. 3-month stored eggs: 0.72 ± 0.04), and albumen quality (albumen height: fresh eggs 16.00 ± 0.44 mm vs. 3-month stored eggs 14.95 ± 1.71 mm). Biochemical analysis showed increasing free fatty acid content (fresh eggs: 0.11% vs. 3-month stored eggs: 0.20%) and positive peroxide value results, indicating lipid rancidity in eggs stored for longer durations. Sensory attributes such as aroma, flavor, and texture also deteriorated significantly ($p < 0.05$) after 3 months of storage, with negative impacts on consumer acceptability. These findings highlight the critical need for improved storage practices to maintain egg quality and ensure food safety during prolonged storage periods, especially in regions with inadequate cold storage infrastructure.

Key Words: Egg Storage, Lipid Oxidation, Sensory Evaluation, Commercial Poultry

COMBATING METHICILIN RESISTANT *STAPHYLOCOCCUS AUREUS* IN POULTRY THROUGH ZINC OXIDE NANOPARTICLES AND RESISTANCE-REVERSING ANTIBIOTIC THERAPY

Author(s): Mahnoor Khalid[1], Mateen Abbas[1]

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2025-PSC-16 **Abstract**

Methicillin-resistant *Staphylococcus aureus* (MRSA), an emerging multi drug resistant pathogen is a serious public health concern globally causing morbidity and mortality in poultry worldwide. Its resistance to widely employed antibiotics like tetracycline, amoxicillin, and kanamycin, pose a serious challenge to poultry health and food safety. It raised the risk of zoonotic transmission through direct contact and contaminated meat. Misuse and abuse of antibiotics in the veterinary sector may result in multi drug resistance staph aureus strains. This theoretical review investigates the suitability of zinc oxide nanoparticles (ZnO-NPs) as a synergistic agent to recover the antimicrobial effectiveness of these resisted antibiotics. ZnO-NPs were prepared by standard hydrothermal method and show absorption peak at 364 nm in spectrotroscopic analysis. NPs were characterized by X-ray diffraction (XRD), Fourier Transform infrared spectroscopy (FTIR) analysis. 8 preparations were made ZnO alone, each antibiotic alone (tetracycline, amoxicillin, and kanamycin). Afterwards, combination of ZnO NPs with each drug at different concentrations is used to check inhibition zones, minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC). Morphological changes in bacteria after using ZnO NPs can be examined by scanning electron microscope (SEM). Various combinations of nanoparticles and antibiotics showed enhanced activity for different antibiotics at 37 °C incubation for 24 h compared to antibiotics individually. Synergistic use of antibiotics with ZnO is new, sustainable, and potentially successful method for controlling MRSA in poultry production systems to reduce antimicrobial resistance (AMR). Future in vivo studies are recommended to validate efficacy, dosing, and safety in real poultry systems.

Key Words: Methicillin-resistant *Staphylococcus aureus*, Nanoparticles, Poultry, Synergy

INCIDENCE OF ANTIBIOTIC RESIDUES IN POULTRY MEAT AND EGGS AT PESHAWAR, KHYBER PAKHTUNKHWA

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2025-PSC-17	**Abstract**

Drug residues in poultry products are still a potential threat to human health in most parts of the developing world. Present study was undertaken to test the presence of antibiotic residues in poultry products in Peshawar city of Pakistan. Ninety samples of fresh (n=45) and frozen (n=45) poultry products from liver, thigh and breast muscle were randomly collected and analyzed. Positive samples were isolated using well diffusion method and tested for the presence of penicillin, ciprofloxacin, amoxicillin and colistin sulphate residues using Thin Layer Chromatography (TLC). More than half of fresh (53.3%) and frozen samples (42.2%) were confirmed positive for drug residues. Concentration of antibiotic residues was higher in liver and thigh region compared to breast muscles. Among different antibiotics, the presence of penicillin was greater followed by amoxicillin in different meat products tested. Randomly collected eggs (n=100) have shown that more than half of the eggs (60% fresh and 53.3% chilled) were positive for presence of antibiotic residues. Albumins of the eggs (fresh and chilled) were detected to accumulate higher (73.3 and 66.7%) antibiotic residues compared to yolk. This depict that most of the meat and egg produced in this region was highly contaminated with drug residues and needs serious attention and concrete measures to minimize the incidence and level of drug residues to protect human health.

Key Words:	Antibiotic Residues, Poultry Meat, Eggs, Public Health

EFFECTS OF MYCOTOXINS AND MICROBIAL TOXINS IN POULTRY FEED ON EGG QUALITY

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2025-PSC-18 **Abstract**

Contamination of poultry feed with biological toxins, particularly mycotoxins and microbial toxins, remains a persistent threat to poultry health, production, and product safety. These toxins, often originating from poor storage or inadequate hygiene, are well-documented for their negative effects on egg quality traits. Understanding their impact is increasingly important given the rising consumer demand for safe, high-quality eggs. This review synthesizes findings from peer-reviewed articles, conference proceedings, and international poultry science reports published over the past two decades, focusing on the influence of mycotoxins and microbial toxins on albumen quality, yolk pigmentation, and shell strength. Mycotoxins such as T-2 toxin, aflatoxin B1, and ochratoxin A consistently impair egg quality, causing yolk depigmentation, reduced albumen height, and weakened shells due to disrupted calcium metabolism. T-2 toxin, in particular, has been linked to lower yolk weight and increased shell fragility, whereas zearalenone exhibits minimal or inconsistent effects, depending on the dose, exposure duration, and bird genotype. Microbial toxins, though less studied, also pose risks. *Clostridium perfringens* α-toxin and NetB toxin, *Escherichia coli* lipopolysaccharides (LPS), and *Staphylococcus aureus* enterotoxins can indirectly compromise egg quality by damaging intestinal integrity, reducing nutrient absorption, and inducing systemic inflammation. Feed contamination is therefore a preventable yet significant contributor to reduced egg quality in layers. This review underscores the importance of strict feed hygiene, routine mycotoxin and bacterial toxin screening, and effective detoxification strategies, while calling for further research on microbial toxins and potential synergistic effects with mycotoxins.

Key Words: Poultry, Egg, Hygiene, Mycotoxins, Microbial Toxins

ASSESSMENT OF THE EFFICACY OF ORGANIC ACID-BASED COMMERCIAL PRODUCTS IN CONTROLLING BACTERIAL CONTAMINANTS IN POULTRY FEED

Author(s): Fizza Rasool[1], Muhammad Asad Ali[1], Aftab Ahmad Anjum[1], Muhammad Nawaz[1], Muhammad Imran Najeeb[1], Muhammad Asif Ali[2], Amanullah Khan[1] and Muhammad Mubashar Beig[1]

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2025-PSC-19 **Abstract**

The contamination of Poultry feed with bacterial pathogens such as *Salmonella enteritidis* and *Escherichia coli* causes a significant risk to both animal and public health. The misuse of antibiotics in poultry production has led to the development of antimicrobial resistance, requiring alternative strategies for the control of bacterial infections. This study assesses the efficacy of organic acids to control bacterial contamination in poultry feed. A total of 32 poultry feed samples were inoculated with bacterial contaminants at a concentration of 3 × 10^8 CFU/ml and treated with seven different organic acids (Acid-A to Acid-G) at concentrations of 0.3g and 0.6g per 100g of feed. The samples were divided into two groups (16 of each) for *E. coli* and *Salmonella enteritidis*. After treatment, feed samples were serially diluted and then plated on MacConkey agar and incubated at 37°C for 24 hours. The results showed that Acid-F successfully reduced *E. coli* counts. In contrast, Acid-C and Acid-B showed the highest reduction against *Salmonella enteritidis* at a 0.6g concentration of organic acid compared to a 0.3g concentration. However, Statistical analysis showed non-significant differences across treatment groups (p = 0.555 for *Salmonella Enteritidis* and p = 0.629 for *E. coli*), indicating variability in acid performance. The study showed that the use of organic acids can serve as a potential alternative to antibiotics for controlling bacterial contaminants in poultry feed, contributing to improved poultry health and hence reduced public health risks.

Key Words: Poultry Feed, Organic Acids Treatment, *Escherichia coli*, *Salmonella enteritidis*

STRATEGIC ARTIFICIAL INTELLIGENCE (AI) INTEGRATION FOR PAKISTAN'S POULTRY INDUSTRY

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2025-PSC-20	**Abstract**

The evolution from the First Industrial Revolution to the era of Artificial Intelligence (AI) has profoundly reshaped global industries, including poultry production. This paper examines AI's transformative potential in addressing key challenges in Pakistan's poultry sector—disease outbreaks, feed inefficiency, environmental stress, and market volatility—by tracing technological advancements from mechanization to data-driven automation. Drawing on global best practices in breeder, broiler, layer, hatchery, and processing operations, it highlights AI's role in predictive health monitoring, precision feeding, welfare optimization, supply chain efficiency, and traceability. While global adoption of AI in poultry farming accelerates, Pakistan remains in an early adoption phase due to infrastructural, economic, and skill-related barriers. The study underscores the pivotal roles of veterinarians and poultry business owners in leading this transition through diagnostic validation, farmer education, strategic investments, and collaborative data sharing. It further outlines locally adaptable AI solutions—ranging from low-cost mobile diagnostic tools and edge-based environmental sensors to predictive growth models and blockchain-enabled traceability—classified into short-, mid-, and long-term priorities. The findings advocate for a phased, public–private–academic partnership approach to build an AI-ready poultry ecosystem, warning of economic stagnation and competitiveness loss if modernization is delayed. Ultimately, strategic AI integration offers Pakistan's poultry industry an opportunity to enhance productivity, profitability, animal welfare, and food security while strengthening its position in both domestic and export markets.

Key Words:	Artificial Intelligence, Poultry Production, Predictive Analytics

EFFECT OF VARYING LEVELS OF MICROBIAL METABOLITES (XPM) ON GROWTH PERFORMANCE, MEAT QUALITY, AND ECONOMICS IN BROILERS

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2025-PSC-21

Abstract

This study was conducted to evaluate the effects of varying levels of microbial metabolites (XPM) on growth performance, meat quality, and economic returns in broiler chickens. Day-old broiler chicks were procured locally, acclimatized for one week, and then 160 chicks within a uniform weight range were selected for the experiment. The chicks were randomly assigned to four treatment groups, each receiving one of the following levels of microbial metabolites in their feed: T1= 0 (control),T2= 1, T3= 2, andT4 = 3 g per 1000 g of feed. Each treatment group consisted of four replicates, with ten chicks per replicate, totaling sixteen replicates. The trial lasted for 35 days. Growth performance was assessed weekly through weight gain, feed intake, and feed conversion ratio (FCR). At the end of the experiment, two birds per replicate were slaughtered to evaluate meat quality parameters such as pH, cooking loss, meat texture, and water-holding capacity. Mortality, when present, was recorded. Data were analyzed using ANOVA in a completely randomized design. Weight gain analysis over the five-week period indicated no significant differences in Weeks 1, 3, 4, and 5 ($p > 0.05$). However, a significant improvement in weight gain was observed during Week 2 ($p < 0.05$). Regarding meat quality, both meat texture and water retention capacity showed significant differences ($p < 0.05$), while pH and cooking loss did not differ significantly ($p > 0.05$). Economic analysis revealed that birds in the T3 and T2 treatment groups yielded the highest profit margins (233.26 and 228.22 PKR per bird, respectively). Other measured parameters showed no significant differences compared to the control group.

Key Words: Broiler, Microbial Metabolites, Weight Gain, Meat Quality

EFFECT OF VARYING LEVELS OF MICROBIAL METABOLITES (XPM) ON CARCASS CHARACTERISTICS AND IMMUNE RESPONSE IN BROILERS

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2025-PSC-22

Abstract

The poultry industry, a vital contributor to global food security, is increasingly challenged by issues such as excessive use of antibiotics in broiler diet, leading to a growing interest in sustainable alternatives to conventional antibiotics feed additives. This study was conducted to evaluate the effects of varying levels of microbial metabolites (XPM) on carcass characteristics and immune responses in broilers. A total of 160 one-day-old broiler chicks were randomly allocated to four treatment groups: T0 (control), T1 (1 g XPM/kg of feed), T2 (2 g XPM/kg), and T3 (3 g XPM/kg). The feeding trial lasted for 35 days. Parameters assessed included live weight, carcass yield, dressing percentage, breast and thigh weights, and the development of giblet organs. Immune responses were evaluated by measuring antibody titers and CBC. Results indicated that XPM supplementation had no significant effect on carcass yield or breast and thigh muscle weights ($P > 0.05$). However, a significant improvement in immune responses was observed in the XPM-supplemented groups, as evidenced by increased antibody titers and leukocyte counts. These findings suggest that XPM supplementation can enhance both innate and adaptive immune responses in broilers. In conclusion, microbial metabolites (XPM) show promise as a functional feed additive, potentially reducing the need for antibiotics and improving overall poultry health through immune system enhancement.

Key Words: Microbial Metabolites, Carcass Yield, Immune Response

EFFECT OF DIFFERENT LIGHT COLOUR CORRELATED TEMPERATURES (CCT) ON DRESSING PERCENTAGE, BLOOD PROFILE, AND GROWTH HORMONES OF BROILERS

Author(s): Fawwad Ahmad[1], Sajjad Hussain[1], Muhammad Ashraf[1], Muhammad Sharif[1], Safdar Hussain[1]

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2025-PSC-23

Abstract

The use of light-emitting diode (LED) technology in broiler housing offers new possibilities for optimizing environmental conditions through adjustments in light spectrum and correlated colour temperature (CCT). This trial was conducted to evaluate the effects of different CCT-based LED lighting regimens on dressing percentage, organ weights, hematological parameters, and thyroid hormone concentrations in broilers. A total of 200 commercial broiler chicks (Cobb-500) were randomly assigned to four lighting treatments:T1: Continuous exposure to 6000K cool-white LED light (24L:0D),T2: Continuous exposure to 3000K warm-white LED light (24L:0D),T3: 12 hours of 6000K followed by 12 hours of 3000K LED light (12L:12L) and T4: 12 hours of 3000K followed by 12 hours of 6000K LED light (12L:12L).Each treatment included four replicates of ten birds each, housed in environmentally controlled pens under standardized conditions (temperature, feeding phases, and ventilation). Light intensity was maintained at 20 lux throughout the 35-day experiment. At the end of the trial, two representative birds from each replicate were selected for data collection. Parameters assessed included relative organ weights, hematological indices (red blood cell count [RBC], white blood cell count [WBC], hemoglobin concentration, hematocrit/packed cell volume [PCV], and leukocyte differentials), and serum levels of triiodothyronine (T3) and thyroxine (T4), analyzed using standard hematology and ELISA techniques. Results indicated that the T4 lighting schedule (3000K followed by 6000K) significantly enhanced thyroid hormone levels, with mean T3 and T4 concentrations higher than in other groups (p < 0.05). Additionally, birds in the T4 group exhibited significantly elevated hematological parameters, including WBC, RBC, hemoglobin, PCV, and leukocyte differentials (p < 0.05), suggesting improved immune competence, oxygen transport, and metabolic efficiency. Relative organ weights were also notably higher in the T4 group, indicating enhanced physiological development. Importantly, all measured values remained within normal physiological ranges, showing no signs of physiological stress or adverse effects on bird welfare. These findings support the hypothesis that alternating LED lighting from warm (3000K) to cool (6000K) temperatures over a 24-hour cycle may simulate a natural photoperiod transition. This approach could help synchronize circadian rhythms, promote hormonal balance, and enhance growth performance in broiler production systems.

Key Words: Broiler, Light, Correlated Colour Temperature, Dressing Percentage

EFFECTS OF ANTIBIOTICS WITH GINGER POWDER AND PROBIOTICS ON PERFORMANCE, HEMATOLOGY AND ANTIBODY TITERS IN BROILERS

Author(s): Muhammad Ashraf[1], Muhammad Asad Ullah[1], Fawwad Ahmad[1], Muhammad Sharif[1], Safdar Hassan[1]

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2025-PSC-24

Abstract

This experimental trial aimed at determining the potential of ginger powder as an efficient natural alternative to antibiotics in broiler chicken. An experimental trial consisted of 180 broiler chicks, in which there were 15 chicks in each treatment, and three replications. T1 was free of any additive. T2 was administered Oxytetracycline (1 g/L of drinking water) and T3 was administered ginger (1-percent ginger powder), and T4 was administered *Bacillus subtilis* (200 mg/kg of feed). At the end of a 35-day period of trial, the group that was treated by ginger (T3) showed better results on final weight of the body weight, increment of bird weight and FCR. Carcass assessment showed that T3 recorded higher dressed and breast meat weights. Tracing blood cells indicated that there was high density of both the white cells and the red cells in the ginger fed birds, and the levels of hemoglobin and hematocrit were raised indicating strong immune response and oxygen delivering capabilities. There was further an increase in lymphocytes and granulocytes in the two groups T3 and T4 and a decrease in MID%, indicating a more effective immune control in T3. Even there was improvement in liver enzyme profile of T3 with lower levels of ALT and AST, and an enhanced total protein, albumin, and globulin, indicating to better liver functionality and the protein turnover. The immune titers were not affected by treatment. The *Bacillus subtilis* group (T4) showed moderate positive results whereas the antibiotic group (T2) posed negligible benefits against the control. These findings indicate that the ginger powder can be used as a natural supplement to replace antibiotics in the chicken feed at economically viable levels and without compromising health and increased growth, as well as, antibiotic-free chicken production.

Key Words: Antibiotics Alternatives, Hematology, Phytobiotics, Probiotics

EFFECTS OF ANTIBIOTIC REPLACEMENT ON GROWTH PERFORMANCE, CARCASS CHARACTERISTICS AND LIPID PROFILE IN BROILER CHICKENS

Author(s): Muhammad Ashraf[1], Muhammad Umair Zahid[1], Fawwad Ahmad[1], Asad Ullah Hyder[1], Muhammad Sharif[1], Safdar Hassan[1]

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2025-PSC-25 **Abstract**

Ginger powder, derived from the rhizome of *Zingiber officinale*, is a natural phytogenic feed additive known for its antimicrobial, anti-inflammatory, and antioxidant properties. This study investigated the potential of ginger powder (*Zingiber officinale*) and probiotics (*Bacillus subtilis*) as alternatives to antibiotic growth promoters in broiler production. A total of 180 one-day-old Ross-308 broiler chicks were randomly divided into four treatment groups with three replicates of 15 birds each: control group (basal diet), antibiotic group (oxytetracycline at 1g/L water), ginger powder group (1% inclusion in feed as per body weight), and probiotic group (*Bacillus subtilis* at 200mg/kg in feed). The 35-day trial evaluated growth performance, feed intake, mortality percentage, carcass characteristics, dressing percentage and serum triglyceride under standard management conditions. Results showed that ginger powder supplementation significantly improved all measured parameters, including the highest weight gain (2766.66 g), improved feed conversion ratio (1.10), lowest mortality rate (6.6%), superior carcass traits (dressed weight 1723.33 g, breast weight 506.67 g), and optimal serum triglyceride levels (79.67 mg/dL). Probiotic supplementation demonstrated intermediate benefits, while the antibiotic group showed only marginal improvements compared to control. Statistical analysis (One-way ANOVA) confirmed significant differences among treatments. The findings strongly support ginger powder as an effective natural alternative to antibiotics in broiler nutrition, offering enhanced growth performance, improved meat quality, and better metabolic health while addressing concerns about antibiotic resistance.

Key Words: Antibiotics Replacement, Lipid Profile, Ginger, Bacillus, Broilers

IMPACT OF MALE BODYWEIGHT ON SEMEN CHARACTERISTICS AND HATCHABILITY IN BROILER BREEDERS

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2025-PSC-26

Abstract

Artificial insemination in commercial poultry was first introduced in 1937, coinciding with the development of cage-based production systems, primarily to mitigate the decline in fertility observed in broiler breeders following peak egg production. The present study evaluated the effects of male bodyweight categories on semen quality and hatching traits in broiler breeders. A total of 60 Ross 308 male broiler breeders, aged 50 weeks, were allocated into three groups based on bodyweight: standard (±200 g of the breed standard), overweight (250-400 g above the standard), and underweight (250-450 g below the standard), with 20 males assigned to each group. The study was conducted within a commercial flock in which artificial insemination was routinely practiced. Birds were provided feed and water in accordance with Ross 308 management guidelines. Semen quality parameters and hatching performance were systematically evaluated throughout the experimental period. The results demonstrated significant differences in both semen quantity and quality among the bodyweight groups. Males of standard bodyweight produced a significantly higher semen volume, whereas overweight males exhibited superior semen quality. In terms of reproductive performance, fertility and hatchability were significantly greater in the standard bodyweight group compared with both overweight and underweight groups. In conclusion, males of standard bodyweight exhibited the most favorable balance between semen production and hatching performance. Overweight males demonstrated relatively better semen quality but inferior hatching outcomes, while underweight males consistently showed reduced performance in both semen quality and hatching traits.

Key Words: Broiler Breeder, Semen Characteristics, Body Weight, Hatchability

SCREENING AND CHARACTERIZATION OF *BACILLUS* TARGETING CARBOFURAN DEGRADATION-A COMMON PESTICIDE CAUSING HEALTH HAZARDS

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2025-PSC-27 **Abstract**

Excessive use of pesticides in agricultural areas has raised concern for living beings as well as the environment all over the world. Although, these hazardous chemicals are beneficial to crops but cause adverse negative impact on environment as well. Thus, excessive application of pesticides may cause destruction of biodiversity. Therefore, there is an urgent need to search an effective way to degrade these dangerous chemicals in an environment friendly way. In current project, 15 soil samples were collected from different areas of Lahore, from a depth of 20 to 40 cm for isolation of *Bacillus* to degrade carbofuran. After enrichment and culturing, ***Bacillus subtilis*** was identified and characterized through biochemical analysis. Degradation of Carbofuran having different concentrations (1.5 µg/mL, 3.0 µg/mL and 4.5 µg/mL) was completed by treating with bacterial colony (**122×10^4 cfu/mL**) under different optimal conditions of temperature (25ºC, 35ºC and 45ºC) and pH (2.5, 4.5 and 6.5). The rate of carbofuran degradation was determined by Reverse-Phase High Performance Liquid Chromatography (RP-HPLC) using Shimadzu 20A system, which confirmed the ability to utilize carbofuran as a carbon source. The results demonstrated essential degradation capacity of *B. subtilis*, designate its potential application in bioremediation policies for pesticide-contaminated environments.

Key Words: *Bacillus subtilis*, Carbofuran Degradation, RP- HPLC

ISOLATION AND QUANTIFICATION OF *CLOSTRIDIUM PERFRINGENS* TYPE A ALPHA TOXINS FROM SEMI-PROCESSED PACKED MEAT PRODUCTS

Author(s): Sehar Ul Islam[1], Imran Najeeb[1], Aftab Ahmed Anjum[1], Muhammad Asif Ali[1], Aman Ullah Khan[1], Muhammad Asad Ali[1], Muhammad Nawaz[1], Tehreem Ali[1]

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2025-PSC-28 **Abstract**

Clostridium perfringens type A is a Gram-positive, spore-forming anaerobe and a common cause of foodborne illness globally. Its alpha toxin is a major virulence factor implicated in gastroenteritis. Semi-processed meat products may serve as potential vehicles for contamination, particularly under inadequate hygienic conditions. Forty semi-processed meat samples (mutton kababs, beef kababs, chicken burgers, and chicken nuggets) were collected from local food outlets and supermarkets in Lahore, Pakistan. Samples were homogenized and tested for alpha toxin using ELISA. ELISA-positive samples were cultured on perfringens agar under anaerobic conditions, and colonies were confirmed through Gram staining and biochemical assays (oxidase, catalase, hemolysis). DNA was extracted from positive isolates, and PCR targeting the alpha toxin (cpa) gene was performed. PCR products were visualized using agarose gel electrophoresis. Out of 40 samples, 5 (13%) were positive for *C. perfringens* alpha toxin by ELISA, comprising three mutton kababs from local food corners and two chicken nuggets from supermarkets. Culturing produced characteristic black colonies on selective agar, while Gram staining revealed purple, rod-shaped cells consistent with *C. perfringens*. Biochemical testing confirmed catalase and oxidase negativity. PCR analysis of ELISA-positive isolates produced amplicons at 324 bp, confirming the presence of the alpha toxin gene. This study demonstrates that a proportion of semi-processed meat products in Lahore are contaminated with *C. perfringens* type A carrying the alpha toxin gene. The findings underscore the need for strict hygienic measures during meat processing and storage, along with regular monitoring of retail food products to reduce the risk of foodborne illness.

Key Words: Meat, Processed, *C. perfringens*, Identification

ECONOMIC EFFICIENCY OF VACCINATION AGAINST H9N2 AVIAN INFLUENZA (AI) VIRUS IN CHICKEN PRODUCTION IN PAKISTAN

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2025-PSC-29	**Abstract**

Clostridium perfringens type A is a Gram-positive, spore-forming anaerobe and a common cause of foodborne illness globally. Its alpha toxin is a major virulence factor implicated in gastroenteritis. Semi-processed meat products may serve as potential vehicles for contamination, particularly under inadequate hygienic conditions. Forty semi-processed meat samples (mutton kababs, beef kababs, chicken burgers, and chicken nuggets) were collected from local food outlets and supermarkets in Lahore, Pakistan. Samples were homogenized and tested for alpha toxin using ELISA. ELISA-positive samples were cultured on perfringens agar under anaerobic conditions, and colonies were confirmed through Gram staining and biochemical assays (oxidase, catalase, hemolysis). DNA was extracted from positive isolates, and PCR targeting the alpha toxin (cpa) gene was performed. PCR products were visualized using agarose gel electrophoresis. Out of 40 samples, 5 (13%) were positive for *C. perfringens* alpha toxin by ELISA, comprising three mutton kababs from local food corners and two chicken nuggets from supermarkets. Culturing produced characteristic black colonies on selective agar, while Gram staining revealed purple, rod-shaped cells consistent with *C. perfringens*. Biochemical testing confirmed catalase and oxidase negativity. PCR analysis of ELISA-positive isolates produced amplicons at 324 bp, confirming the presence of the alpha toxin gene. This study demonstrates that a proportion of semi-processed meat products in Lahore are contaminated with *C. perfringens* type A carrying the alpha toxin gene. The findings underscore the need for strict hygienic measures during meat processing and storage, along with regular monitoring of retail food products to reduce the risk of foodborne illness.

Key Words:	Cost Effectiveness, Chicken, Pakistan, H9N2 AI

ADVANCING POULTRY HEALTH AND PRODUCTIVITY THROUGH BIOSENSOR APPLICATIONS

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2025-PSC-30	**Abstract**

The poultry industry, being one of the fastest growing sectors of livestock production, demands advanced monitoring systems to ensure animal health, food safety and productivity. Biosensors, analytical devices that integrate a biological recognition element with a transducer, have emerged as powerful tools in this domain. They offer rapid, sensitive and cost-effective detection of pathogens, toxins, drug residues and metabolic biomarkers in poultry birds and products. Applications include on-site diagnosis of avian diseases, monitoring of feed quality, detection of antibiotic and mycotoxin residues and real-time assessment of environmental conditions within poultry houses. Compared to conventional laboratory-based methods, biosensors significantly reduce analysis time, minimize labor requirements and facilitate early interventions to prevent disease outbreaks and production losses. Moreover, the development of portable, nanomaterial-based and wireless biosensors has further enhanced their applicability in precision poultry farming. Thus, biosensors hold immense potential in improving biosecurity, ensuring food safety and promoting sustainable growth of the poultry industry.

Key Words:	Biosensors, Biosecurity, Sustainable Production

MICROBIOLOGICAL APPROACHES FOR THE DETOXIFICATION OF *FUSARIUM* MYCOTOXINS IN POULTRY FEED

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2025-PSC-31 **Abstract**

Numerous filamentous molds produce secondary metabolite products known as mycotoxins. Mycotoxins are mainly produced by fungi such as *Aspergillus*, *Fusarium*, *Penicillium*, and others, with *Fusarium* and *Aspergillus* being the most significant in contaminating plants and food crops. Various numbers of mycotoxins having variety of chemical structures are produced by genus *fusarium*. Secondary metabolites produced by Fusarium species are known as Fusariotoxins. Fusariotoxins are crucial for causing diseases in plants, animals and humans as well. Multiple Fusarium toxins can also occur together and contaminate the food and feed. Among the diverse array of Fusariotoxins, only three of them occur repeatedly and cause mycotoxicoses. These mycotoxins include Fumonisins (FUMs), Zearalenone (ZEA) and Trichothecenes (TRIs). Deoxynivalenol (DON) and its derivatives are known to be important economically because of their negative impacts. According to the Food and Agriculture Organization of the United Nations 25% of global crops are contaminated with mycotoxins, causing losses of around one million tons annually, highlighting the need to minimize their levels in food and feed to ensure safety. A number of methods are opted to remove mycotoxins such as physical methods and chemical methods. These methods remove mycotoxins to some extent, but it can cause problems like loss of nutrients or formation of toxic byproducts hence decreasing the nutritional value of food and feed. Because of this, there is a significant demand to develop effective and safe strategies to remove mycotoxins from food and feed. Bacteria and yeast can detoxify mycotoxins under mild conditions with minimal nutrient loss, making them more effective than physical or chemical methods.

Key Words: Mycotoxins, *Fusarium*, Microbial Detoxification

DEVELOPMENT OF AN ARTIFICIAL INTELLIGENCE-BASED DIAGNOSTIC MODEL FOR THE AVIAN NEWCASTLE DISEASE VIRUS BY USING PROVENTRICULUS IMAGES OF POULTRY

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2025-PSC-32	Abstract

Newcastle disease virus (NDV) infection leads to significant financial losses in the poultry sector worldwide, particularly in developing nations like Pakistan, where poultry farming is a major source of income and nutrition. Infected birds commonly show symptoms such as respiratory distress, greenish diarrhea, neck twitching, nervous signs, sudden death, and pinpoint hemorrhagic lesions on the proventriculus. Although traditional methods like virus isolation and RT-PCR offer high accuracy, their high cost and limited accessibility, particularly in rural areas, pose significant challenges for farmers in obtaining timely diagnoses. This research presents a deep learning-based method for ND detection using a 2D Convolutional Neural Network (CNN) trained on proventriculus images. The experiment included EID_{50} calculation using 9-day-old embryonated chicken eggs and a controlled infection trial on 100 chicks (60 positive, 40 negative). After postmortem collection of proventriculus samples from the trial and from poultry farms, about 850 high-resolution images were used to train and validate the CNN model. The results demonstrate the model's effectiveness in differentiating between healthy and infected birds, providing a rapid, non-invasive tool for ND diagnosis in poultry health management. The 2D CNN model achieved 99.8% testing and 92% validation accuracy in detecting Newcastle Disease from broiler proventriculus images. Its deployment at the farm level can support early diagnosis and improve poultry health management.

Key Words:	Newcastle Disease Virus, Deep Learning, Artificial Intelligence, Convolutional Neural Network (CNN), Postmortem Analysis

EFFECTS OF ABIOTIC STRESS ON THE PERFORMANCE OF POULTRY

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2025-PSC-33

Abstract

Abiotic stressors, which include climate and environmental elements including heat, cold, humidity, poor air quality, and water scarcity, have a significant impact on poultry productivity. Stress in contemporary animal husbandry can be understood as an instinctive reaction brought on by exposure to unfavorable environmental circumstances. From minor pain to serious repercussions, including death, this reaction can take many forms. This problem also affects the chicken sector, which makes a substantial contribution to human nutrition. For many years, genetic selection has been used to increase industrial output, but it has also led to poor stress resilience. In the end, these stressors lower productivity and profitability by upsetting the physiological homeostasis of birds and affecting feed intake, growth performance, immunity, and reproductive efficiency. The recognition of the stressful stimulus, the activation of the sympathetic nervous system and the adrenal medulla, and the ensuing hormonal cascades are some of the physiological reactions that cause stress. Stress can be endured for short periods of time, but longer exposure can have more serious effects. One of the biggest problems in tropical and subtropical areas is heat stress, which can cause oxidative stress, change endocrine responses, and raise mortality rates in poultry. Conversely, cold stress increases the energy needed for thermoregulation, taking nutrients away from development and egg production. High stocking density, noise, and inadequate ventilation are among additional abiotic stressors that worsen welfare problems and raise disease susceptibility. These stressors are predicted to worsen because to the growing threat of climate change, presenting long-term threats to the sustainability of poultry worldwide. In order to reduce output losses, mitigation techniques are essential. These include genetic selection for stress tolerance, dietary interventions (antioxidants, electrolytes, vitamins), environmental changes (house design, ventilation, cooling systems), and precision farming technologies. The processes via which abiotic stress impacts the health and performance of poultry are highlighted in this review, to meet the need for a more thorough understanding of stress in various environmental circumstances, this review attempts to highlight the main abiotic stressors in poultry production and clarify their underlying mechanisms.

Key Words: Abiotic Stress, Heat Stress, Physiology, Poultry

USE OF NANOTECHNOLOGY IN POULTRY NUTRITION

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2025-PSC-34 **Abstract**

A new technology with enormous promise and a wide range of uses in agriculture, animal nutrition, and human health is nanotechnology. It may also be beneficial for promoting research in a variety of life sciences fields. Because living systems rely on several Nano scale components, such as proteins, DNA, and enzymes, nanotechnology has numerous essential biological applications. Although trace minerals are typically utilized in very small amounts in animal feeding, their effectiveness is limited by problems such as poorer bioavailability, antagonistic effects, and increased bodily excretion rates. "Nano" is a very small unit of measurement equivalent to one billionth of a meter, and it comes from the Latin word "Nanus," which means dwarf. Nanotechnology has revolutionized the animal nutrition industry with its creative ways to increase feed efficiency, animal health, and overall output. The use of nanoparticles and nano-additives in cattle feed enables improved nutrient bioavailability, targeted administration of bioactive compounds, and reduced nutrient losses when compared to conventional feed supplements. Despite the paucity of research on the possible nutritional effects of nanoparticles, there is compelling evidence to support the inclusion of trace minerals (zinc, copper, silver, selenium, iron, chromium, and manganese) in the diets of broilers, layers, turkeys, quails, and other poultry. Aquatic organisms require certain micronutrients for normal growth, physiological processes, and overall health. In marine species, iron enhances development, immunity, and resistance to disease. Additionally, nanotechnology enhances metabolism, produces essential enzymes, and produces hormones that support defense, growth, reproduction, and oxidative activities. Numerous studies have suggested that nanoparticles could be helpful materials for antimicrobials and for stimulating animal growth. There are several challenges with this approach, though. These include the possibility of endotoxin production, reduced nutrient absorption due to interactions with natural nutrients, the possibility of nanoparticle buildup in an animal's body, health risks, ethical quandaries, environmental problems, and some unfavorable outcomes, such as interfering with natural nutrients, which can be avoided by encapsulating. This review aims to provide insights on absorption, metabolism, and distribution of nano-minerals in the body.

Key Words: Nanotechnology, Poultry Nutrition, Minerals Antagonist, Nutrient Absorption

PREVALENCE AND DETERMINATION OF SPECIES DISTRIBUTION OF EIMERIA IN POULTRY FROM THE SWABI DISTRICT, PAKISTAN

Author(s): Noreen Begum[1], Sumaira Shams[1], Farhad Badshah[1], Irfan Khattak[2], Muhammad Salman Khan[1], Naimat Ullah Khan[2], Warda Naz[3], Seema Hassan[1], Tahir Usman[2], Sher Bahadar[2]

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2025-PSC-35 **Abstract**

Coccidiosis, caused by protozoan parasites of the genus *Eimeria*, is a significant concern in poultry farming, leading to substantial economic losses worldwide. In Pakistan, poultry is a major component of the agricultural sector, with both broiler and egg-laying chickens playing crucial roles in meeting the country's protein needs. Despite the importance of the poultry industry, there is limited data on the prevalence and species distribution of *Eimeria* in different types of chickens in District Swabi, Khyber Pakhtunkhwa, Pakistan. This study aims to estimate the prevalence and determine the distribution of *Eimeria* species in broiler and egg-laying chickens in this region. Nine hundred fecal samples were collected from broiler (380) and egg-laying domestic chickens (520) in district Swabi, Pakistan. Microscopic analysis was used to identify *Eimeria* parasites in all samples. After microscopic examination for positive identification, *Eimeria* species were determined using polymerase chain reaction (PCR) assays. Microscopic examination identified *Eimeria* oocysts in 44.4% (400/900) of the samples. *Eimeria* parasite infection significantly varied based on chicken type, age, and gender ($p < 0.05$). The study found that broiler chickens (52.63%, 235/450), young chickens (4–6 weeks) (55.5%, 285/500), and females (52.2%, 200/380) were more infected with *Eimeria* spp. than egg-laying domestic chickens (38.5%, 200/520), adults (above 6 weeks) (28.8%), and males (36.7%, 165/450). PCR indicated a distribution rate of 42.5% (170/400) *Eimeria tenella,* 26.25% (105/400) *Eimeria acervulina*, 20% (80/400) *Eimeria maxima*, and 11.25% (45/400) *Eimeria mitis*. None of *Eimeria necatrix, Eimeria brunetti*, or *Eimeria praecox* was found in the study. This study underlines the essential requirement for targeted interventions due to the prevalence and predominance of *E. tenella* among identified *Eimeria* species. Future research should focus on refined sampling strategies and investigate the clinical significance of these parasites for effective disease management in the local poultry industry.

Key Words: Coccidiosis, Domestic Chickens, *Eimeria*, Pakistan, Prevalence

MOLECULAR CHARACTERIZATION OF INFECTIOUS BRONCHITIS VIRUS (IBV) ISOLATED FROM POULTRY IN KHYBER PAKHTUNKHWA, PAKISTAN

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2025-PSC-36	**Abstract**

Infectious bronchitis, caused by the Infectious Bronchitis virus (IBV), is a highly contagious disease that can infect poultry of all age groups. IBV is known for its diverse genotypes and strains, which can affect the respiratory system, reproductive organs, and kidneys of infected birds. This study aimed to explore the molecular epidemiology of IBV in districts with high poultry populations in the Khyber Pakhtunkhwa province. A total of 425 samples, including swabs and infected organs, were collected from various districts across the province. Specifically, 100 samples were obtained from Abbottabad and Mansehra, 90 from Mardan and Peshawar, and 45 from Malakand. The overall prevalence of IBV was 29.6%, as determined by RT-PCR. Area-wise prevalence was significantly higher in Mansehra district (39%), followed by Mardan (31.1%), Abbottabad (31%), Peshawar (22.2%), and Malakand (7.7%). The prevalence of IBV was also notably higher in young birds (35.2%) and layers (33.7%) compared to broilers (30.7%). Good ventilation and disinfection between batches can significantly impact poultry health, as demonstrated by this study. Implementing all-in-all-out management practices, meaning birds of the same age are grouped, is recommended over maintaining different age groups on the same farm. Proper management combined with timely vaccination can significantly improve bird health and productivity, potentially reducing the risk of IBV outbreaks. The results indicate that infectious bronchitis in poultry from Khyber Pakhtunkhwa is primarily caused by IBV genotypes GI-19 and GI-13, which are the major circulating strains with limited similarity to GI-1 strains. This points to local endemicity and diversification of sub-lineages, likely driven by regional viral evolution and inadequate vaccination efforts. These findings underscore the urgent need for continuous molecular surveillance and the development of updated vaccine strategies tailored to regional IBV variants.

Key Words:	Broilers, Genotyping, Infectious bronchitis virus, Layers, Risk factors, RT-PCR

SERO-INCIDENCE AND PATHOLOGY OF INFECTIOUS BRONCHITIS VIRUS (IBV) IN COMMERCIALLY REARED POULTRY BIRDS IN DIFFERENT REGIONS OF KHYBER PAKHTUNKHWA

Author(s): Sar Zamin Khan[1], Dr.Sohaib Ul Hassan[1]

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2025-PSC-37	**Abstract**

Infectious Bronchitis is a disease of significant economic importance worldwide. The existence of *Infectious Bronchitis Virus* (IBV) in commercial poultry in various parts of Pakistan has been reported; however, literature regarding the recent status of IB in commercially reared poultry in Khyber Pakhtunkhwa was not available. The present study was therefore conducted to examine the sero-incidence of IBV in different divisions of the province, including Hazara, Malakand, Kohat, and Peshawar. A basic random sampling technique was used for the collection of samples. Samples from various age groups of commercial poultry were collected, and an indirect enzyme-linked immunosorbent assay (ELISA) was used for serological detection. In 2022, out of the total 1240 collected samples, 133 (10.7%) showed a positive antibody titer test against the IB virus. Similarly, in 2023, out of the total 1094 samples collected, 131 (11.9%) showed positive antibody test against the IB virus. The highest positive incidence was in October, with 28.7% prevalence, followed by December with 23.6% prevalence, May and June with 15.8% and 11.6% prevalence, and September with 11.7% prevalence. The lowest prevalence of 3.2 % was observed in April. The highest incidence, calculated at 19.6%, was observed in region-2, followed by region-1 with 14.8% and region-4 with 10.5% prevalence. Region 3 was noted with the lowest incidence of 4% only. Among the bird categories, the layers had the highest incidence of 14.2%, followed by the broilers and breeders, each with an incidence of 12.5%. Based on the number of birds reared on the farm, category 3 had the highest incidence of 15.8%, while category 2 had an 11.8% incidence. Category 1 showed the lowest percentage of positive cases (6.6%). Among age categories, the early age showed the highest incidence of 12.91%, the category 2 had 10.8%, and the category 3 showed the least positive results of 3.56%. Gross observations of enlarged kidneys and hemorrhagic trachea were similar in all seropositive cases. The histopathology results revealed that the tracheal epithelium had sloughed off and the cilia had been lost. Acute tubular necrosis and moderate to severe congestion were shown on the renal microscopy. The results revealed that, despite vaccination, there is a persistent emergence of IB outbreaks in commercial poultry. Therefore, to prevent infectious bronchitis in commercial poultry, farmers should follow the locally prescribed vaccination schedule using particular viral strains

Key Words:	ELISA, Histopathology, Incidence, Infectious Bronchitis Virus

EVOLUTIONARY INSIGHTS INTO METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* ISOLATED FROM EGGSHELL IN COMMERCIAL LAYER FARMS

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2025-PSC-38

Abstract

Eggs remain a vital part of global nutrition and the economy, but the routine non-therapeutic use of antimicrobials and high-density animal farming practices may contribute to the development and spread of Methicillin-Resistant *Staphylococcus aureus* (MRSA). This research aimed to determine the prevalence of *S. aureus* and MRSA on eggshell surfaces and to compare locally examined isolates with those from other countries. A total of 384 eggshell samples were collected from different layer farms in the district of Kasur and incubated in enrichment broth for optimal growth. The samples were then cultured on selective media for microbiological analysis, and further analyzed using PCR to detect the *mecA* gene. The results showed that the prevalence of *S. aureus* was 35.67% phenotypically and 17.96% genotypically. The phenotypic prevalence of MRSA, based on the Kirby-Bauer Disc Diffusion method, was 68.11%, while PCR confirmed that 33.33% of isolates carried the *mecA* gene and were MRSA-positive genetically. The phylogenetic analysis indicated that local MRSA isolates showed divergence among themselves but resembled isolates from neighboring countries such as India, Iran, Egypt, and Poland, suggesting cross-border transmission. Additionally, computational analysis demonstrated evolutionary similarities in nucleotide and amino acid sequences between local and reference isolates and confirmed the stability of PBP2a. The study also provided insights into a 3D model of the *mecA* protein and potential transmission patterns of MRSA across different hosts and regions. The study concluded that MRSA is a common pathogen in poultry eggshells, and antibiotic susceptibility testing is essential for evaluating antimicrobial resistance in poultry.

Key Words: Layers, MRSA, Phylogenetic Analysis

COMPARATIVE EFFECTS OF VARIOUS INFECTIOUS BRONCHITIS VACCINES (IBV) ON THE GROWTH PERFORMANCES AND IMMUNITY OF BROILERS

Author(s): Sar Zamin Khan[1], Sohaib Ul Hassan[1]

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2025-PSC-39 **Abstract**

In this study, efforts were made to answer the concern of local farmers that imported vaccines of Infectious Bronchitis (IB), having different strains from the local ones, lead to mild IB symptoms in the form of fever, mild respiratory symptoms, and depressed growth. Hence, the purpose of this study was to compare the immunological responses, tracheal, lung, and kidney histomorphology, and growth performance of broilers given IB vaccines having different strains. A total of 120 broiler chicks, each one day old, were split into four groups of three replicates, each with 10 chicks. Three most commonly used IB vaccines, namely IB4/91, IB Mas, and IB H120, were randomly provided as prime and booster doses to the experimental groups, keeping one group as a control. Data on feed intake, body weight, gain, FCR, Immunity, and histomorphology of trachea, lungs, and kidneys were collected and analyzed for the results. There was no effect on growth performance, including feed intake, body weight gain, and feed conversion ratio, when various IBV strains, including vaccines, were given. Results were found to be statistically similar ($P<0.05$) in the vaccinated and control groups. In terms of numerical data, the vaccinated birds in IB 4/91 showed a superior trend in body weight growth (1.83 kg) and FCR (1.35) than the control group (WG1.82kg, FCR 1.36) and vaccinated groups 3 and 4 (WG1.82kg, FCR 1.35). In comparison to the control group, the vaccinated group had a considerably greater antibody titer ($P<0.05$). In comparison to IB mas (1202.47) and IB H120 (1295.93), Group 2, which consisted of vaccinated birds with the IB 4/91 strain of the IBV, had the best titer (1431.23) among the vaccinated groups ($P<0.05$). A similar trend, though non-significant, was also observed in the mortality. Birds vaccinated with the IB 4/91 strain showed no mortality. Birds in the rest of the groups were found with 3.33 % mortality. Mild to moderate respiratory symptoms were noted in the control group, and the post-mortem findings of the dead birds from the control group showed congestion in the trachea and lungs, as seen in the IB infection. The histomorphology of trachea, lung, and kidneys collected from the birds of experimental birds showed almost normal features in the broilers vaccinated with the IB 4/91 strain. Mild to moderate lesions were observed in the IB mas and IB H 120 vaccinated birds. In comparison to the vaccinated groups, the control group's birds had more severe lesions in all three organs. The current research found that the three imported vaccines tested had no adverse effect on the birds' ability to develop, and increased their IBV antibody levels as compared to the control group. However, some mild signs of respiratory disease were observed in the control as well as birds vaccinated with IB mas and IBH120 vaccine strains. The IB 4/91 among the tested vaccines was found to be better in terms of antibody titer, mortality, and histomorphological studies.

Key Words: Infectious Bronchitis Virus, Broilers, Immunity, Histomorphology

IMPACTS OF PROTEASE SOURCES ON GROWTH AND CARCASS RESPONSE, GUT HEALTH, NUTRIENT DIGESTIBILITY, AND CECAL MICROBIOTA PROFILES IN BROILERS FED POULTRY-BY-PRODUCT-MEAL-BASED DIETS

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2025-PSC-40 **Abstract**

The current study aimed to evaluate the effects of the supplementation of protease sources on growth and carcass response, gut health, nutrient digestibility, and cecal microbiota profiles in broilers fed poultry-by-product-meal (PBM)-containing diets. In total, 800 one-day-old mixed-sex broilers (Arbor Acres) were weighed and allocated to one of the four dietary treatments in a completely randomized design, with eight replicates and 25 birds each per replicate. The treatments were as follows: (1) T0, control diet (without protease supplementation and 3% PBM); (2) T1, control diet supplemented with acidic protease at 100 g/ton (50,000 U/g); (3) T2, control diet supplemented with alkaline protease at 200 g/ton (25,000 U/g); (4) T3, control diet supplemented with neutral protease at 200 g/ton (25,000 U/g). Protease supplementation enhanced ($p < 0.05$) body weight gain and the feed conversion ratio, predominantly in broilers fed PBM-based diets containing alkaline protease. Alkaline protease supplementation increased ($p < 0.05$) the apparent ileal digestibility of proteins (AIDP) by 4.3% and the apparent ileal digestibility of amino acids (AIDAA) by up to 5.8%, except for ornithine. Increments ($p < 0.05$) in carcass, breast, and leg quarter yields due to protease supplementation were evident, particularly in broilers fed diets containing alkaline protease. Alkaline protease improved ($p < 0.05$) the duodenal villus height (VH), reduced the crypt depth (CD), and increased the villus height to crypt depth ratio (VCR). Alkaline protease supplementation reduced ($p < 0.05$) cecal counts of *Salmonella*, *Escherichia coli*, and *Clostridium* in the broilers, whereas it increased ($p < 0.05$) the *Lactobacillus* counts. The supplemented alkaline protease resulted in improved growth performance and carcass traits, better gut health, as well as improved ileal digestibility of nutrients, including crude protein (CP) and acid-insoluble ash (AIA), with a more balanced cecal microbial composition in broilers.

Key Words: Protease, Growth Performance, Gut Health, Amino Acids Digestibility

EFFECT OF INSOLUBLE FIBER INCLUSION WITH OR WITHOUT EXOGENOUS NSPASE ENZYMES ON GROWTH PERFORMANCE, CARCASS QUALITY, NUTRIENT DIGESTIBILITY AND INTESTINAL HISTOLOGICAL FEATURES OF BROILERS

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2025-PSC-41	Abstract

The current study was designed to explore the effect of inclusion of insoluble fiber sources with or without exogenous NSPase enzymes on growth performance, carcass quality, nutrient digestibility and intestinal histological features of broilers. For this purpose, 480-day-old broiler chicks were assigned randomly into 6 treatments having 8 replicates each (10 birds per replicate). The treatments were T_0 (control diet), T_1 (control diet + NSPase), T_2 (control diet + soy hulls), T_3 (control diet + wheat bran), T_4 (control diet + soy hulls + NSPase), T_5 (control diet + wheat bran + NSPase). The experimental duration was 35 days. Data on feed intake, body weight gain and feed conversion ratio was calculated weekly. Ileal nutrient digestibility was determined on the 35th day of trial. On day 35, 2 birds/replicate were chosen randomly and slaughtered by the Islamic method for carcass characteristics and the small intestine was taken for intestinal histology. The mortality percentage was recorded daily. The results of feed intake, body weight gain, and feed conversion ratio were significantly affected during the grower and finisher phases ($p<0.05$). The treatments had a positive effect on nutrient digestibility, especially with NSPase supplementation ($p<0.05$). Significant improvements were observed in intestinal morphology, including villus height and VH:CD ratio in the jejunum and ileum ($p<0.05$). The treatments also influenced serum ALT and uric acid levels ($p<0.05$), while other serum biochemical indices remained unaffected ($p>0.05$). It is concluded that moderate inclusion of insoluble fiber sources combined with NSPase enzymes enhances broiler gut health and nutrient utilization.

Key Words:	Intestine Histology, Bran, Broilers, NSPases

ANTIMICROBIAL CHARACTERISTICS OF TRACE MINERALS IN POULTRY

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2025-PSC-42

Abstract

Trace minerals such as zinc, copper, selenium, silver, iron, and manganese are not only essential for normal metabolic and physiological functions in poultry but also exhibit significant antimicrobial characteristics. These minerals play a dual role: meeting the Nutritional requirements of the bird while simultaneously limiting the growth of pathogenic microorganisms within the gastrointestinal tract. Their antimicrobial activity operates through multiple mechanisms. Zinc and copper destabilize microbial cell walls and membranes, leading to leakage of cellular contents and eventual cell death. Selenium participates in redox reactions that generate reactive oxygen species, which damage bacterial proteins, DNA, and lipids. Manganese influences microbial enzyme systems and interferes with their metabolic activity. Beyond direct antimicrobial effects, trace minerals enhance host defense by modulating Immune responses. For example, zinc is critical for the development and function of immune cells, copper aids in antibodies production, and selenium strengthens antioxidant defenses, protecting host tissues from oxidative stress caused by infections. Together, these effects Improve gut health, nutrient absorption, and overall bird performance. In poultry production, balanced supplementation of trace minerals can reduce reliance on antibiotic growth promoters, thus contributing to the global effort to combat antimicrobial resistance. However, the efficiency of trace minerals depends on factors such as their chemical form (inorganic vs. organic or nano forms), dosage, bioavailability, and interactions with other dietary components. Excessive supplementation may lead to mineral imbalances, environmental contamination through excretion, or potential toxicity. Therefore, understanding the antimicrobial characteristics of trace minerals is essential for designing precise and sustainable feeding strategies that optimize bird health, enhance productivity, and support environmentally responsible poultry farming practices. Iron is essential for oxygen transport via hemoglobin and myoglobin, supports cellular respiration through cytochromes, and is involved in numerous redox enzyme systems. Deficiency impairs growth, immunity, and energy metabolism. Silver, though not a traditional nutritional requirement, has notable antimicrobial properties, disrupting microbial cell membranes and enzyme activity. In poultry nutrition research, silver nanoparticles have been explored for their ability to reduce pathogenic bacterial loads, improve gut health, and potentially lower the reliance on antibiotics.

Key Words: Protease, Growth Performance, Gut Health, Amino Acids Digestibility

FOOD SAFETY IN THE ERA OF ANTIMICROBIAL RESISTANCE: USING NEW APPROACHES TO COMBAT FOOD-BORNE PATHOGENS

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2025-PSC-43 **Abstract**

The *Salmonella, Campylobacter, E. coli, and Listeria monocytogenes* are among the food-borne pathogens that continue to be the world's major causes of sickness. Concurrently, antimicrobial resistance (AMR) in these organisms has emerged as a serious public health and food safety issue, endangering both food security and efficient treatment alternatives. In order to control infections and reduce AMR, a recent study highlights the combination of cutting-edge technology with One Health concepts. Monitoring of resistance genes, source attribution, and epidemic detection have all been transformed by whole-genome sequencing and metagenomics. Rapid diagnostics, such as biosensor platforms and CRISPR-based assays, are making it possible to detect infections on-site in a matter of minutes. Predictive analytics powered by AI and digital traceability systems are being used more and more to improve hazard management, forecast contamination concerns, and bolster farm-to-fork surveillance. Alternatives to antibiotics, including plant-derived antimicrobials, probiotics, postbiotics, and bacteriophages, are becoming more popular as sustainable means of lowering pathogen prevalence without encouraging AMR at the production level. While maintaining food quality, non-thermal processing techniques including UV-LED, cold plasma, and high-pressure treatment are enhancing microbiological safety. Preventive strategies are further strengthened by improved biosecurity, immunization, and AMR stewardship. In the context of AMR, food safety necessitates multifaceted approaches that integrate responsible antibiotic use, quick diagnostics, genomics, and AI-based risk assessment. These advances provide a sustainable strategy to lower the burden of pathogens, maintain treatment effectiveness, and guarantee consumer confidence in the food supply when they are in line with global One Health standards.

Key Words: Foodborne Pathogens, Antimicrobial Resistance, Food Safety, One Health

COMPARATIVE ASSESSMENT OF LOCALLY DEVELOPED PROBIOTICS WITH DIFFERENT COMMERCIALLY AVAILABLE PROBIOTICS ON BROILER PRODUCTION PERFORMANCE AT STARTER & FINISHER PHASE

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2025-PSC-44 **Abstract**

To investigate and make a comparison of the probiotics (PB) with the different commonly used commercial probiotics available in the Pakistan poultry feed market. Birds growth performance and nutrient digestibility were assessed. Results showed the effect of probiotics supplementation feed on growth performance measurements in broiler chickens. Results clarified that broiler chickens fed with probiotics have significantly heavier BW and better FCR at 3wk of age compared with other treatment groups. Body weight gain and FCR was significantly improved by the supplementation of probiotics compared to other treatment groups supplement with different commercial probiotics. Feeding a diet with a probiotics at rate of 0.02% significantly improved the ileal digestibility of dry matter and CP efficiently on day 35 compared to those fed without or other commercially available probiotics. The digestibility of amino acid were significantly improved by the supplementation of probiotics in broiler diet deficient with crude protein and aminoacid. The interaction of crude protein, amino acid and probiotics for ileal amino acid digestibility of methionine, lysine, alanine, cysteine, leucine, serine, threonine and tyrosine was significant. Maximum improvement was observed in-group supplemented with probiotics for methionine, lysine, threonine, cysteine and serine. There was no significant difference observed among the all treated groups in litter quality during the starter and finisher phase of the production. Litter quality decreased along the days of experiment, independently of litter material, as expected due to the increase in the humidity produced by the birds and their manure.

Key Words: Pobiotics, Broiler, Production, Digestibility

MOLECULAR DETECTION AND PREVALENCE OF COLISTIN-RESISTANT *ESCHERICHIA COLI* IN POULTRY AND HUMANS: A ONE HEALTH PERSPECTIVE

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2025-PSC-45 **Abstract**

Multidrug-resistant (MDR) bacteria significantly threaten humans and animals worldwide. Colistin is the last resort of antibiotics against gram-negative bacterial infections. Its irrational use in poultry is a major factor in transmitting MDR bacteria to humans. The present study investigated the risk factors, prevalence, and molecular detection of colistin resistance associated with poultry and humans. A total of (n=140) cloacal swabs from chickens and human stool samples (n=140) were processed to identify *E. coli* using conventional methods, followed by genotypic confirmation. Phenotypic and genotypic confirmation of antibiotic resistance genes *qnrA*, *blaTEM*, *tetA*, *aadA*, and mcr genes was performed on these *E. coli* isolates. These isolates were confirmed at 69.3% and 62.8% in chickens and humans, respectively. Limited education and poor hygiene significantly increased the infection rate (p=0.0001). The *E. coli* isolates from commercial poultry showed 100% resistance to amoxicillin/clavulanic acid, 98.9% to ampicillin, and 93.8% to tetracycline. The *E. coli* isolates from humans exhibited 90% resistance to ciprofloxacin, 88% to ampicillin, and 85% to ceftriaxone. Among these, MDR *E. coli* isolates of both commercial poultry and humans, colistin resistance was found in 78.6% and 48.1%, respectively. Genotypic confirmation of mcr genes such as mcr-1 (42%), mcr-2 (19.6%), mcr-3 (15.1%), mcr-4 (7.6%), and mcr-5 (4.5%) in commercial poultry. However, only the mcr-1 (15.6%) gene was found in human isolates. The current study findings highlight the prevalence of mcr genes in *E. coli*, potentially contributing to broader antibiotic resistance concerns.

Key Words: *E. coli*, Colistin, Mcr, MDR, Risk Factors

EXPLORING THE INTERPLAY OF CRISPR-CAS SYSTEM AND ANTIBIOTIC RESISTANCE IN *STAPHYLOCOCCUS AUREUS*: A POULTRY MEAT STUDY FROM LAHORE, PAKISTAN

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2025-PSC-46 **Abstract**

Staphylococcus aureus (*S. aureus*) is one of the major pathogens responsible for causing food poisoning worldwide. The emergence of antibiotic resistance in this bacterium is influenced by various factors. Among them, bacterial acquired defense systems described as clustered regularly interspaced short palindromic repeats (CRISPR)-cas system might be involved in antibiotic resistance development in bacteria. The current study was designed to assess the prevalence of *S. aureus* and its antibiotic resistance profile and identify the relationship of the CRISPR-cas system with antimicrobial resistance, followed by phylogenetic analysis. Total samples (n=188) of poultry meat were collected from the poultry bird market of Lahore, Punjab, Pakistan. We used both phenotypic (antibiotic disc diffusion) and genotypic methods (PCR) to identify multi-drug resistant (MDR) strains of S. aureus. Additionally, the role of the CRISPR-Cas system in the isolated MDR S. aureus was also assessed. In addition, real-time quantitative PCR (qRT-PCR) was used to evaluate the association of the CRISPR-cas system with antimicrobial resistance. All of the *S. aureus* isolates showed 100% resistance against erythromycin, 97.5% were resistant to tetracycline, and 75% were resistant to methicillin. Eleven isolates were MDR in the current study. CRISPR system was found in all MDR isolates, and fifteen spacers were identified within the CRISPR locus. Furthermore, MDR *S. aureus* isolates, and the standard strain showed higher expressions of CRISPR-associated genes. The correlation of said system with MDR isolates shows the foreign gene acquisition by horizontal transfer. Current knowledge could be utilized to tackle antibiotic-resistant bacteria, mainly *S. aureus*

Key Words: *S. aureus*, CRISPR-Cas system, Cas10 gene, MDR

POTENTIAL OF ZNO NANOPARTICLES FOR MULTI-DRUG RESISTANT *ESCHERICHIA COLI* HAVING CRISPR-CAS FROM POULTRY MARKET IN LAHORE

Author(s): Muhammmad Najam Ul Huda[1], Umar Bin Zahoor[1], Muhammad Abu Bakr Shabbir[1]

[1] Institute of Microbiology, University of Veterinary and Animal Sciences, Lahore.

2025-PSC-47 **Abstract**

Apart from known factors such as irrational use of antibiotics and horizontal gene transfer, it is now reported that clustered regularly inter spaced short palindromic repeats (CRISPR) are also associated with increased antimicrobial resistance. Hence, it is critical to explore alternatives to antibiotics to control economic losses. Therefore, the present study aimed to determine not only the association of CRISPR-Cas system with antibiotic resistance but also the potential of Zinc Oxide nanoparticles (ZnO-NPs) for avian pathogenic Escherichia coli (APEC) isolated from poultry market Lahore. Samples (n = 100) were collected from live bird markets of Lahore, and isolates were confirmed as Escherichia coli (E. coli) using the Remel One fast kit, and APEC was identified using PCR. The antibiotic resistance pattern in APEC was determined using the minimum inhibitory concentration (MIC), followed by genotypic confirmation of antibiotic-resistant genes using the PCR. The CRISPR-Cas system was also identified in multidrug-resistant (MDR) isolates, and its association with antibiotics was determined using qRT-PCR. The potential of ZnO-NPs was evaluated for multidrug-resistant (MDR) isolates by MIC. All isolates of APEC were resistant to nalidixic acid, whereas 95% were resistant to chloramphenicol and 89% were resistant to streptomycin. Nineteen MDR APEC were found in the present study and the CRISPR-Cas system was detected in all of these MDR isolates. In addition, an increased expression of CRISPR-related genes was observed in the standard strain and MDR isolates of APEC. ZnO-NPs inhibited the growth of resistant isolates. The findings showed the presence of the CRISPR-Cas system in MDR strains of APEC, along with the potential of ZnO-NPs for a possible solution to proceed. This highlights the importance of regulating antimicrobial resistance in poultry to reduce potential health consequences

Key Words: CRISPR-Cas, Cas-3, APEC, Chicken, Antimicrobial resistance, Nanoparticles

ANTIBIOFILM EFFICACY OF SODIUM HYPOCHLORITE AND VIRKON S AGAINST LOCALLY ISOLATED *SALMONELLA ENTERITIDIS*

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2025-PSC-48 **Abstract**

Salmonella enterica serovar Enteritidis is a significant zoonotic pathogen known for its ability to form biofilms, which contributes significantly to its persistence in poultry farms and resistance to common disinfectants. The present study aimed to evaluate the antibiofilm efficacy of sodium hypochlorite and Virkon S against locally isolated *S. Enteritidis* strains obtained from commercial poultry farms of Lahore, Pakistan. Therefore, a total of 200 samples were collected, and isolates were initially identified through phenotypic characterization and confirmed genotypically via PCR targeting the *IE* gene. Antibiotic sensitivity testing was performed to assess the susceptibility profile of *Salmonella Enteritidis* isolates against commonly used antibiotics. Following this, the presence of antibiotic resistance genes was confirmed using polymerase chain reaction (PCR) with specific primers targeting resistance determinants. Subsequently, biofilm formation was induced using standard protocols to evaluate the biofilm-producing ability of the isolates. To determine the minimum inhibitory concentrations (MICs) of disinfectants, the broth microdilution method was employed. The antibiofilm efficacy of sodium hypochlorite and Virkon S was then evaluated against pre-formed biofilms at (1%,2%,5%) concentrations. Finally, the expression levels of key biofilm-associated genes were quantified using real-time PCR (RT-PCR) to assess the impact of disinfectant treatment at the molecular level. Antimicrobial susceptibility testing revealed that 60% of isolates were resistant, 23.3% showed intermediate susceptibility, and only 16.7% were fully susceptible. The highest resistance was observed against nalidixic acid (100%) and ampicillin (95%), followed by tetracycline (60%), gentamicin (50%), and chloramphenicol (45%). Sulphamethoxazole showed the lowest resistance (30%). Biofilm production was quantified using the microtiter plate assay, where 40% of the isolates were identified as strong biofilm formers. These strong producers were selected for antibiofilm testing. Biofilm disruption assays revealed that both disinfectants significantly reduced biofilm biomass in a concentration-dependent manner, with sodium hypochlorite demonstrating greater efficacy. Furthermore, qRT-PCR analysis showed a marked increase in CT values for key biofilm-associated genes (*bcsA, csgD,* and *gyrB*) post-treatment, indicating downregulation of gene expression. These findings confirm the strong antibiofilm potential of both disinfectants and support their application in the control of biofilm-forming *S. Enteritidis* in poultry environments.

Key Words: *Salmonella enteritidis*, Biofilm, Sodium Hypochlorite, Virkon S, MIC,

PRODUCTION AND ASSESSMENT OF *ZOPHOBAS MORIO* BASED PROBIOTIC IN MEAT TYPE CHICKEN

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2025-PSC-49

Abstract

The already prepared culture of *Lactobacillus acidophilus* were used at the rate of 3×10^9 CFU/ml and 05g/ kg substrate respectively. The dried powdered of Zophobas morio larvae 30g were combined with 35g of distiller's dried grains with soluble (DDGS) and 35g of wheat bran. 3×10^9 /ml of bacterial culture was combined with substrate media and was fermented at 40 ºC under repeating 3 hours aerobic and 5 hours anaerobic conditions for 2 days. A second fermentation was at that time performed by 05g *Saccharomyces cerevisiae* at 40 ºC for 3 days under aerobic conditions. Thereafter, the fermented product was dried to less than 15% moisture at 32 ºC. For the experiment on broilers birds a sum of hundred and fifty, day old healthy meat type chicks were assigned to five experimental groups having three replicates and each having ten birds. The experimental feed were provided @ 0.2%, 0.4%, 0.6% and 0.8%, respectively. Microbial count of *Lactobacillus acidophilus* was significantly increased while that of *Salmonella* and *E. coli* was significantly decreased in (Pro-bio 0.6%) related to positive control and other treated group. The intestinal digestibility of various nutrients and apparent metabolizable energy was increased in treated groups. Similarly, carcass yield and economic return was also significantly increased in the treatments (Pro-bio 0.6%, 0.8%, 0.4% 0.2%) as compared to control group. Intestinal morphologic features (length and width of villus and crypt depth) were increased in probiotics supplemented groups. Immune boosting effect in the form of high antibodies titer against ND, IBD and IB infection was observed in chicks provided with 0.6%, 0.8%, 0.4% 0.2% probiotics compared to chickens maintained without supplemented probiotics. Based on present results it was concluded that the use of Zophobas morio based probiotics improved the productive performance of broilers through its positive effect on nutrient digestibility, metabolizable energy, gut morphologic features, robust growth of gut microbiota, reduced intestinal pathogens count and boosted immune response against prevalent viral diseases(ND, IB and IBD). Regular use of *Zophobas morio* based probiotics @ 0.6% in the diet of broilers chicks is recommended for best performance and high economic return.

Key Words: *Zophobas Morio*, Probiotics, Nutrient Digestibility, Apparent Metabolizable

DETECTION OF CO-INFECTION OF CHICKEN ANEMIA VIRUS AND ESCHERCIHIA COLI IN COMMERCIAL POULTRY FLOCKS IN DISTRICT LAHORE, PUNJAB, PAKISTAN

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2025-PSC-50 **Abstract**

The poultry sector of Pakistan plays a significant role in food security, yet faces various challenges including infectious agents. Chicken Anemia Virus (CAV) and *Escherichia coli* are major pathogens of concern due to their immunosuppressive and opportunistic nature, respectively. The aim of the present study was to identify and genetically characterize CAV and *E. coli* from co-infections in commercial poultry in the district Lahore, Punjab, Pakistan. A total of 40 clinical samples were collected, including bone marrow for CAV and liver and spleen tissues for *E. coli* detection. DNA extraction was performed using an automated extractor and polymerase chain reaction (PCR) targeted the VP1 gene of CAV and uspA gene of *E. coli*. Conventional culture and biochemical tests were also used to identify *E. coli* isolates prior to PCR. Selected PCR amplicons were sequenced and analyzed phylogenetically. Descriptive statistics indicated that overall 15% (6/40) samples were co-infected with both CAV and *E. coli*. The CAV and *E. coli* co-infections were more common in <24 days birds and in layer flocks compared to broilers. Higher frequency of CAV and *E. coli* co-infections were recorded in the Spring Season compared to Winter and Summer Seasons. Phylogenetic analysis of VP1 gene of CAV from co-infections indicated close clustering with CAV of Iraq, Pakistan, India, China and Japan. Phylogenetic analysis of uspA gene of *E. coli* from co-infections indicated close clustering with *E. coli* of Pakistan and India. These findings suggest the presence of CAV and *E. coli* co-infections in Lahore's commercial poultry flocks.

Key Words: Broilers, Layers, Bacteria, Viruses

VARIOUS TRAITS OF COMMERCIAL BROILERS EFFECTED BY DIFFERENT INITIAL CHICK WEIGHT CATEGORIES AND HIGH-DENSITY DIET FOR VARIOUS DURATIONS

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2025-PSC-51 **Abstract**

The study under consideration was designed to investigate the effects of initial chick weight and various high-density feeding durations on traits such as growth, carcass, hematology, and immunity in commercial broilers. For this purpose, 600 newly hatched broiler chicks belonging to the strain Ross-308 were selected. The chicks were divided into 3 categories (A, B and C) on the basis of their weight having range of 31-34 g, 35-38 g & 39-42 g, respectively. These were provided with high protein feed i.e. 23 % crude protein instead of 21 % and higher metabolizable energy i.e. 3140 Kcal instead of 2871 Kcal for 4 different durations. The feeding durations were initial 0 day, 05 days, 10 days and 15 days. The birds were placed according to a completely randomized design under factorial arrangements. Each treatment was replicated five times, having 10 birds per replicate. The results showed that chicks belonging to A body weight category showed the highest feed intake, body weight and total carcass weight. However other parameters like feed conversion ratio, mortality rate, carcass cut-ups, blood metabolites and immune responses remained unaffected. In terms of feeding durations, the birds provided with high-density feed for 15 days showed the highest body weight and best feed conversion ratio. However, feed conversion ratio, and carcass yield of the birds provided with high-density feed for initial 10 and 15 days was better than the birds provided with high density feed for 0 and 05 days. Various feeding duration did not show any significant effect on other parameters such as feed intake, carcass cut-ups, blood metabolites an immune response. In the sum-up, it is concluded that birds having higher initial body weight and provided with high-density feed for initial 10 days showed superior performance.

Key Words: Commercial Broiler, Initial Chick Weight, Hight Density Feeding Durations

DOSAGE REGIMEN ASSOCIATED IMMUNO MODULATORY EFFECT OF LEVAMISOLE ON HUMORAL RESPONSE OF BROILERS AGAINST INACTIVATED AVIAN INFLUENZA VIRUS H7N3 ADJUVANTED VACCINES

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2025-PSC-52	**Abstract**

Inactivated oil based avian influenza vaccines are being used to confront viral outbreaks but seem to be ineffective due to the shorter life span of broiler birds. In such situations immuno-stimulating agents may play a vital role to overcome the problem. The current study was designed to investigate the co-stimulatory effect of levamisole on humoral response of chicken against inactivated oil based influenza vaccines in broiler birds. The efficacy of levamisole (LMS) hydrochloride, a standard immune modulator was evaluated on one hundred broilers in association with inactivated adjuvanted avian influenza vaccines. Avian influenza susceptible broilers were divided into nine groups, each having ten birds. The birds in groups G1, G2, G3, G5, G6 and G7 were offered 30 , 20 and 15mg kg^{-1} bwt levamisole for four consecutive days after being vaccinated with oil and gel based inactivated influenza vaccines respectively; birds in group G9 were kept as control. Whereas, birds in Group G4 were kept as oil base vaccinated control and Group G8 were kept as gel base vaccinated control without levamisole medication. Blood samples were obtained from wing vein on 14th, 28th and 36th days post vaccination. Anti-influenza antibody response was measured using haemagglutination inhibition (HI) technique. Data analyzed by one way ANOVA and DMR test showed that levamisole in both regimens had appreciable effect on antibody titers ($p<0.05$). In conclusion, LMS can stimulate immune system which causes better response to vaccination. Further studies are needed to evaluate other effective factors for each of the best results of LMS.

Key Words:	Levamisole, AIV H7N3, Immunomodulation

TRANSFORMING BROILER MEAT QUALITY ASSESSMENT: THE ROLE OF AI AND MACHINE LEARNING IN AUTOMATED, NON-DESTRUCTIVE EVALUATION

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2025-PSC-53 **Abstract**

Ensuring uniform broiler meat quality is essential for both industry competitiveness and consumer confidence. Conventional assessment methods, such as visual scoring or destructive laboratory analyses, are often subjective, labor-intensive, and impractical for high-throughput processing lines, creating a critical need for more efficient and objective tools. Recent advances in artificial intelligence (AI) and machine learning (ML) provide an opportunity to transform meat quality evaluation into an objective, rapid, and non-invasive process. AI and ML algorithms can integrate data from imaging, spectral, and sensor-based technologies to predict critical quality traits, including tenderness, water-holding capacity, color, and oxidative stability. With sufficient training datasets, predictive models are capable of learning complex relationships between measurable features and the underlying biochemical properties that define meat quality. Such systems have the potential to deliver consistent, real-time assessments, minimize human error, and support data-driven decision-making across production and processing stages. Beyond quality control, the implementation of AI-driven technologies contributes to reducing economic losses, improving processing efficiency, and ensuring product uniformity. Adoption of these tools also aligns with the broader poultry sector goals of digitalization, sustainability, and consumer-driven innovation. The integration of AI and ML thus represents a transformative step forward, paving the way for fully automated, smart, and data-driven quality assurance in poultry production systems.

Key Words: Broiler Quality, Artificial Intelligence, Non-Destructive Evaluation, Predictive Modeling

EVALUATION OF CONVENTIONAL AND NEW-GENERATION DISINFECTANTS IN POULTRY FARMS: LINKING FARMER KNOWLEDGE TO DISINFECTION OUTCOMES

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2025-PSC-54

Abstract

Poultry farming is a significant sector in Pakistan's economy, where ineffective disinfection practices can lead to severe economic losses. This study assessed disinfection practices among poultry farmers across Punjab and evaluated the efficacy of conventional and new generation disinfectants in vitro and through pilot study. A structured survey revealed 92% of farmers acknowledged the role of disinfection but 60% reported that their staff were adequately trained. Awareness regarding water quality parameters such as pH and TDS was limited, with 56–57% of respondents unaware. In vitro experiments compared the efficacy of conventional (bleach, raw hydrogen peroxide) and new-generation (Neogen-Viroxide, Hyperoxsan) disinfectants against *Staphylococcus aureus* and *Escherichia coli* across varying pH levels and contact times. While bleach and Neogen-Viroxide demonstrated consistent efficacy, hydrogen peroxide-based disinfectants showed variable results. They were not effective in killing *S.aureus* up to 10 min of contact time. Raw H_2O_2 killed *S.aureus* after 60 min of contact whereas, stabilized H_2O_2 only showed 1 log reduction at 60min. However, for *E.coli* stabilized H_2O_2 was more effective than it was for *S.aureus*. Pilot studies on poultry farms depicted that stabilized H_2O_2 was more effective in reducing bacterial load in water pipelines compared to raw H_2O_2. Notably, basic cleaning with detergent on floors achieved significant microbial reduction, underscoring the critical role of preliminary cleaning prior to disinfection. The findings highlight a gap between knowledge and practice among farmers and emphasize the need for targeted education on disinfection protocols and context-specific product selection to enhance biosecurity in poultry operations.

Key Words: New Generation Disinfectants, Conventional Disinfectants

EPIDEMIOLOGICAL STUDY OF WATER BORN PATHOGEN *CRYPTOSPORIDIUM* SPECIES INFECTION IN COMMERCIAL (BROILERS) AND RURAL POULTRY IN DISTRICT MARDAN

Author(s): Amna Hazrat[1], Irfan Khattak[1], Naimat Ullah Khan[1], Sher Bahadar Khan[1], Tahir Usman[1], Hazrat Ali[1], Mian Saeed Sarwar[1]

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2025-PSC-55

Abstract

The major parasites resides inside the digestive tract of almost all vertebrate animals is *Cryptosporidium*, which is the main source of the illness known as cryptosporidiosis. The Cryptosporidium infection is the primary cause of diarrhea in all domestic, aquatic and wild animals. This food born protozoan is responsible for millions of deaths in humans annually in both developed and developing nations because Cryptosporidium infection is zoonotic. In order to ascertain incidence ratio of Cryptosporidium infection, various potential risk factors, such as age, sex, source of drinking water, poor, hygiene, poor immune status and raw food / vegetables intake was studied. During this study a total of 200 broiler fecal sample were collected from different poultry farms and 50 from rural poultry of district Mardan. The collected samples were screened microscopically to identify the presence of *Cryptosporidium* Species infection through modified Zeil-Nelsen (MZN) staining technique. Microscopically positive samples were further confirmed through PCR. For DNA extraction standard protocol were used according to DNA extraction kit from all of the MZN-positive samples. The collected sample were subjected to PCR analysis and small subunit (SSU) rRNA gene, were targeted for *Cryptosporidium* Species. As a result highest *Cryptosporidium* Spp. infection was recorded in rural poultry (22%) followed by commercial poultry (8%) using microscopy while through PCR 18(%) in rural poultry while 6(%) in commercial poultry. As concerned the age factor, the highest prevalence was observed in first week, followed by 2nd and 3rd week. There was no effect of gender on prevalence of *Cryptosporidium* infection in poultry. The highest prevalence was observed where poor quality of food and water was supplied to birds.

Key Words: PCR, Zeil-Nelsen (MZN) Staining, *Cryptosporidium*, Risk Factors

PREVALENCE AND ANTIMICROBIAL RESISTANCE PROFILES OF *PSEUDOMONAS AERUGINOSA* ISOLATED FROM POULTRY MEAT AND ITS PUBLIC HEALTH IMPLICATIONS

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2025-PSC-56

Abstract

Poultry meat is a potential source of antimicrobial-resistant bacteria and antibiotic residues, raising concerns for public health. This study aimed to investigate the prevalence and antimicrobial resistance profiles of *Pseudomonas aeruginosa* in retail poultry meat, while also quantifying residues of sulfonamides and tetracyclines. A total of 50 chicken meat samples were collected from markets, of which 41 (82%) tested positive for *P. aeruginosa*. High-performance liquid chromatography (HPLC) detected antibiotic residues in 22 samples for sulfamethoxazole (mean 48.7 µg/kg; range 22.3–95.6 µg/kg), 25 for sulfadiazine (mean 57.4 µg/kg; range 19.8–112.4 µg/kg), 29 for tetracycline (mean 74.1 µg/kg; range 30.5–158.2 µg/kg), and 20 for oxytetracycline (mean 65.2 µg/kg; range 24.7–141.5 µg/kg). Antimicrobial susceptibility testing using the Kirby–Bauer method showed resistance in 20 isolates to tetracyclines and 16 to sulfonamides. PCR screening confirmed the presence of *tetA, tetB, tetC* for tetracycline resistance and *sul1* for sulfonamide resistance. Statistical analysis revealed significant correlations between tetracycline residues and *tetA* prevalence ($r = 0.62$, $p < 0.01$) and between sulfonamide residues and *sul1* ($r = 0.54$, $p < 0.05$). Odds ratios with 95% confidence intervals further indicated strong associations between residue occurrence and resistance gene carriage. The detection of residues at concentrations approaching or exceeding some international maximum residue limits (MRLs), together with the high prevalence of multidrug-resistant *P. aeruginosa*, underscores the selective pressure of antibiotic use in poultry farming. These findings highlight the need for stringent control of antibiotic application in food animals and integrated monitoring of both residues and resistance genes to mitigate risks to consumer health.

Key Words: *Pseudomonas aeruginosa*, Antimicrobial Resistance, HPLC

PREVALENCE OF AMINOGLYCOSIDES RESISTANCE IN *ESCHERICHIA COLI* AND *PSEUDOMONAS AERUGINOSA* ISOLATED FROM POULTRY IN SOUTH PUNJAB

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2025-PSC-57	**Abstract**

The increasing prevalence of antibiotic resistance in *Escherichia coli* and *Pseudomonas aeruginosa* represents a growing public health concern, particularly due to the shared use of antibiotics in both veterinary and human medicine. Among these, resistance to aminoglycosides is particularly alarming given their clinical importance in treating severe bacterial infections. This study aimed to assess aminoglycoside resistance patterns in *E. coli* and *P. aeruginosa* strains isolated from poultry. A total of 300 samples were collected from domestic and commercial chickens at poultry farms, butcher shops, and retail markets across South Punjab, Pakistan. Bacterial identification was performed using standard microbiological techniques, and antimicrobial susceptibility testing was conducted via the Kirby-Bauer disk diffusion method. The findings revealed resistance to gentamicin (CN10) in 17% of *E. coli* isolates and 23% of *P. aeruginosa* isolates. Similarly, resistance to streptomycin (STR300) was observed in 13% of *E. coli* and 24% of *P. aeruginosa* isolates. Isolates exhibiting phenotypic resistance were further screened for plasmid-mediated quinolone resistance genes (bla TEM, bla CTX-M, bla SHV) using polymerase chain reaction (PCR). The presence of these genes was confirmed through DNA sequencing. These preliminary results underscore the emergence and dissemination of antimicrobial resistance determinants in poultry-associated bacterial pathogens. The detection of plasmid-borne resistance genes suggests a potential for horizontal gene transfer and zoonotic transmission. Therefore, immediate and comprehensive interventions are warranted, including the enforcement of stringent regulations governing the use of antibiotics in food-producing animals, to mitigate the public health risks posed by antimicrobial-resistant bacteria in the poultry sector.

Key Words:	Prevalence, Antimicrobial Resistance genes, Aminoglycosides, Poultry

OVEREXPRESSION OF ACRAB EFFLUX PUMP LEADING TO FLUOROQUINOLONE RESISTANCE IN *SALMONELLA* AND FOOD SAFETY CONCERN IN POULTRY

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2025-PSC-58 **Abstract**

Salmonella enterica serotype typhimurium poses a major public health importance due to increasing antimicrobial resistance a major cause of enteritis and subclinical infections in poultry. In 2017 fluoroquinolone resistant salmonella was highlighted as prime concern by WHO. Salmonella is comprised of 9 multidrug efflux pump and AcrAb is one contributing to drug resistance consisting of 3 parts AcrB(inner membrane move substrate to outside of cell), AcrA (act as a bridge situated in periplasmic space) & TolC (outer membrane) all playing role in the excretion of broad range of antibiotics, bile salts and toxins outside of cell. AcrAb is regulated by mediators like ramA, Soxs, Rob, MarA and SidA which help the bacteria to resist against any antimicrobial result in clinical failure. RamA gene is repressed by a gene ramR(repressor gene), when ramR is mutated function of RamA is enhanced and it effectively outcast the effect of antimicrobials like fluoroquinolone leading to its resistance in poultry. Grasp on the topic efflux mediated resistance is crucial for the efficient approach to alleviate antimicrobial resistance. The review focuses how AcrAb efflux mediated pump has a potential role in the resistance of fluoroquinolone, antimicrobials and point out the necessity of diagnosis, active monitoring and innovative method to cope salmonella resistance.

Key Words: *Salmonella*, Rama Gene, Fluoroquinolone, Acrab Efflux Pump

PREVALENCE AND DISTRIBUTION OF KEY BACTERIAL AND MYCOPLASMAL DISEASES IN COMMERCIAL AND BACKYARD CHICKENS, SAHIWAL, PAKISTAN

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2025-PSC-59

Abstract

Poultry farming is a cornerstone of Pakistan's agriculture, yet its sustainability is threatened by bacterial diseases that reduce productivity and increase economic losses. This study investigated the prevalence of three major poultry diseases (Colibacillosis, Salmonellosis, and Mycoplasmosis) in broilers, layers, and backyard chickens in the Sahiwal region of Punjab, Pakistan. A total of 2400 samples (1200 broilers, 600 layers, and 600 backyard chickens) were collected from private farms. Standard bacteriological and biochemical tests were used for pathogen identification, while slide plate agglutination was employed for *Mycoplasma* detection. Epidemiological data on flock management and clinical signs were also recorded. Findings revealed that *Escherichia coli* was prevalent in 7.09 % of broilers, 5.98 % of layers, and 3.09 % of backyard poultry. *Salmonella* infections were higher, detected in 10.09 % of broilers, 20.47 % of layers, and 19.89 % of backyard birds. *Mycoplasma gallisepticum* was confirmed in 17.11 % of broilers, 1.59 % of layers, and 0.0068 % of backyard poultry. Seasonal peaks were observed during hot and humid months, correlating with poor management and biosecurity practices. This study highlights the endemic nature of these diseases in Punjab's poultry sector. Strengthening biosecurity, implementing targeted vaccination, and ensuring responsible antibiotic use are critical to minimize losses. The results provide baseline epidemiological data to guide disease control and support sustainable poultry production in Pakistan.

Key Words: Prevalence, Mycoplasmal diseases, Commercial chickens, Backyard chicken

NANOPARTICLE-BASED DELIVERY OF ESSENTIAL NUTRIENTS FOR IMPROVED BROILER PERFORMANCE

Author(s): Ayesha Attiq[1], Pakiza Aslam[1], Musfira Maryam[1], Tahira Liaqa[1]t, Maham Fatima[1], Saima Talib[1], Amjad Islam Aqib[1], Fatima Sabir[1]

[1] Cholistan University of Veterinary and Animal Sciences, Bhawalpur.

2025-PSC-60 **Abstract**

In recent years, research has explored innovative approaches to enhance nutrient delivery in broiler chickens. One promising avenue is the utilization of nanoparticles (NPs) for improved nutrient bio-availability. Nanoparticles can effectively deliver vitamins, minerals, amino acids, and other essential nutrients, leading to better absorption and utilization compared to traditional forms. These systems can reduce nutrient losses during digestion and minimize the environmental impact by decreasing the excretion of unmetabolized nutrients. Methionine is an essential amino acid and plays a crucial role in broiler nutrition. It is a building block for protein synthesis, supports feather development, and contributes to overall health. This bioassay evaluated the bioavailability of a novel methionine nanoparticle (nano-Met) relative to DL-methionine (DL-Met) in starting broilers. The study found that nano-Met positively impact body weight gain, breast meat yield, and thigh meat yield, while also reducing feed conversion ratio and malondialdehyde concentration in meat samples. The results suggest that reducing the particle size of DL-Met to nanoparticles could enhance the efficiency of methionine supplementation in broilers. By using nano-Met as a methionine source in broiler diets, producers can potentially improve the efficiency of nutrient utilization and enhance broiler performance. This can lead to better growth rates, carcass yield, and overall profitability.

Key Words: Broiler chickens, Nanoparticles, Methionine, Bioavailability, Carcass Yield

HARNESSING BACTERIOPHAGES AGAINST BACTERIAL INFECTIONS IN POULTRY: AN ANTIBIOTIC-FREE APPROACH

Author(s): Mohsin Khan[1], AI Aqib[1], Pakiza Aslam[1], Musfira Maryam[1], Ayesha Attiq[1], Tahira Liaqat[1], Tasleem Kausar[1], Sadia Zubair[1]

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2025-PSC-61 **Abstract**

Poultry production is a global industry heavily reliant on antibiotics, and minimizing their usage presents a significant challenge for the sector worldwide. Antibiotic resistance due to emergence of multi drug-resistant bacteria has become a serious concern as a result of overuse of antibiotics in poultry farming, necessitating the development of alternative strategies to control bacterial infections. Bacteriophages, viruses that specifically infect and lyse bacteria, have emerged as a promising solution. This context has explored the use of bacteriophages as a biocontrol agent in poultry production, highlighting their specificity, effectiveness, and safety. In contrast to antibiotics, bacteriophages target only specific bacterial strains, which minimize their impact on beneficial microbiota and reduce the likelihood of resistance development. Phages can be easily prepared and applied, are non-toxic to plants, animals and humans. Their minute size allows them access areas which are inaccessible to other drug molecules. Additionally, bacteriophages can be genetically modified to produce enzymes that target and breakdown biofilms produced by bacteria, facilitating their penetration and disruption of these barriers. They offer a targeted approach specifically aiming at harmful bacteria such as *Salmonella, Escherichia coli, and Campylobacter* which are responsible for numerous zoonotic diseases. Additional challenges, including the emergence of bacteriophages resistance, regulatory issues and the necessity for accurate phage-bacteria matching are also considered. Overall, bacteriophages offer a viable, eco-friendly substitute for antibiotics, with potential to advance poultry well-being and food safety. Nevertheless, sustained research and development, along with favourable regulatory frameworks, are necessary to completely unlock the potential of this innovative approach.

Key Words: Poultry production, Bacterial infection, Antimicrobial Resistance, Bacteriophages

ANTIMICROBIAL PEPTIDES: NOVEL STRATEGIES FOR CONTROLLING POULTRY PATHOGENS

Author(s): Amjad Islam Aqib[1], Fatima Sabir[1], Ayesha Attiq[1], Musfira Maryam[1], Pakiza Aslam[1], Tahira Liaqat[1], Saima Talib[1], Maham Fatima[1]

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2025-PSC-62

Abstract

The growing problem of antimicrobial resistance has driven the need to find alternative means of controlling poultry pathogens, among which antimicrobial peptides (AMPs) have come to the fore. AMPs are small, naturally occurring proteins that exhibit broad-spectrum antimicrobial activity against bacteria, viruses, fungi, and parasites. This abstract will probe into the potential of AMPs in poultry production by considering their mechanisms of action, efficacy, and practical applications. Such molecules hence offer a multifaceted approach to the control of pathogens, as AMPs disrupt many pathogen cell membranes, inhibit biofilm formation, and modulate host immune responses. AMPs, when used as feed additives or therapeutic agents in poultry, significantly reduce the incidence of common infections like Salmonella, E. coli, and Campylobacter, thereby improving health and productivity in a flock. Compared to the classic antibiotics, AMPs are less likely to induce resistance, hence providing a long-term, feasible solution. Based on these facts, the integration of AMPs into poultry management practices foretells a promising development toward food safety and a reduction in the use of conventional antibiotics within this sector. Further research into the optimization of AMP formulation, delivery methods, and cost-effectiveness would hold the key to its wide acceptance by the poultry industry.

Key Words: Amps, Poultry Pathogens, Broad-Spectrum Activity, Pathogen Cell Membranes

MITIGATING OXIDATIVE STRESS IN POULTRY THROUGH NUTRITIONAL INTERVENTIONS BY USING VITAMIN E FOR DEFICIENCY-RELATED DISORDERS

Author(s): Amjad Islam Aqib[1], Maham Fatima[1], Mohsin Khan[1], Musfira Maryam[1], Fatima Sabir[1], Pakiza Aslam[1], Ayesha Attiq[1], Sadia Zubair[1]

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2025-PSC-63

Abstract

Nutritional deficiencies leading to oxidative stress poses significant issues in poultry farming affecting both the welfare of birds and the economic aspects of production. The lack of essential nutrients such as vitamin A, C and E along with selenium and zinc play a significant role in the oxidative stress experienced by poultry. An imbalance between reactive oxygen species (ROS) and antioxidant defenses triggers oxidative stress, causing cellular damage and impaired health. Various studies have demonstrated that deficiencies in nutrients can worsen oxidative damage, compromise immune function, hinder growth rates and impact reproductive performance. As an illustration, insufficient vitamin E has been correlated with increased oxidative damage to cell membrane and a diminished immune response. To counteract these challenges, a range of nutritional interventions are developed to lessen oxidative stress linked to vitamin E deficiency. Approaches include integrating feed fortified with vitamin E, utilizing synthetic and natural vitamin E supplements, and augmenting the diet with polyunsaturated fatty acids that compliment vitamin E. Optimizing dietary level of selenium and other antioxidants can also bolster the effectiveness of vitamin E. Utilizing these dietary approaches can manage oxidative stress, boost poultry health, and increased overall production efficacy. Effective nutritional management is thus crucial for optimizing poultry welfare and sustaining productivity in the industry. Achieving optimal poultry welfare and sustaining industry productivity relies heavily on effective nutritional management.

Key Words: Nutritional Deficiencies, Oxidative Stress, Vitamin E, Immune Response

ENHANCING EGG PRODUCTION AND MANAGING GASTROINTESTINAL DISORDERS IN POULTRY THROUGH PROBIOTIC ADMINISTRATION

Author(s): Maham Fatima[1], Fatima Sabir[1], Saima Talib[1], Ayesha Attiq[1], Amjad Islam Aqib[1], Mohsin Khan[1], Musfirah Maryam[1]

[1] Cholistan University of Veterinary and Animal Sciences, Bhawalpur.

2025-PSC-64

Abstract

The administration of probiotics in poultry has become an effective approach for boosting egg production and addressing gastrointestinal issues. Probiotics, which are live microorganisms that provide health benefits when given in sufficient quantities, can enhance gut health and overall productivity in poultry. This study highlights recent findings on how probiotic supplementation affects egg production and gastrointestinal health in poultry. Evidence indicates that probiotics can boost egg production by optimizing feed conversion ratios, improving nutrient absorption, and altering the gut microbiota. Furthermore, probiotics have demonstrated the ability to decrease the occurrence of gastrointestinal disorders, like enteritis and dysbiosis, by restoring microbial balance and boosting the immune response. Important probiotic strains, such as Lactobacillus, Bifidobacterium, and Bacillus species, have proven effective in enhancing gut health and boosting reproductive performance. The study also covers the best practices for dosing, methods of administration, and possible challenges related to using probiotics in poultry. Overall, incorporating probiotics into poultry management practices offers substantial potential to enhance egg production efficiency and support gastrointestinal health, ultimately aiding in the advancement of sustainable poultry farming.

Key Words: Probiotics, Poultry Egg Production, Gastrointestinal Disorders, Gut Microbiota, Enteritis, Immune Response

THE CONTROL OF CONTAGIOUS POULTRY DISEASES BY THE USE OF VACCINES

Author(s): Fatima Sabir[1], Bushra Iqbal[1], Shabab Zahra[1], Sadia Zubair[1], Saima Talib[1], Maham Fatima[1], Tasleem Kausar[1], Amjad Islam Aqib[1], Mohsin Khan[1]

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2025-PSC-65

Abstract

Vaccines against infectious diseases in poultry are routinely used to prevent and manage these infections. By preventing or reducing the occurrence of clinical disease at the farm level, their usage in the production of chickens aims to increase productivity. Vaccines and vaccination programs are often overseen by the poultry industry and vary widely depending on a variety of local circumstances (such as the type of production, the local pattern of disease, expenses, and prospective losses). Modern poultry species, especially domesticated chickens, are more susceptible to disease because they have lost some of their ancestors' immune systems and defence mechanisms due to genetic selection favouring rapid growth, massive breast muscles, and egg production. Additionally, the fast appearance and spread of poultry diseases has been facilitated by environmental changes brought on by climate change, rendering the immune systems of poultry species incapable of defending the birds against illnesses and untimely death. Both the human population and the poultry industry suffered from the extensive and dispersed spread of zoonotic diseases like Avian Influenza (AI) and Newcastle disease (ND). In order to enhance the immune system of poultry birds and improve their welfare and productivity, several vaccination programs and procedures are used, either at the maternal level or before and after hatch. Therefore, vaccination ought to be implemented as part of national or regional programs to eradicate poultry diseases, overseen by the public veterinary services.

Key Words: Poultry, Vaccines, Diseases, Environmental Issues

OPTIMIZATION OF POULTRY PRODUCT QUALITY AND SAFETY: A CRITICAL REVIEW OF CURRENT ADVANCES AND FUTURE DIRECTIONS

Author(s): Maham Fatima[1], Saima Talib[1], Sadia Zubair[1], Fatima Sabir[1], Amjad Islam Aqib[1], Mohsin Khan[1], Tasleem Kausar[1]

[1] Cholistan University of Veterinary and Animal Sciences, Bhawalpur.

2025-PSC-66

Abstract

Vaccines against infectious diseases in poultry are routinely used to prevent and manage these infections. By preventing or reducing the occurrence of clinical disease at the farm level, their usage in the production of chickens aims to increase productivity. Vaccines and vaccination programs are often overseen by the poultry industry and vary widely depending on a variety of local circumstances (such as the type of production, the local pattern of disease, expenses, and prospective losses). Modern poultry species, especially domesticated chickens, are more susceptible to disease because they have lost some of their ancestors' immune systems and defence mechanisms due to genetic selection favouring rapid growth, massive breast muscles, and egg production. Additionally, the fast appearance and spread of poultry diseases has been facilitated by environmental changes brought on by climate change, rendering the immune systems of poultry species incapable of defending the birds against illnesses and untimely death. Both the human population and the poultry industry suffered from the extensive and dispersed spread of zoonotic diseases like Avian Influenza (AI) and Newcastle disease (ND). In order to enhance the immune system of poultry birds and improve their welfare and productivity, several vaccination programs and procedures are used, either at the maternal level or before and after hatch. Therefore, vaccination ought to be implemented as part of national or regional programs to eradicate poultry diseases, overseen by the public veterinary services.

Key Words: Poultry Products, Quality, Safety, Regulatory Frameworks, Industry Standards

EVALUATION OF EFFECTS OF POSTBIOTIC AND EGG YOLK POWDER SUPPLEMENTATION ON THE GROWTH PERFORMANCE, GUT HISTOMORPHOLOGY, AND GENE EXPRESSION OF BROILER CHICKENS

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2025-PSC-67

Abstract

The purpose of this study was to explore the useful effects of postbiotic and egg yolk powder on growth performance, intestinal histomorphology, and growth-related gene expression in boiler chickens. A total of 320 (Ross 308) mixed one-day-old chicks were acquired and randomly allocated to four experimental groups for 40 days; each experimental group was replicated four times with 20 chicks per replicate. Experimental groups were as follows: (i) control with only basal diet (Control), (ii) postbiotic +basal diet (PB), (iii) egg yolk powder +basal diet (EYP), and (iv) the combination of postbiotic and egg yolk powder (PB+EYP). Results showed that feed intake remained unaffected ($P<0.05$) except in weeks three and four, while significantly improved body weight and body weight gain were observed in the treatment groups (PB, EYP, and PB+EYP) compared to the control group. Treatment groups expressed better ($P<0.05$) feed conversion ratio (FCR), European production efficiency factor, and performance index than the control group. While findings about the gut histomorphology indicated that villus height (VH) and crypt depth (CD) of the duodenum, jejunum, and ileum, and VH: CD of the ileum only were significantly higher in the PB+EYP group. Growth hormone receptor (GHR) and insulin-like growth factor-1 (IGF-1) gene expression were up-regulated ($P<0.05$) in the PB+EYP treatment group compared to other treatment groups and the control group. Based on the findings of the current study, it can be concluded that the supplementation of postbiotic and egg yolk powder enhanced growth performance, gut histomorphology, and gene expression in broiler chickens.

Key Words: Broiler, Villus Height And Crypt Depth, Growth Hormone, Postbiotic, Performance Indices

MODERN LIGHTING TOOLS ENHANCING POULTRY WELFARE AND PRODUCTIVITY, THE ROLE OF 350–750 NM WAVELENGTHS IN ANIMAL PERFORMANCE.

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2025-PSC-68 **Abstract**

Lighting is emerging as a modern and powerful tool in poultry and livestock production, directly influencing animal welfare, productivity, and farm profitability. Our research in commercial poultry and dairy farms evaluates the role of controlled lighting climates (CLC) as an integral component of sustainable and efficient farming. In poultry, Controlled Environment Lighting (CEL) strategies regulate circadian rhythms, improve feed conversion ratios (FCR), and reduce stress. PICA broiler trials under blue (450–495 nm) and green (495–570 nm) light combinations demonstrated 3–5% improvement in body weight, 5–7% better flock uniformity, and 4–6% FCR improvement, with calmer behavior and lower mortality. CORAX breeders, exposed to targeted red light (620–660 nm), showed 4-6% higher fertility and hatchability rates. STERNA layers, managed under balanced blue-green growth light with red enrichment during laying, achieved 3–5% higher egg production and shell quality, while UVA (350-380 nm) supplementation reduced feather pecking and promoted natural behaviors. All trials were conducted using warm white (3000K) programmable LED systems with dawn-to-dusk simulation, controlled dimming, and spectrum tuning. These systems provided up to 60% energy savings compared to traditional lamps and offered robust IP67-rated durability, ensuring reliable operation in demanding farm environments. In dairy farming, prolonged exposure to blue-enriched white light increased milk yields by 8-12%, alongside reduced cortisol levels and improved cow behavior. The integration of CEL strategies across poultry and dairy has resulted in lower feed costs, higher production efficiency, and reduced veterinary expenses, while advanced LED systems deliver both biological and economic sustainability.

Key Words: Warm White 3000K, Dawn-To-Dusk Dimming, Breeder Fertility, Layer Egg Quality, Dairy Yield, Energy Efficiency, Ip67, Animal Welfare

DEVELOPMENT AND EVALUATION OF PROTECTIVE EFFICACY AND SAFETY OF GAMMA-IRRADIATED INACTIVATED VACCINE AGAINST FOWL TYPHOID

Author(s): Minahil Ashraf[1], Aamir Ghafoor[1], Muhammad Suleman[2], Masham Mukhtar[1], Muhammad Umer Farooq[1], Umar Bin Zahoor[1], Muhammad Hassan Mushtaq[3]

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2025-PSC-69 **Abstract**

Gamma-irradiated vaccines are emerging as safer alternatives to conventional live attenuated and inactivated vaccines. In this study, gamma-irradiated *Salmonella* Gallinarum (γ-SG) vaccine was developed from a local field isolate and its immunogenicity was evaluated in broilers. Radiation doses ranging from 1.5-10 kGy were evaluated and 7 kGy was optimized as the effective dose that completely inhibited replication while maintaining residual metabolic activity. For immunization-challenge experiment, broilers at 14 days of age were vaccinated twice at two-week intervals with γ-SG (oral), oil-based γ-SG (IM), oil-based formalin-inactivated SG (F-SG) and commercial SG 9R vaccine. Each vaccine was administered at a concentration of 2×10^8 CFU and SG 9R at 2×10^7CFU in 0.2 mL PBS. At three weeks post-vaccination γ-SG (Oral) showed the highest CD4+ T cell response (39.74%) compared with SG 9R (29.36%), γ-SG (IM) (20.2%) and F-SG (22.8%). CD8+ T cell response was elevated in γ-SG (Oral) (28.6%) compared with SG 9R (5.28%), γ-SG (IM) (19.7%) and F-SG (14.3%). IFN-γ concentrations were significantly elevated in γ-SG (Oral) (452.75 pg/mL) compared with SG 9R (307.5 pg/mL), γ-SG (IM) (334 pg/mL), and F-SG (221.75 pg/mL). A similar increase was observed in IgG antibody response, with γ-SG (Oral) eliciting the strongest response among the groups. Challenge study demonstrated complete protection with γ-SG (Oral) (100% survival), equivalent to SG 9R, whereas F-SG and γ-SG (IM) conferred partial protection with 40% and 20% mortality respectively, compared with 70% mortality in unvaccinated control. These findings underscore the potential of γ-SG (Oral) as a safe and promising vaccine candidate.

Key Words: Fowl Typhoid, Gamma Irradiated, Inactivated Vaccine, IgG, CD4+T Cells, CD8+T Cells

NUTRITION-SPECIFIC FEEDING STRATEGIES FOR ENHANCING POULTRY GUT HEALTH AND IMMUNE FUNCTION

Author(s): Saima Talib[1], Maham Fatima[2], Mohsin Khan[2], Sadia Zubair[2], Fatima Sabir[2], Tsleem Kausar[2], Amjad Islam Aqib[2], Mubeen Talib[1]

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2025-PSC-70

Abstract

This review explores the impact of specific nutrients on gut health and immune function in poultry. The gut microbiota plays a critical role in poultry health, influencing immune function, nutrient absorption, and overall well-being. Nutrition has a profound impact on gut health, with specific nutrients and feed additives demonstrating the ability to modulate gut microbiota and enhance immune responses. This comprehensive review examines the current state of knowledge on nutrient-specific feeding strategies for promoting poultry gut health and immune function. We delve into the mechanisms by which prebiotics, probiotics, and synbiotics influence gut microbiota composition and activity, and explore the role of vitamins and minerals in supporting immune function. The review also discusses the impact of nutrient-specific feeding strategies on key performance indicators, such as growth rate, feed efficiency, and disease resistance. Furthermore, we identify knowledge gaps and areas for future research, highlighting the need for a more understanding of the complex relationships between nutrition, gut health, and immune function in poultry. By providing a detailed examination of the evidence, this review aims to inform the development of effective feeding strategies for promoting poultry health and well-being.

Key Words: Nutrition, Gut Health, Immune Function, Microbiota

POULTRY FARMING: A NUTRITIONAL AND COMMERCIAL SOURCE

Author(s): Shabab Zahra[1], Fatima Sabir[1], Tasleem Kausar[1], Maham Fatima[1], Mohsin Khan[2], Saima Talib[2], Sadia Zubair[2], Mehreen Fatima[2], Amjad Islam Aqib[2], Bushra Iqbal[1]

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2025-PSC-71 **Abstract**

Poultry farming, raising birds domestically or commercially, not only, primarily for meat and eggs but also for feathers. Chickens, turkeys, ducks, and geese are of primary importance. It contributes greatly to supply of high-quality protein (meat and egg) for humans. The intensification and commercialization of the poultry sector is accelerated and continues to be so as a result of research discoveries in the field of breeding, nutrition, housing management and disease control. These research efforts are largely geared towards the following: improving genetic strains specialized for food use (meat and eggs) and regional conditions; improving knowledge of nutritional requirements and ability to match these for variable conditions; and ensuring stable environment for growth and production. So far, the objectives of nutritional research include selecting ingredients good for the growth of the bird, enabling conditions for the bird to express its full genetic potential, eliminating certain disease conditions, reducing the cost of production, maintaining product quality and allowing for partial alleviation of the adverse effects of environmental factors. Thus, advances in nutrition research are crucial if the poultry sector is to continue to play a major role in animal protein food production in meeting the needs of ever-increasing world. In a chicken farm, everything is beneficial. Even chicken manure can make money for us. Chicken and eggs are good sources of protein. Egg white can be used for food, medicine, paint, adhesive, printer ink, photography, binding and textile dyeing, etc. Egg yolk can be used to make cake mixes, soap, paint, shampoo, leather finishing and book binding, etc. Feathers can be used for fertilizers, pillows, mattresses. Egg shells can be used in mineral mixtures, fertilizers, decorations and animal feeds. The demand for broiler chicken in our market has encouraged more farmers to raise it on commercial scales that exclusively target meat. The industry is characterized by its flexibility and growth, with intensive farming methods offering increased production efficiency and profitability. However, it is essential to address challenges such as animal welfare, disease management, and environmental impact to ensure sustainable and responsible practices.

Key Words: Poultry, Nutrition, Protein Source, Commercial, Valuable Resource

GENOME EDITING: A PROMISING TOOL TO PROMOTE POULTRY PRODUCTION AND EXAMINE POULTRY INFECTIONS

Author(s): Sadia Zubair[1], Mohsin Khan[2], Saima Talib[1], Maham Fatima[1], Fatima Sabir[1], Tasleem Kausar[2], Amjad Islam Aqib[2]

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2025-PSC-72	Abstract

The chicken is a wonderful model for studying vertebrate developmental biology and a major source of protein for people all around the world. Poultry farming is important since it greatly improves household income and standard of living. Genome editing is a very potent technology that can significantly boost the output of poultry genetic resources (PGR). With the recent rapid development of precise genome-editing technologies mediated by the CRISPR/Cas9 system, it is now possible to produce genome-edited poultry models with unique features that have applications in agriculture, fundamental sciences, and the biomedical industry. The newest and most sophisticated gene-editing technique, CRISPR technology, enables scientists to target and change specific genes in the animal genome for purposes such as medication delivery, gene therapy, transcriptional regulation, and epigenetic alteration. Future developments in chicken productivity and health could be hampered by factors like climate change, decreased feed, restricted access to water, new avian diseases, and limitations on the use of antibiotics. The creation of innovative in vitro cell culture technologies and new genetic resources to study gene function will facilitate the research and development of innovative countermeasures against both established and emerging poultry diseases. Therefore, the advantage of using CRISPR to access genetic traits that would otherwise be unavailable for application in poultry production is made possible. Consequently, CRISPR/Cas9 emerges as a very potent and reliable method for modifying genes that permit the entry or control of genetic material in the genomes of chickens. However, in order to maximize its application in the chicken sector, a number of restrictions with the CRISPR/Cas9 technology must be overcome. With a primary focus on chicken, this study assesses and summarizes current developments in the application of CRISPR/Cas9 gene editing technology in poultry research. It also looks at how this technology might be used to improve poultry breeding and production and also reducing poultry infections. This could facilitate the application of CRISPR technology to enhance poultry production in the future.

Key Words:	Poultry, Nutrition, Protein Source, Commercial, Valuable Resource

IMPACT OF VARIOUS BROILER HOLDING PERIODS IN THE OPEN MARKET ON MEAT QUALITY, SENSORY PROPERTIES AND ECONOMIC LOSSES IN WINTER

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2025-PSC-73

Abstract

The study was conducted on birds subjected to four treatments of the wet market holding durations. The birds were kept for 0, 3, 6, and 9 hours after reaching the markets from the farms. The study was replicated in 03 shops with 10 birds in each holding duration, making a total of 120 birds. It was observed that increasing the holding duration of the birds resulted in a significant increase in the body weight loss of the birds. There was no effect on the feed contents present in the crop and gizzard due to various holding durations. The carcass % was also not affected due to holding durations. Meat lightness was higher in the 6-hour holding period, whereas redness and ultimate pH were higher in 6- and 9-hour treatments. Moreover, birds in these treatments had lower drip loss compared to other groups. The sensory panel liked the meat of birds slaughtered at 0 and 3 hours after arrival in the market. The meat of the birds slaughtered at 6 and 9 hours was in the disliked category. The same findings were also observed in the economic appraisal of the chickens, where 3 hours of holding were found to be optimum. It can be concluded that a 3-hour holding period in winter is optimum for broilers concerning meat quality, sensory properties, and economic losses.

Key Words: Economics, Holding, Sensory, Meat Quality

EFFECT OF ESSENTIAL OILS BLEND ON INTESTINAL HEALTH IN EXPERIMENTALLY CHALLENGED BROILER

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2025-PSC-74 **Abstract**

Recent ban on the use of antibiotics worldwide due to their harmful effects has made a shift towards herbal products being studied significantly as alternatives to the antibiotic growth promoters. Recently these herbal products have brought about a change in poultry medicine especially with multiple herbal ingredients being combined in a single product to increase the efficiency of the product. These ingredients being, but not limited to, Thymol, Carvacol, Eugenol, Cinnamaldehyde and Hydrogenated vegetable oils. These ingredients have showed antibiotic activities and growth promotion through various researches individually. This research is designed to evaluate the combination of these ingredients in a single product to maximize the growth efficiency of broilers under various stress/challenge conditions. A total of 75 A-grade day-old broiler chicks was purchased commercially and grown in the open-sided poultry house. The chicks was divided randomly into 3 groups A, B and C with 25 chicks in each group and one replicates in each group. The treatments was given to the respective groups after experimental infection upon arrival and continued during the whole-experiment. The product used in this challenge was commercially available is a mixture of essential oils to an innovative microencapsulation process. It acted as an intestinal barrier, stimulates immune system, improve microvillus protection, improves Lactobacillus activity, and stabilizes beneficial, intestinal bacteria. It is an antibiotic replacer. Provide protection against viral outbreaks like H9, IBD, NDV, and IB. increase the immunity, increase weight gain (FCR) up to 1 kg. Essential oils are having antiviral, antibacterial, antioxidant and antifungal properties. The results of this study indicated that consumption of modified essential oil was more effective when given as growth promoter in terms of better weight gain, improved FCR, and overall health status of the birds.

Key Words: Essential Oils, Antibiotic Replacer, Micro Encapsulation, Improved FCR

PHYSICOCHEMICAL AND MICROBIOLOGICAL QUALITY ASSESSMENT OF POULTRY DRINKING WATER IN AND AROUND LAHORE

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2025-PSC-75

Abstract

The disease burden in poultry farms poses a significant economic challenge, with contaminated water being one of the major contributing factors to disease transmission. Ensuring access to clean and safe water is therefore crucial for maintaining poultry health and productivity. In this study, a total of 50 water samples were collected from poultry farms in the Lahore region and evaluated for both microbiological and physicochemical quality. Key parameters analyzed included pH, turbidity, total dissolved solids (TDS), hardness, and the presence of harmful bacteria such as *Escherichia coli (E. coli)*. Microbiological analysis revealed that 28% of the samples were positive for *E. coli*. In terms of physicochemical properties, several samples exceeded recommended limits for TDS, pH, and total hardness. Overall, many of the tested water sources failed to meet established safety standards for consumption. These findings highlight the urgent need for regular monitoring of water quality and the adoption of improved hygiene practices in poultry farms. Implementing effective filtration, disinfection, and routine testing protocols can significantly mitigate waterborne risks, thereby enhancing flock health, improving productivity, and supporting the sustainability of poultry farming in the region.

Key Words: Drinking Water, Poultry, Physicochemical, *E. coli*

MOLECULAR CHARACTERIZATION OF INDIGENOUS *AVIBACTERIUM PARAGALLINARUM* ISOLATES AND OPTIMIZATION OF CULTURE CONDITIONS FOR VACCINE SEED PRODUCTION

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2025-PSC-76 **Abstract**

This study was conducted to isolate, identify, and rapidly detect *Avibacterium paragallinarum*, the causative agent of Infectious Coryza (IC), from layer chickens across various farms in Pakistan. A total of 46 isolates were recovered from 244 clinical samples obtained from 122 sick, moribund, or dead birds exhibiting typical signs of IC, such as mild swelling of the infraorbital sinuses and nasal mucus secretions. Two sampling strategies were employed: nasal swabs from live birds and infraorbital sinus swabs from moribund or freshly dead birds, with the latter yielding a higher number of viable isolates. Identification was performed using conventional culture techniques, biochemical characterization, species-specific PCR, and classical serotyping. Two types of swab samples were collected, one for direct PCR detection and the other for conventional diagnostic procedures. All isolates were confirmed as *Av. paragallinarum*, exhibiting NAD dependency and the inability to ferment galactose and trehalose. Direct PCR from swab samples demonstrated a higher detection sensitivity compared to PCR performed on colonies obtained via culture-based methods. Page serotyping revealed that all isolates belonged to Page serovar B. Among the different media tested, brain heart infusion supplemented with serum and NAD (BHI/SN) supported optimal bacterial growth, producing the highest colony-forming units (CFU) and achieving the maximum specific growth rate during the exponential phase at 8 hours post-inoculation. Overall, this study demonstrates that direct PCR from clinical swabs is a more accurate, rapid, and sensitive diagnostic approach compared to conventional culture-based methods. Furthermore, BHI/SN was identified as the most suitable medium for achieving maximum biomass of *Av. paragallinarum*, an essential requirement for vaccine seed production.

Key Words: *Avibacterium paragallinarum*, Avian Infectious Coryza, Brain Heart Infusion

COMPARATIVE EVALUATION OF COMMERCIAL AND AUTOGENOUS VACCINES AGAINST *AVIBACTERIUM PARAGALLINARUM* IN LAYER CHICKENS IN PAKISTAN

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2025-PSC-77	**Abstract**

Infectious coryza, an acute and highly contagious upper respiratory disease of chickens caused by *Avibacterium paragallinarum*, leads to substantial economic losses in the poultry industry. This study aimed to evaluate the efficacy, stability, and safety of autogenous bacterins and two commercially available vaccines against *A. paragallinarum* in layer chickens in Pakistan. A total of 100 six-week-old layer chickens were randomly allocated into 10 groups of equal size. The experimental groups were vaccinated with autogenous bacterins formulated with aluminum hydroxide or Montanide oil adjuvants containing 107, 108, and 109 CFU/0.5 ml/dose, alongside two commercial vaccines: Vaccine A (alum-based) and Vaccine B (mineral oil-based). Two control groups were maintained: a positive control (challenged but non-vaccinated) and a negative control (non-challenged and non-vaccinated). Booster doses were administered at 9 weeks of age, followed by an intrasinus challenge with *A. paragallinarum* at 12 weeks. Birds were monitored daily for 7 days post-challenge, and vaccine performance was assessed based on clinical signs, postmortem lesions, bacterial reisolation, protection rates, and vaccine stability after 3 and 6 months of storage at 4°C. The results demonstrated that autogenous bacterins with Montanide oil or alum gel adjuvants at 109 CFU/0.5 ml/dose, as well as commercial Vaccine A, provided the highest protection rates (95%, 90%, and 90%, respectively) and exhibited superior stability after storage. In conclusion, autogenous bacterins containing 109 CFU/0.5 ml/dose and commercial Vaccine A were found to be safe, stable, and highly effective in preventing *A. paragallinarum* infection in layer chickens when administered in two doses.

Key Words:	*Avibacterium paragallinarum*, Infectious Coryza, Vaccine

MOLECULAR DETECTION AND DRUG RESISTANCE PROFILING OF *CANDIDA ALBICANS* IN COLUMBIFORMES AND PSITTACIFORMES

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2025-PSC-78 **Abstract**

Candida albicans represents a major opportunistic fungal pathogen of increasing concern in avian medicine and zoonotic health, particularly among caretakers of captive birds and individuals exposed to feral pigeon populations. The present investigation was designed to determine the prevalence of medically relevant *Candida* species in captivity-maintained *Psittaciformes* and *Columbiformes,* as well as to evaluate their antifungal susceptibility patterns. A total of 100 avian samples were collected, comprising fecal (n = 20), cloacal (n = 15), and pharyngeal (n = 15) swabs from both parrots and pigeons. Primary isolation was performed on Sabouraud Dextrose Agar (SDA), followed by subculture for purification. Species-level confirmation was achieved through polymerase chain reaction (PCR)-based molecular identification. Antifungal susceptibility testing was conducted using disc diffusion assays in accordance with Clinical and Laboratory Standards Institute (CLSI) guidelines. Among pigeon samples (n = 50), *Candida albicans* was detected in 30%, whereas 22% of parrot-derived specimens yielded non-*albicans Candida* spp. The overall prevalence of *Candida albicans* across the dataset was 26%. Comparative statistical analysis using the z-test demonstrated no significant variation in the distribution of fungal isolates between sample types ($z > 1.96$; $\alpha = 0.05$). Antifungal susceptibility profiling indicated that *C. albicans* isolates exhibited highest sensitivity to voriconazole, clotrimazole, and amphotericin B, whereas fluconazole showed the lowest resistance profile. The findings underscore the epidemiological significance of avian candidiasis in Columbiformes and Psittaciformes, with implications for veterinary diagnostics, therapeutic decision-making, and public health risk mitigation in environments contaminated with avian excreta.

Key Words: *Candida albicans*, PCR, Antifungal Sensitivity Testing, Psittaciformes, Columbiformes

PHAGE–PROBIOTIC HYBRID STRATEGIES: A NOVEL FRONTIER FOR FOOD SAFETY AND AMR MITIGATION IN PAKISTAN'S POULTRY SECTOR

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2025-PSC-79

Abstract

The emergence of antibiotic resistance in the pathogens of agro-food animals represents critical challenges to poultry production systems worldwide, with particularly pressing implications for Pakistan's rapidly expanding industry. Reliance on conventional antibiotic-based approaches is increasingly unsustainable, highlighting the urgent need for innovative, non-antibiotic biocontrol strategies. This study introduces phage–probiotic hybrid interventions, which combine the pathogen-targeting specificity of bacteriophages with the gut-stabilizing and immune-modulatory benefits of probiotics. In controlled trials, hybrid administration achieved up to a 75% reduction in bacterial loads in comparison to untreated controls. Concurrently, enhancing intestinal integrity and nutrient absorption. Importantly, this dual approach also reduced horizontal transmission of pathogens within poultry houses, thereby lowering the risk of carcass contamination at slaughter. For Pakistan, where antibiotic residues and AMR-linked export rejections continue to constrain global market access, such hybrid strategies offer both public health and economic advantages. While large-scale adoption will depend on the development of cost-effective delivery systems and supportive regulatory frameworks, these findings demonstrate a promising pathway to mitigate AMR, strengthen food safety, and sustain the competitiveness of poultry exports.

Key Words: Phage–Probiotic Hybrids, Antibiotic Resistance, Poultry

BACTERIOCINS AS BIOCONTROL AGENTS AGAINST POULTRY-ASSOCIATED PATHOGENS: A SUSTAINABLE FOOD SAFETY STRATEGY FOR PAKISTAN

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2025-PSC-80 **Abstract**

The poultry industry in Pakistan is a cornerstone of national food security, yet it faces persistent challenges from emergence and re-emergence of food-borne pathogens such as *Salmonella enterica*, avian pathogenic *Escherichia coli* (APEC), and *Campylobacter jejuni*. This in turn not only compromises the flock health and productivity but also contribute significantly to antibiotic resistance and export rejections. Bacteriocins are ribosomally synthesized antimicrobial peptides produced by *Lactobacillus* and *Bacillus* species, offer a targeted, residue-free biocontrol strategy. In controlled *in-vivo* trials conducted in commercial broiler farms (n=10; 25,000 birds), bacteriocin-supplemented diets demonstrated a 1.5–2.0 $\log_{10}$ CFU/g reduction in cecal *Salmonella* and *E. coli* counts, and a 44% lower prevalence of *Campylobacter* at slaughter compared to conventional flocks. Importantly, farms supplementing bacteriocins reported a 32% reduction in prophylactic antibiotic usage, highlighting their role in antibiotic resistance mitigation. Given Pakistan's reliance on poultry as a primary protein source, bacteriocin-based interventions represent a scalable, cost-effective, and globally compliant food safety measure. Their integration into commercial feed formulations could substantially improve pathogen control, enhance consumer confidence, and align the Pakistan's poultry sector with international trade standards.

Key Words: Bacteriocins, Lactobacillus, Antibiotic Use

EFFECT OF DIETARY INCLUSION OF *ACACIA NILOTICA* AND *PONGAMIA PINNATA* PODS ON GROWTH PERFORMANCE OF BROILER CHICKENS

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2025-PSC-81

Abstract

Rising feed costs remain one of the biggest challenges in poultry production, contributing more than 60% of the total expenses. The use of locally available plant by-products as feed supplements offers a promising way to reduce costs and support sustainable production. This study investigated the potential of Acacia nilotica (AN) and Pongamia pinnata (PP) pods as dietary additives for broiler chickens. A total of 200 day-old Ross broilers were randomly divided into five groups (n=40). The control group (A) received a standard basal diet. Group A1 was fed AN pods, Group A2 received PP pods, Group B1 received soaked AN pods, and Group B2 received soaked PP pods, all in combination with the basal diet. Birds were raised under standard conditions for 42 days, and data on growth performance, feed intake, feed conversion ratio (FCR), carcass yield, and organ weights were collected. The findings revealed that the control and soaked AN group (B1) showed superior performance, with higher feed intake, body weight, and improved FCR compared to the other treatments. Inclusion of soaked AN also enhanced dressing percentage and provided better economic returns. In contrast, PP supplementation negatively affected growth and feed efficiency. Organ weights remained largely unaffected, except for liver weight, which was elevated in PP-fed groups. In conclusion, supplementation with soaked Acacia nilotica pods at 10 g/kg can be a beneficial, low-cost strategy to improve growth, feed utilization, and profitability in broiler production, whereas Pongamia pinnata pods appear less suitable as a feed additive.

Key Words: Broilers, *Acacia nilotica, Pongamia pinnata*, Growth Performance

MYCOPLASMA GALLISEPTICUM IN ASSOCIATION WITH IMMUNE RESPONSE OF NEWCASTLE DISEASE VIRUS IN BROILERS

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2025-PSC-82 **Abstract**

Respiratory diseases are responsible for major economic losses in poultry farms. Newcastle disease virus (NDV) infections cause huge economic losses in poultry industry especially in the presence of other co-infecting pathogens. The purpose of this study was to assess the less understood effect of *Mycoplasma gallisepticum* (MG) on the replication and immune responses of NDV in broiler chicken. Three-week-old commercial broiler chickens were inoculated with either NDV, MG or both etiological agents. The experimental groups were identified as follows: negative control (Group C), *Mycoplasma* challenged (Group M), NDV challenged (Group V) and virus and Mycoplasma challenged (Group V+M). Blood samples and swabs were collected on daily basis for two weeks. All infected birds showed positive results for NDV shedding, however, the pattern of virus shedding was different, with birds of the group V+M showing more pronounced virus shedding than the birds in the group V. In addition, birds of V+M group showed significant reduction in anti-AI antibody responses and interferon gene expression than the birds in the V group. The present study revealed that MG could facilitate replication of NDV by bringing alterations in immune responses.

Key Words: Broilers, Co-infection, Immunity, Newcastle Disease Virus

EFFICACY (HUMORAL IMMUNE RESPONSE) OF COMMERCIALLY AVAILABLE POULTRY VACCINE AGAINST NEWCASTLE AND AVIAN INFLUENZA VIRUSES IN PIGEONS (*COLUMBA LIVIA DOMESTICA*)

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2025-PSC-83

Abstract

The dual threats of Newcastle Disease (ND) and Avian Influenza (AI) pose significant challenges to pigeon health and productivity. This study evaluates the efficacy of the VRI-ND-FLU vaccine designed to provide protection against both ND and AI in pigeons. A cohort of pigeons was vaccinated with VRI-ND-FLU and monitored for serological response, clinical signs, and survival following exposure to virulent strains of ND and AI. Vaccinated pigeons demonstrated a robust humoral immune response, with significantly higher Hemagglutination inhibition (HI) titers compared to unvaccinated controls. Clinical observation confirmed reduced morbidity and mortality rates in the vaccinated group. Additionally, viral shedding was markedly lower in vaccinated pigeons, highlighting the vaccine's potential to mitigate viral transmission. These findings support the VRI ND-FLU vaccine as an effective tool in safeguarding pigeon populations against ND and AI, contributing to improved avian health and biosecurity.

Key Words: Humoral Immune Response, VRI-ND-FLU Vaccine, Newcastle Diseases, Avian Influenza

EVALUATION OF PLANT ESSENTIAL OIL FRACTIONS AGAINST UINOLONE-RESISTANT *CLOSTRIDIUM PERFRINGENS* TYPE A

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[1] Institute of Microbiology, University of Veterinary and Animal Sciences, Lahore.

2025-PSC-84 **Abstract**

Clostridium perfringens, an opportunistic pathogen affecting both humans and animals, is responsible for a range of diseases, including enteric infections and foodborne illness. This study examined the quinolone resistance profiles of C. perfringens Type A isolates and evaluated the antibacterial activity of plant-derived essential oils against resistant strains. Resistance screening revealed that eight out of nine isolates exhibited resistance to levofloxacin, pefloxacin, and nalidixic acid, while six were resistant to norfloxacin. The antibacterial potential of essential oils from *Cinnamomum verum, Elettaria cardamomum, Prunus dulcis, Nigella sativa,* and *Cuminum cyminum* was assessed. Among these, *C. verum* and *N. sativa* demonstrated the strongest inhibitory zones, warranting further investigation. Minimum inhibitory concentration (MIC) testing indicated significantly lower MIC values for *C. verum* (8.62 ± 2.93) compared with N. sativa (32.56 ± 17.41). Subsequent fractionation revealed that the n-hexane extract of *C. verum* showed the highest antibacterial activity (26.11 ± 4.38), followed by the n-hexane plus chloroform fraction (18.55 ± 3.80). For *N. sativa,* the ethyl acetate plus methanol fraction exhibited the greatest activity (14.55 ± 2.94). MIC values confirmed the superior potency of C. verum n-hexane fractions relative to *N. sativa* fractions. Cytotoxicity assays using baby hamster kidney (BHK-21) cells indicated that C. verum fractions had lower EC50 values compared to those of N. sativa, suggesting a more favorable safety profile. GC–MS analysis of C. verum identified key bioactive constituents, including oleic acid, 10-octadecenoic acid, cinnamaldehyde, and 2-propenoic acid. Overall, findings highlight C. verum, particularly its n-hexane fraction, as a promising natural antibacterial candidate against quinolone-resistant C. perfringens Type A.

Key Words: *Clostridium perfringens*, Cuminum, *Cinnamomum verum*, *Prunus dulcis*

ALPHA-TOXIN PRODUCTION CAPACITY AND ANTIBIOTIC RESISTANCE TRENDS IN POULTRY MEAT-DERIVED *CLOSTRIDIUM PERFRINGENS*

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2025-PSC-85

Abstract

The presence of *Clostridium perfringens (C. perfringens)* in meat products poses a substantial public health risk due to its established role in foodborne illness. This study investigated the prevalence, molecular characterization, toxinotyping, alpha-toxin production capacity, and antimicrobial resistance patterns of *C. perfringens* isolates recovered from meat samples obtained from diverse sources. An enzyme-linked immunosorbent assay (ELISA) was employed to screen sixty meat samples for alpha toxin, yielding a positivity rate of 13.3%, predominantly in raw poultry meat. Culture on Perfringens agar further identified nine samples harboring colonies characteristic of C. perfringens, mainly from raw poultry meat. Molecular confirmation via 16S rRNA gene amplification and sequencing authenticated twelve isolates as *C. perfringens,* with nine strains showing close genetic similarity to locally circulating isolates. Toxinotyping based on alpha toxin-specific gene detection confirmed all nine isolates as C. perfringens type A, with no evidence of beta or epsilon toxin genes. Hemolysis assays revealed variable alpha-toxin production among isolates, with strain accession number OQ721004.1 exhibiting the highest activity. Antimicrobial susceptibility profiling demonstrated multidrug-resistant (MDR) phenotypes across isolates, raising concerns for effective therapeutic management. Phylogenetic analysis provided insights into the genetic relatedness of the strains, revealing distinct clustering patterns that suggest evolutionary divergence within the population. Overall, the findings highlight the potential food safety threat posed by C. perfringens contamination in meat products, particularly raw poultry. The results emphasize the necessity for strengthened surveillance, routine monitoring, and improved control measures to reduce the risk of C. perfringens-associated foodborne outbreaks.

Key Words: *Clostridium perfringens*, ELISA, Alpha toxin

ANTIBACTERIAL ACTIVITY OF N-HEXANE (OLEIC ACID) FRACTION AGAINST QUINOLONE-RESISTANT *ENTEROCOCCUS FAECALIS* FROM POULTRY

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2025-PSC-86

Abstract

Quinolone-resistant *Enterococcus faecalis* represents an emerging threat in poultry-associated gastrointestinal infections. This study characterized ten resistant isolates confirmed by 16S rRNA sequencing. All isolates exhibited resistance to enrofloxacin, ofloxacin, ciprofloxacin, levofloxacin, and moxifloxacin. The antibacterial potential of selected plant essential oils was tested, with *Cinnamomum verum* demonstrating the strongest activity (zone of inhibition: 16.24 ± 0.23 mm; MIC: 9.31 ± 1.34 mg/mL). Fractionation of *C. verum* essential oil revealed that the n-hexane fraction provided the highest inhibition (26 ± 8.5 mm) and the lowest MIC compared to other solvent fractions. Cytotoxicity assays confirmed 56.85% cell death at 78.28 mg/mL for the n-hexane fraction. GC/MS analysis identified oleic acid (23.8%) as the key bioactive component. These findings highlight *C. verum* essential oil and its n-hexane fraction as promising natural alternatives for managing gastrointestinal infections caused by quinolone-resistant *E. faecalis*.

Key Words: *Cinnamomum verum*, *Enterococcus faecalis*, Quinolones, Oleic acid

MOLECULAR PROFILING OF MULTI-DRUG-RESISTANT *CLOSTRIDIUM PERFRINGENS* TYPE A FROM POULTRY MEAT AND BYPRODUCTS

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2025-PSC-87

Abstract

Despite significant advancements in food production technology, foodborne diseases (FBDs) remain a major public health challenge. This study aimed to evaluate the effectiveness of plant-derived essential oils against multi-drug-resistant *Clostridium perfringens* type A isolated from poultry meat and related products. A total of 60 poultry samples were screened by indirect ELISA, of which 8 (13.3%) tested positive for *C. perfringens* toxins. The highest prevalence was observed in raw poultry meat, followed by poultry byproducts, while no positive samples were detected in processed poultry meat. Out of 25 suspected isolates characterized by cultural, microscopic, and biochemical methods, 12 were identified as *C. perfringens*. Further confirmation through 16S rRNA gene amplification and sequencing validated 9 isolates as *C. perfringens* type A. Toxinotyping revealed that all confirmed isolates belonged to type A. Sequencing of the alpha toxin gene identified several mutations, some predicted to be deleterious, while others were classified as tolerated. SDS-PAGE analysis confirmed the presence of the alpha toxin protein at approximately 48 kDa. Hemolytic assays demonstrated maximum alpha toxin activity (10.66 ± 0.47) at 72 hours of incubation. Antibiotic susceptibility profiling indicated multi-drug resistance among isolates, highlighting the need for alternative therapeutic strategies. The antibacterial potential of selected essential oils was evaluated by the well diffusion method. *Cinnamomum verum* exhibited the strongest activity (15.33 ± 1.41 mm inhibition zone), followed by *Syzygium aromaticum* (11.77 ± 1.31 mm), *Eucalyptus globulus* (10.11 ± 1.52 mm), and *Nigella sativa* (10.11 ± 1.52 mm), while *Allium sativum* showed minimal activity (1.33 ± 1.56 mm). These findings suggest that *C. verum* essential oil has promising potential as a natural antimicrobial agent against multi-drug-resistant C. perfringens type A, warranting further in vivo evaluation.

Key Words: *Allium sativum, Eucalyptus globulus, Nigella sativa, Cinnamomum verum*

CHARACTERIZATION OF MULTI-DRUG-RESISTANT *SALMONELLA ENTERICA* ISOLATES FROM BROILER BIRDS WITH SUSPECTED FOWL TYPHOID

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2025-PSC-88 **Abstract**

Salmonellosis is one of the most prevalent foodborne diseases worldwide, with increasing concern due to multi-drug-resistant (MDR) strains of *Salmonella*. Phytochemicals, particularly essential oils, are being explored as potential alternative therapeutics. In this study, *Salmonella enterica* isolates (n = 15) obtained from suspected cases of fowl typhoid were characterized biochemically and confirmed by PCR. Antibiotic susceptibility profiling revealed resistance to multiple drugs, including ampicillin, amoxicillin, streptomycin, ciprofloxacin, enrofloxacin, tetracycline, erythromycin, chloramphenicol, and gentamicin. The antibacterial potential of selected plant essential oils was assessed against these MDR isolates. *Syzygium aromaticum* exhibited the highest activity, with a mean zone of inhibition (20.66 ± 1.02 mm) and the lowest MIC value (0.43 ± 0.12 mg/mL), followed by *Eucalyptus globulus* (16.67 ± 2.01 mm) and *Nigella sativa* (10.78 ± 2.03 mm). Fractionation of *S. aromaticum* oil by column chromatography yielded n-hexane, chloroform, n-hexane + chloroform, and ethyl acetate fractions. Among these, the n-hexane fraction demonstrated the lowest MIC (10.14 ± 5.91 mg/mL). Cytotoxicity assays using the BHK21 cell line indicated 55% cell survival at a concentration of 50.90 mg/mL of the n-hexane fraction. Gas chromatography–mass spectrometry (GC–MS) analysis identified benzene (30%) as the predominant active compound. Overall, *S. aromaticum* essential oil and its n-hexane fraction demonstrated promising antibacterial activity against MDR S. enterica isolates from fowl typhoid, supporting their potential as alternative therapeutics.

Key Words: *Eucalyptus globulus*, Gas Chromatography, Mass Spectrometry, Multidrug Resistance, *Salmonella enteric*

PCR-BASED DETECTION AND MUTATION DYNAMICS OF FUSION PROTEIN GENE OF ORTHOAVIULA VIRUSES SEQUESTERED DURING 2024 FIELD OUTBREAKS IN PAKISTAN

Author(s): Muhammad Danish Mehmood[1], Muhammad Ismael[1], Huma Anwar ul-Haq[1], Rida Tariq[2], Ahad Fayyaz[3] , Faisal Ameen[4] , Nadeem Sharif[5]

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2025-PSC-89

Abstract

To isolate and detect a Newcastle disease virus in commercial poultry, olecular characterization and phylogenetic analysis of the confirmed isolate and Multiple sequence alignment and achievement of accession numbers against our submissions in NCBI bankit. Materials and Methods: The partial fusion protein gene of the 14 NDV isolates during the 2024 outbreaks from different areas of Pakistan was determined and analyzed. The antigenic protein translational segment of the fusion gene nucleotide fragment was targeted with a specifically designed primer executed 202 bp size of predictable amplicon during PCR amplification. Result: The nucleotide sequence analysis of studied isolates showed closed similarity to the NCBI bankit numbers. Phylogenetic analysis revealed that 3 isolates belong to genotype II while, 2 isolates positions near genotype VIII of class II. The 6 isolates were located near genotype XVII and only 1 was presented on genotype V branch in calss II. Mutation analysis results revealed various mutations at nucleotide intervals and even found altered amino acids during translation. Conclusion: The results revealed that nucleotide mutation at various positions attributes amino acid substitution that enables wild prevailing strains to evade artificial active immunity. In such a scenario Chimeric and genotype match vaccines prepared from indigenous isolates may be useful in developing candidate vaccines to prevent virus shedding and infection. Further studies are suggested at molecular level to determine the consensus amino acid sequence for virulent, mesogenic, and avirulent prevailing NDV strains.

Key Words: Newcastle Disease Virus, Fusion Protein Gene, Phylogenetic Tree, Mutation Analysis

BEYOND ANTIBIOTICS: HOW GENOTYPE AND PRODUCTION SYSTEM SELECTION DIRECTLY IMPROVE MEAT QUALITY AND SENSORY ACCEPTABILITY

Author(s): Abdul Ghayas[1], Jibran Hussain[2], Shakeel Ahmad[1], Hafiz Muhammad Ishaq[3], Shahid Mehmood[2], Muhammad Hayat Jaspal[4], Sohail Ahmad[2], Waqas Ishaq[5], Muhammad Usman[2], Muhammad Waqas[2]

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2025-PSC-90	Abstract

This study evaluated the effects of genotype and production system on carcass characteristics, meat quality, and sensory attributes in chickens. A total of 720 birds from three genotypes i.e. Cobb-500, CobbSasso, and Rhode Island Red (RIR) were raised in either intensive or free-range production systems, with 36 replicates total. Data were collected on carcass traits (dressing percentage, cut-part yields, internal organ weights, intestinal length), breast muscle morphometrics (length, width, thickness) and histomorphometry (muscle fiber density and diameter), meat physicochemical parameters (pH, color, cooking loss, shear force), and sensory attributes. Statistical analysis was performed using a two-way ANOVA under a RCBD design in SAS. Results indicated that dressing percentage and breast muscle yield were significantly higher ($P \leq 0.05$) in fast-growing Cobb-500 birds under the intensive system. In contrast, wing yield was significantly higher in slow-growing RIR chickens raised in the free-range system. Drumstick yield was unaffected by either factor ($P > 0.05$). Organ weights varied by genotype and system: liver and heart percentages were significantly higher in free-range Cobb-500 ($P \leq 0.05$), while spleen and gizzard yields were greater in free-range RIR ($P \leq 0.05$). Meat quality was superior in RIR, exhibiting significantly improved color, lower pH change, and higher overall acceptability scores ($P \leq 0.05$) in sensory evaluation. Breast muscle dimensions were larger in intensively-reared Cobb-500 ($P \leq 0.05$). Histomorphometric analysis revealed significantly higher ($P \leq 0.05$) muscle fiber density in free-range RIR compared to intensive Cobb-500, which conversely exhibited greater fiber diameter. CobbSasso consistently demonstrated intermediate performance between Cobb-500 and RIR for most metrics. Overall, Cobb-500 provided higher carcass yield but inferior meat quality, whereas RIR produced lower yield but superior quality. Based on the combined assessment of meat yield, quality, muscle fiber structure, and sensory performance, CobbSasso was identified as the optimal genotype, particularly under a free-range production system.

Key Words: Fast Growing, Slow Growing, Muscle Fibre, Cobbsasso, Genotypes, Production Systems

EFFECT OF ESSENTIAL OILS BLEND ON INTESTINAL HEALTH IN BROILER EXPERIMENTALLY CHALLENGED WITH *SALMONELLA* AND *E. COLI*

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2025-PSC-91

Abstract

Herbal products are now being extensively researched as potential alternatives to antibiotic growth promoters as a result of recent global restrictions on the use of antibiotics due to their detrimental effects. Poultry medicine has changed recently as a result of these herbal treatments, particularly when many herbal elements are combined to boost the product's effectiveness. These components include, but are not restricted to, hydrogenated vegetable oils, eugenol, carvacol, thymol, and cinnamon aldehyde. Antiviral, antibacterial, antioxidant, and antifungal qualities are all possessed by essential oils. Numerous independent investigations have demonstrated the growth-promoting and antibiotic-like properties of these substances. The purpose of this study is to assess how well these components work together in a single product to optimize broiler growth efficiency under various stress/challenge conditions. A total of 50 A-grade day-old broiler chicks was purchased commercially and raised in the open-sided poultry house. The chicks were split into three groups, A, B, and C, at random. Each group contained 25 chicks and one replicate. The therapies was administered to each group upon arrival following experimental infection and continued for the duration of the experiment. The commercially available product used in this challenge was a blend of essential oils made using a cutting-edge microencapsulation technique. It stabilized good intestinal bacteria, improved microvillus protection, increased Lactobacillus activity, stimulated the immune system, and functioned as an intestinal barrier. It is a substitute for antibiotics. Offer defense against bacterial diseases such as Salmonella and Ecoli. Boost immunity and weight gain (FCR) by up to 1 kg. Antiviral, antibacterial, antioxidant, and antifungal qualities are all possessed by essential oils. According to the study's findings, using modified essential oil was more beneficial when administered as growth promoter in terms of the birds' overall health, increased weight gain, and enhanced FCR.

Key Words: Essential Oil, Microencapsulation, Growth Promoters

EVALUATION OF ARUGULA (*ERUCA SATIVA*) SEEDS AS A NATURAL THERAPEUTIC FOR MANAGING FOWL POX IN POULTRY

Author(s): Muhammad Aftab[1], Aneela Zameer Durrani[1], Hafiz Nouman Zaheer[1], Sadia Sanaullah[1]

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2025-PSC-92

Abstract

Fowl pox is a contagious viral disease in poultry characterized by cutaneous and diphtheritic lesions, leading to reduced productivity and economic losses. Alternative, herbal-based therapies are gaining attention as sustainable options to minimize dependency on synthetic drugs. To evaluate the therapeutic potential of arugula (*Eruca sativa*, locally known as Taramira) seeds in managing fowl pox in poultry. A total of 100 clinically affected birds were administered a treatment consisting of 100 g of freshly ground arugula seeds mixed in drinking water daily for 7 consecutive days. Clinical progress was monitored through lesion assessment, spread of infection, feed intake, and overall health status. Birds receiving the arugula seed treatment demonstrated a marked reduction in lesion severity and spread within the treatment period. Normal feed intake and activity levels were maintained, with no adverse effects observed. The therapeutic effect is attributed to bioactive phytochemicals in arugula seeds, potentially possessing antiviral activity. Arugula seeds show promising efficacy as a natural, cost-effective, and sustainable therapeutic option for controlling fowl pox in poultry. Adoption of such herbal interventions could support organic poultry production and reduce reliance on conventional pharmaceuticals.

Key Words: Fowl Pox, Poultry Health, Sustainable Disease Management

ZOONOTIC AND FOODBORNE RISKS OF POULTRY PRODUCTION IN SOMALIA: A ONE HEALTH PERSPECTIVE

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2025-PSC-93 **Abstract**

Poultry farming has emerged as one of the most dynamic and rapidly expanding livestock sectors worldwide, offering an important source of low-cost animal protein and generating livelihood opportunities to millions of households. In Somalia, the poultry production is getting appreciated more as the basis of household food security and a way to lower the dependence on imports of animal-source foods. The industry is, nevertheless, mainly informal, with a poor infrastructure, ineffective veterinary services and poor biosecurity practice. These gaps result in an enabling situation that allows the transmission of zoonotic and foods borne pathogens such as Salmonella, Campylobacter, avian influenza virus, and multidrug-resistant bacteria. Unsafe methods, which include unhygienic slaughter, lack of cold-chain facilities, and lack of handling caring of eggs and poultry meat, and unregulated use of antimicrobials also increase risks to the health of the population. The consequences are particularly concerning in Somalia, where fragile healthcare and veterinary systems, compounded by the absence of disease surveillance and reporting mechanisms, make detection and control of outbreaks highly challenging. This review collates what is known of Somalia and other relevant regional situations to provide evidence of zoonotic or foodborne risks of poultry production. It highlights the amplified imperativeness of a One Health strategy in which human health, animal health, and environmental health sectors are connected. Improved disease surveillance, the regulatory system of antimicrobial consumption, education of farmers and consumers and community based biosecurity strategies are important actions. Addressing these challenges will not only safeguard public health but also support the sustainable growth of Somalia's poultry sector, ensuring it contributes positively to nutrition security and economic resilience.

Key Words: Poultry production, Zoonoses, Foodborne diseases, Somalia, One Health

CAN FEEDSTUFFS ACT AS A CARRIER OF AVIAN INFLUENZA VIRUS (AIV) BETWEEN FEED MILLS AND POULTRY FARMS?

Author(s): Shahan Azeem[1,2], Yuko Sato[3], Baoqing Guo[3], Anna Wolc[4,5], Hanjun Kim[3], Hai Hoang[1], Mahesh Bhandari[1], Kathleen Mayo[1], Jian Yuan[3], Jihun Yoon[6], Phillip C. Gauger[3], and Kyoung-Jin Yoon[1,3]

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2025-PSC-94

Abstract

The study evaluated the potential role of feedstuffs for the AIV area spreading. Firstly, feed samples were collected from the US Midwestern commercial poultry facilities that experienced highly pathogenic avian influenza (H5N2) in 2014–2015 and tested for AIV by a real-time RT–PCR targeting the viral matrix gene. Secondly, layer mash obtained from an AIV-negative farm was spiked with various concentrations of a low pathogenic AIV (H5N2). Virus-spiked cell culture media were used for comparison. The spiked samples were tested by the real-time RT–PCR in a quantitative manner, either immediately or after incubation at −20, 4, 22, and 37 ◦C for 24, 48, and 72 hours. Some feedstuffs from the poultry facilities/feed mills were positive for AIV RNA but negative by virus isolation, while all the formaldehyde-treated feedstuffs were PCR-negative. AIV titers in the spiked feeds were 1–3 logs lower than in the corresponding media, even when tested immediately after spiking, suggesting that the feed might have a negative impact on the virus/PCR detection. The half-life of AIV RNA was shorter at a higher temperature. A significant decay in the viral RNA over time was noted at 37 ◦C ($p < 0.05$), suggesting the crucial role of maintaining the cold chain when testing is desired. The thermal degradation of AIV indicates that the heat treatment of feeds may be an alternative to chemicals when contamination is suspected. In summary, AIV survivability in feed is relatively low, thus rendering it a low risk.

Key Words: Feed, Complete Layer Mash, Real-Time Polymerase Chain Reaction, Half-Life

A NOVEL QUICK LYSIS APPROACH FOR ON-SITE AVIAN DNA EXTRACTION: APPLICATIONS IN SEXING, GENOTYPING, AND DISEASE SURVEILLANCE

Author(s): Ihsan Ullah[1], Misbah Rani[1], Muhammad Osama[1], Muhammad Shahan Anwar[1], Sumbal Tariq[1], Amina Afzal[1], Aisha Arif[1], Mohammad Sheraz Yasin[1], Abdullah Arif Saeed[1]

[1] Institute of Biochemistry and Biotechnology, University of Veterinary and Animal Sciences, Lahore

2025-PSC-95 **Abstract**

We present the first field-ready, large-scale, validated DNA extraction method for avian research. This patented quick lysis protocol recovers PCR-ready DNA from feathers, egg membranes, saliva, and blood in just 10–15 minutes, using minimal input (as little as 1 µL of liquid sample or a single feather). Requiring only three compact instruments, it is optimized for mobile and resource-limited laboratories, enabling molecular diagnostics directly in the field.Tested on more than 200,000 samples across diverse bird species, the method achieved >99.9% accuracy in sex determination, with DNA quality and reproducibility comparable to conventional extraction techniques. PCR products generated were successfully Sanger sequenced, confirming equivalence to standard laboratory workflows. Beyond sexing, the protocol supports genotyping and pathogen detection, including polyomavirus, poxvirus, and Psittacine Beak and Feather Disease (PBFD) virus, highlighting its broad diagnostic utility.Field trials with portable, battery-operated devices further demonstrated robust performance under remote and resource-limited conditions. By dramatically reducing processing time and infrastructure requirements, this approach removes key barriers to molecular analyses outside traditional laboratories.This quick lysis method provides a scalable and portable platform for avian genetics, conservation, and disease surveillance. It advances animal welfare and breeding management while enabling rapid, evidence-based decision-making in both wild and captive bird populations.

Key Words: Remote PCR, Poultry DNA, Pathogen Testing, Gender Identification

EFFECTS OF ENCAPSULATED BUTYRIC ACID ON GROWTH PERFORMANCE, CARCASS CHARACTERISTICS AND NUTRIENT DIGESTIBILITY IN BROILER

Author(s): Saleh Shahbaz[1], Riaz Mustafa[1], Muhammad Auon[1], Umar Farooq[1], Muhammad Farooq Khalid[1], Muhammad Usman[1], Wasif Shafique[1], Hafiz Abdul Latif[1], Urooj Khan[1], Zia-ur-Rehman[1], Muhammad Tariq[1], Muhammad Ashraf[1], Roma Saleem[1], Farwa Tariq[1], Maliha Sarfraz[1], Farukh Ameen[1], Kiran Hussain[1], Muhammad Mushahid[1], Hafiz Bilal Murtaza[1]

[1] University of Agriculture, Faisalabad Constituent College Toba Tek Singh.

2025-PSC-96	Abstract

This study investigated the impact of dietary supplementation with encapsulated butyric acid on growth performance, nutrient digestibility, carcass characteristics, and organ development in broiler chickens. A total of 360-day-old chicks were randomly allocated to four dietary treatments: a control group (T1) receiving a basal diet, and three treatment groups supplemented with encapsulated butyric acid at 0.2 ml/kg (T2), 0.3 ml/kg (T3), and 0.4 ml/kg (T4) of feed. The results revealed that butyric acid supplementation significantly improved body weight gain and feed conversion ratio ($p < 0.05$), with the T4 group achieving the highest weight gain (2338.78 g) and most efficient FCR (1.34). Apparent digestibility of dry matter, crude protein, ether extract, crude fiber, and ash was also significantly enhanced in the supplemented groups ($p < 0.05$), particularly in T4. Carcass yield parameters, including dressing percentage, carcass percentage, breast, and thigh yield, exhibited marked improvements with increasing supplementation levels, while non-significant differences were observed in head and wing proportions. Among visceral organs, only liver weight showed a significant increase ($p = 0.034$), whereas heart, gizzard, spleen, lungs, pancreas, and proventriculus weights remained unaffected ($p > 0.05$). In conclusion, the inclusion of encapsulated butyric acid in broiler diets resulted in enhanced growth performance, nutrient utilization, and carcass quality without adversely affecting internal organ development, supporting its potential as a functional feed additive in poultry production.

Key Words:	Butyric Acid, Cobb®, Encapsulated, FCR, Carcass, Nutrient Digestibility

DEVELOPMENT AND PROSPECTS OF *ESCHERICHIA COLI* VACCINE VARIANTS:A REVIEW FROM A PAKISTANI PERSPECTIVE

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[1] University of Jhang.
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2025-PSC-97 **Abstract**

Escherichia coli (*E. coli*) is a very common bacterium present in the intestines of humans and animals. While many strains are harmless, some are pathogenic and can cause diarrhea, urinary tract infections, and septicemia in humans, as well as colibacillosis in poultry and neonatal calf diarrhea in livestock. These infections not only harm health but also cause economic loss. In Pakistan, *E. coli* infections are very common, especially in the poultry and dairy industries. Antibiotic resistance has also increased due to excessive use of antibiotics making treatment more difficult. This problem highlights the urgent need for vaccine development. A vaccine Variant is a weakened or modified form of *E.coli* that cannot cause disease but can still stimulate the immune system. By exposing the body to this safe strain, the immune system "learns" to recognize and fight the harmful bacteria in the future. The process of developing a vaccine candidate begins with isolating local pathogenic *E. coli* isolates identifying them through laboratory and molecular techniques and then modifying them either through inactivation, attenuation or recombinant methods. Such candidates are then tested for safety, stability, and their ability to produce an immune response. In Pakistan, most research has focused on identifying *E. coli* and testing antibiotic resistance, but very little work has been done on vaccine development. Developing local vaccine strains is more effective than relying on imported ones, as they are better matched with local pathogens. This could reduce disease, improve animal health, lower antibiotic use, and control resistant strains. Preparing an *E. coli* vaccine will be an important step for Pakistan's health and agriculture sectors. It will safeguard animals and humans from *E.coli* infections, healthcare costs, and promote local microbiological research.

Key Words: *Escherichia coli*, Vaccine Variants, Vaccine Development

COMPARATIVE EFFICACY OF SINGLE VERSUS THREE-STRAINS PROBIOTIC ON GROWTH PERFORMANCE, NUTRIENT DIGESTIBILITY AND GUT HEALTH IN BROILERS

Author(s): Taimoor Hassan[1], Riaz Mustafa[1], Maliha Sarfraz[1], Zia-ur-Rehman[1], Umar Farooq[1], Muhammad Farooq Khalid[1], Muhammad Auon[1], Hafiz Abdul Latif[1], Urooj Khan[1], Muhammad Usman[1], Wasif Shafique[1], Muhammad Tariq[1], Muhammad Mushahid[1], Hafiz Bilal Murtaza[1], Muhammad Ashraf[1], Roma Saleem[1], Farwa Tariq[1], Farukh Ameen[1], Kiran Hussain[1], Ayesha Akram[1], Syed Ali Imran[1], Sohaib Nawaz[1]

[1] University of Agriculture, Faisalabad Constituent College Toba Tek Singh.

2025-PSC-98 **Abstract**

The present study was designed to examine the effects of encapsulated butyric acid on growth performance, carcass characteristics, and nutrient digestibility in broilers. A total of 360-day-old Ross-308® chicks were randomly assigned to four dietary treatments, each comprising 9 replicates with 10 birds per replicate. The treatments included T1 (basal diet without encapsulated butyric acid), T2 (0.2 ml of encapsulated butyric acid/kg of feed), T3 (0.3 ml of encapsulated butyric acid/kg of feed) and T4 (0.4 ml of encapsulated butyric acid/kg of feed). The experimental period lasted for 35 days. Data on feed intake, body weight gain and feed conversion ratio were recorded on a weekly basis. Nutrient digestibility was determined on day 35 of the trial using the indirect marker method. Carcass characteristics, including carcass yield (%), breast yield (%), thigh yield (%) and organ weights such as heart (%), liver (%), gizzard (%), pancreas (%) and proventriculus (%) were also assessed on day 35. Mortality percentage was recorded throughout the trial. The collected data were analyzed using the General Linear Model procedure in Minitab and treatment means were statistically compared using Tukey's test. The results showed that no significant differences ($p>0.05$) were observed among treatments in body weight gain (BWG), feed intake (FI) and feed conversion ratio (FCR) during the first week. Similarly, FCR remained statistically unaffected during weeks 3 and 4. However, significant differences ($p<0.05$) were noted among treatment groups during the overall performance period (1-35 days). Similarly, nutrient digestibility at day 21st and 35th was enhanced ($p<0.05$) with supplementation of butyric acid as compared to control group. Carcass characteristics such as dressing%, carcass%, breast%, and thigh% were showed significant ($p<0.05$) results while head% and wings% showed no significant ($p>0.05$) results. Organ characteristics such as gizzard% and liver% were significant ($p>0.05$) results while heart%, spleen%, lungs%, pancreas% and proventriculus were not effected ($p<0.05$) by the supplementation of butyric acid.

Key Words: Ross-308®, Butyric Acid, Gut Health

HISTOMORPHOLOGICAL EFFECTS OF A PHYTOBIOTIC BLEND ON THE IMMUNE ORGANS OF COCCIDIOSIS ASSOCIATED BROILERS

Author(s): Arfa Iqra[1], Saima Masood[1], Mirza Muhammad Usman[1], Abdullah Arif Saeed[2], Saima Ashraf[1], Sahar Ijaz[1], Ayesha Masood[3]

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[3] Department of Anatomy and Histology, The Islamia University, Bhawalpur.

2025-PSC-99

Abstract

The present study was designed to examine the effects of encapsulated butyric acid on growth performance, carcass characteristics, and nutrient digestibility in broilers. A total of 360-day-old Ross-308® chicks were randomly assigned to four dietary treatments, each comprising 9 replicates with 10 birds per replicate. The treatments included T1 (basal diet without encapsulated butyric acid), T2 (0.2 ml of encapsulated butyric acid/kg of feed), T3 (0.3 ml of encapsulated butyric acid/kg of feed) and T4 (0.4 ml of encapsulated butyric acid/kg of feed). The experimental period lasted for 35 days. Data on feed intake, body weight gain and feed conversion ratio were recorded on a weekly basis. Nutrient digestibility was determined on day 35 of the trial using the indirect marker method. Carcass characteristics, including carcass yield (%), breast yield (%), thigh yield (%) and organ weights such as heart (%), liver (%), gizzard (%), pancreas (%) and proventriculus (%) were also assessed on day 35. Mortality percentage was recorded throughout the trial. The collected data were analyzed using the General Linear Model procedure in Minitab and treatment means were statistically compared using Tukey's test. The results showed that no significant differences ($p>0.05$) were observed among treatments in body weight gain (BWG), feed intake (FI) and feed conversion ratio (FCR) during the first week. Similarly, FCR remained statistically unaffected during weeks 3 and 4. However, significant differences ($p<0.05$) were noted among treatment groups during the overall performance period (1-35 days). Similarly, nutrient digestibility at day 21st and 35th was enhanced ($p<0.05$) with supplementation of butyric acid as compared to control group. Carcass characteristics such as dressing%, carcass%, breast%, and thigh% were showed significant ($p<0.05$) results while head% and wings% showed no significant ($p>0.05$) results. Organ characteristics such as gizzard% and liver% were significant ($p>0.05$) results while heart%, spleen%, lungs%, pancreas% and proventriculus were not effected ($p<0.05$) by the supplementation of butyric acid.

Key Words: Ross-308®, Butyric Acid, Gut Health

EFFICACY OF NATURAL VS. SYNTHETIC ANTIOXIDANTS IN MITIGATING OXIDATIVE STRESS IN AGING LAYING HENS

Author(s): Umar Farooq[1], Fahad Mustafa[1], Muhammad Farooq Khalid[1], Muhammad Auon[1], Riaz Mustafa[1], Urooj Khan[1], Hafiz Rao Abdul Latif[1], Zia-ur-Rehman[1], Muhammad Tariq, Maliha Sarfaraz[1], Farwa Tariq[1], Roma Saleem[1], Shahid Mehmood[2], Jibran Hussain[2], Muhammad Usman[2], Muhammad Ashra[1], Muhammad Mushahid[1], Wasif Shafique[1]

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2025-PSC-100

Abstract

Oxidative stress is a major challenge in aging laying hens due to the natural decline in physiological functions, resulting in reduced production, compromised eggshell quality, weakened immunity, and significant economic losses. This study evaluated the effects of natural and synthetic antioxidants on productive performance and oxidative stress in old-age layers. A total of 240 Hy-Line Brown hens (50 weeks old) were randomly allotted into four dietary treatments: A) basal diet without antioxidants, B) basal diet plus vitamin E and selenium, C) basal diet plus antioxidant formulation-1, and D) basal diet plus antioxidant formulation-2. Each treatment consisted of three replicates of 20 birds. The trial lasted 10 weeks, during which weekly egg production and shell quality were recorded. Blood samples were collected at 0, 6, and 10 weeks for hematological, serological, immunological, and oxidative stress analyses. Results indicated that natural antioxidant supplementation significantly enhanced hen-day egg production (by 0.13%), improved shell strength, albumin height, and yolk color, and increased antioxidant enzyme activities (SOD, CAT, peroxidase). Synthetic antioxidants showed moderate benefits but posed minor toxicity risks at high inclusion levels. Hematological and biochemical profiles remained stable in treated groups, indicating improved physiological resilience. Overall, natural antioxidants were superior to synthetic ones in sustaining productivity, improving egg quality, and delaying age-related decline in commercial laying hens.

Key Words: Egg Production, Egg Shell Quality, Stress, Albumen Height

AN ASSESSMENT OF VARIOUS DISINFECTANTS USING THE KIRBY-BAUER METHOD WITH DISC DIFFUSION TO DETERMINE THEIR EFFECTIVENESS AGAINST LOCALLY ISOLATED PATHOGENS

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2025-PSC-101 **Abstract**

This study aimed to assess the effectiveness of various disinfectants against locally isolated pathogens using the Kirby-Bauer Method with disc diffusion. Indigenous strains of Salmonella typhimurium, E. coli, Campylobacter, Citrobacter freundii, and Staphylococcus aureus were obtained from the bacterial depository bank and sub-cultured on their respective selective media.

A 0.5 McFarland Turbidity Standard was prepared, and eight commercially available disinfectants were tested for efficacy. The results of this study will inform the selection of appropriate disinfectants for use in preventing the spread of disease in various settings, including home sanitation, healthcare, and industrial manufacturing processes. The disinfectants used in this study produced different results against the targeted pathogens. Hydrogen peroxide and Formalin produced larger zones of inhibition, while Povidone Iodine and Hydrochloric acid produced intermediate zones. Ethanol, Methanol, and Dettol produced smaller .zones of inhibition. Benzalkonium Chloride was effective only against S. aureus, while all other indigenous isolates resisted it.

Key Words: Disinfectants, *S. typhimurium*, *E.coli*, Antibiotic Sensitivity Test

MODULATION OF GROWTH PERFORMANCE AND ORGAN MORPHOLOGY BY PHYTOBIOTIC BLEND IN COCCIDIOSIS CHALLENGED BROILERS

Author(s): Saima Masood[1], Arfa Iqra[1], Muhammad Khalil Ateeq[1], Muhammad Usman[1], Saleem Qaiser[1], Easha Tur Razia[1]

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2025-PSC-102

Abstract

Coccidiosis, a parasitic disease disrupts health and significantly impacts broiler productivity. Due to increasing concerns over drug resistance and chemical residues in poultry meat, herbal alternatives such as phytobiotics have gained attention. The study aimed to evaluate the efficacy of a phytobiotic blend comprising clove, cinnamon, and oregano addition in diet in mitigating the organ damage caused by coccidiosis. A total of 100 a day-old Ross broilers were randomly divided to five groups (n=20): A1 (control), A2 (phytobiotic blend), A3 (phytobiotic blend + coccidiosis), A4 (coccidiosis), and A5 (amprolium + coccidiosis). The birds were sampled at day 35 and organs were collected for morphological analysis. The results revealed significant differences ($P<0.05$) in body weight gain among groups, with group A2 showing increased growth performance. Feed conversion ratio (FCR) also improved significantly ($P<0.05$) in the A2 group compared to control group. Significant differences ($P<0.05$) were noted in the relative weights of body organs. Phytobiotics group showed low heart weight, while rise in bursa and liver weight was observed as compared to the control group. However, the liver and bursa weight was significantly ($P<0.05$) higher in A4 than in A1, indicating pathological stress. No significant changes were observed in spleen weight across the treatments. Thus, phytobiotic blend supplementation improved growth performance indicators and reduced the severity induced by coccidiosis, suggesting herbal alternative to conventional strategies.

Key Words: Coccidiosis, Phytobiotics, Growth Performance, Broilers

NATURAL ALTERNATIVES FOR ANTIMICROBIAL RESISTANCE: ROLE OF MANUKA HONEY IN FANCY BIRD WOUND HEALING

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2025-PSC-103

Abstract

Antimicrobial resistance (AMR) has grown into an urgent issue worldwide, enticing researchers to look for sustainable alternatives to conventional antibiotics in both human and animal medicine. Honey, which has been used for eras in traditional wound care, has come back as a therapeutic agent due to its broad-spectrum antibacterial and tissue-healing abilities. Among the numerous versions, manuka honey, derived from Leptospermum scoparium, is particularly regarded for its non-peroxide antibacterial effects, related to methylglyoxal (MGO), which remains effective regardless of the presence of tissue enzymes and fluids. Wound healing is a vital component of chicken welfare management, particularly in fancy birds where infection risk is elevated. Through a number of processes, including improving hemoglobin's ability to release oxygen, blocking bacterial proteases, lowering inflammation, and removing lymph from tissues to aid in autolytic debridement, manuka honey aids in healing. Along with , Nutritional suppliments Biotin and Omega three fatty acids play a crucial role. By promoting tissue regeneration and lowering the risk of infection, these measures produce a moist, antibacterial wound environment that lessens the need for antibiotics.

Key Words: Manuka Honey, Antimicrobial Resistance, Fancy Bird

COMPREHENSIVE CHARACTERIZATION OF PHENOTYPIC TRAITS, GENETIC DIVERSITY, AND ANTIBIOTIC RESISTANCE PROFILES OF *SALMONELLA* SEROVARS IN POULTRY FARMS ACROSS PAKISTAN DURING 2024-2025

Author(s): Muhammad Danish Mehmood[1], Muhammad Usman Ghani[1], Huma Anwar ul Haq[1], Sawaira Sabir[1], Muhammad Ismail[1]

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2025-PSC-104 **Abstract**

Salmonellosis is a leading cause of gastrointestinal foodborne illness globally, resulting in significant losses to the poultry industry. This study focused to isolate, purify, and characterize *Salmonella* species from chickens affected during natural outbreaks in commercial poultry farms across Pakistan during 2024 - 2025. Fifty deceased birds were randomly selected from each of 15 farms in Punjab and Sindh provinces. Liver and cloacal swabs from birds with typical lesions were cultured on Salmonella-Shigella agar (SSA), Xylose-Lysine Deoxycholate agar (XLD), and CHROM agar (CA). DNA was extracted from isolates and amplified using *flhB*-specific primers. Sequences were analyzed via the NCBI portal, and phylogenetic relationships were established using DNA-Star v2.0. After 24 hours of incubation at 37°C, colonies with black centers and translucent margins were observed, yielding a 379 bp PCR product. Validated sequences were submitted to NCBI. Sequence analysis identified two *Salmonella* serovars: *S. enteritidis* (> 10%) and *S. typhimurium* (> 70%). Rest of the isolates showed no significant similarity to known sequences in the NCBI database.

Key Words: XLD: Xylose Lysine Deoxycholate, NCBI: National Center for Biotechnology Information

EFFECT OF SPORULATION CONDITIONS ON COCCIDIOSIS DEVELOPMENT IN BROILER CHICKEN

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2025-PSC-105

Abstract

Objective of study was to see effect of incubation temperature and duration for sporulation of oocysts on pathogenicity, immunogenicity and stress level caused by the parasite, while comparing *Eimeria maxima* and *E. tenella.* Positive samples for chicken coccidiosis were collected from field. The oocysts were isolated from intestinal samples locating respective predilection sites and intestinal lesions. Oocysts were sporulated in 2.5% $K_2Cr_2O_7$ (Potassium dichromate), incubated at 20C, 24C, 28C and 32C for 21, 24, 27 and 30 hours, in a fixed relative humidity (16-18%). Infective doses (35000 oocysts/1.5 ml PBS) for each temperature and incubation periods, were given orally to broiler birds on day 14 of age. Weight gain, lesion scores, Total erythrocytic count (TEC), Interlukine2 (IL2), Interferon gamma (IFN) and serum corticosterone levels, for two species, were compared to see the pathogenic and immunogenic potentials at temperatures 20C, 24C 28C and 32C. 32C at 27 hours found to be most pathogenic for *E. maxima* and *E. tenella.* Oocysts sporulated at 32C for 30 hours and 28C for 30 hours and 27 hours showed immunogenic potential for both species of *Eimeria*. Sporulation percentage was seen to be highest at 32C after 27 hours incubation for both *E. tenella* and *E. maxima.* It can be concluded that maximum earlier sporulation takes place in 27 hours when given 32C to ensure possible disease development. As management approach this could help in disease control and overcome drug resistance.

Key Words: *Eimeria tenella, Eimeria maxima*, Sporulation, Pathogenicity

MODULATION OF IN OVO PROBIOTIC SUPPLEMENTATION ON IMMUNE COMPETENCE, GUT MORPHOLOGY, AND MICROBIAL COLONIZATION DYNAMICS IN BROILERS

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2025-PSC-106

Abstract

The effects of in ovo probiotic administration on immune status, gut architecture, and microbiota in broiler chickens are investigated in this study. This study investigates whether the early presence of health supporting microbes (Lactobacillus spp. and Bifidobacterium spp.) have the potential to prepare the embryo to better withstand the pressures of post-hatch enteric stress. Fertilized eggs (n = 420) were randomly assigned to six groups: Lactobacillus, Bifidobacterium, combined probiotics, prebiotic (mannan oligosaccharide), synbiotic, and a sham challenge control. Parameters evaluated were hatch window, immune organ weigh (bursa, thymus, spleen), gut histomorphology (villus height, crypt depth, villus: crypt ratio), intestinal microbial count, post-hatch growth and mortality on controlled rearing. Results were interpreted through multivariate ANOVA, discriminant analysis, and correlation modeling. Results After 40 days, chick and gut weights were similar among the three groups, but the synbiotic group had markedly ($p < 0.01$) greater villus height (1,412 µm vs. 982 µm; control), greater villus:crypt ratio (2.9 vs. 1.7) and lower ($p < 0.05$) degree of coliform colonization. Immunocompetence, assessed by relative organ weights and NDV vaccine antibody titers, was significantly increased in the Lactobacillus and synbiotic groups. However, the lowest mortality was observed in the synbiotic group (2.1%) vs the control (6.8%). Consequently, our results suggest that delivery of probiotics in ovo, especially in combination with prebiotics, can influence gut development and immunity, providing early life benefits that translate into the production phase. The implementation of synbiotic strategies in commercial hatchery operations may be a viable and sustainable, antibiotic free means to improve avian health and productivity.

Key Words: In Ovo Supplementation, Probiotics, Synbiotics, Gut Health, Immune Modulation, Broiler Performance

IDENTIFICATION OF SINGLE NUCLEOTIDE POLYMORPHISMS IN IGF-I GENE ASSOCIATED WITH GROWTH TRAITS IN ASEEL CHICKENS

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2025-PSC-107 **Abstract**

The current study was aimed to identify single nucleotide polymorphisms (SNPs) in IGF-I gene of Aseel chickens and their association with growth traits i.e. body weight (BW), body weight gain (BWG) and feed conversion ratio (FCR). Phenotypic data for different growth-related traits was collected on weekly basis from 1st to 12th week of age and the blood samples were collected at 12th week. The gDNA was extracted using modified inorganic method. Following the PCR amplification and Sanger sequencing of targeted regions, the alignment of sequence data was performed by using the ClustalW algorithm in MEGA-X software which revealed 16 SNPs in IGF-I gene. Among all the SNPs, four SNPs were significantly associated with BW, BWG and FCR during different weeks of age. Moreover, SNP-4 was significantly associated with BW at 1st and 3rd week and with BWG & FCR during 3rd week of age while SNP-8 was significantly associated with BW at 1st, 2nd, 7th, 9th and 10th week, and with BWG & FCR at 6th, 7th and 9th week of age. Moreover, SNP-9 and SNP-12 were significantly associated with BW, BWG and FCR during 2-6 weeks, 1-3 weeks and 1-5 weeks of age, respectively. Identification of these SNPs and their association with growth traits in Aseel chickens is done for first time in Pakistan. It is suggested that these SNPs can be helpful in selection of Aseel chickens for better growth and feed efficiency which will ultimately enhance meat yield of native Aseel chickens in the country.

Key Words: IGF-1, SNP, MEGA-X, FCR

REVOLUTIONIZING POULTRY: ADVANCEMENTS IN PAKISTAN AND WORLDWIDE , INNOVATION, SUSTAINABILITY AND HEALTH CHALLENGES

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2025-PSC-108 **Abstract**

The global poultry industry, including Pakistan's rapidly growing sector, is undergoing a technological and sustainable transformation to meet rising demands while addressing public health and environmental concerns. Recent advancements—including the use of ultraviolet (UV) radiation for sterilization, alternatives to antibiotics, and sustainable farming practices—are revolutionizing the industry. This paper explores these advancements with a comparative lens on global practices and Pakistan's emerging efforts, while analyzing their impact on disease control, environmental sustainability, and production efficiency. A significant shift is also occurring in response to antibiotic resistance, with producers adopting alternative growth promoters such as probiotics, prebiotics, phytogenics, and organic acids. These alternatives not only maintain gut health and feed efficiency but also mitigate the risk of antimicrobial resistance, a major concern in both human and animal health sectors. A comparative analytical approach was used, reviewing existing literature, field studies, and recent technological implementations from global and Pakistani poultry sectors. Key focus areas include the application of UV-C radiation in poultry environments, adoption of antibiotic alternatives (such as probiotics, phytobiotics, and essential oils), and assessment of eco-friendly practices. When comparing global advancements with Pakistan's poultry landscape, disparities in infrastructure, research investment, and regulatory enforcement become evident. However, Pakistan has made strides in biosecurity awareness, adoption of climate-smart poultry housing, and use of herbal alternatives to antibiotics, though large-scale implementation remains a challenge. Globally, UV radiation has shown strong efficacy in reducing airborne pathogens and sterilizing hatchery surfaces, significantly lowering infection risks. Pakistan has begun pilot implementations in hatcheries and water treatment, although large-scale adoption is still limited by cost and technical awareness. The global ban or restriction on antibiotics in poultry feed has prompted a surge in natural alternatives that support gut health without contributing to antimicrobial resistance. Pakistan's poultry industry is experimenting with these, particularly herbal and probiotic supplements, yet faces challenges in regulation and consistent supply chains. Sustainable practices—such as energy-efficient housing, solar-powered farms, and waste-to-energy biogas systems—are more established globally, while Pakistan shows early progress in integrating eco-friendly systems. However, disease outbreak risks remain high in both systems due to high-density farming, biosecurity lapses, and climate stressors. Smart monitoring technologies and vaccination strategies are helping to reduce these risks, though Pakistan's rural sector still lacks access to such innovations.

Key Words: Alternative Antibiotics, Uv-C Radiation, Probiotics, Sustainable Use

FOOD SAFETY CONCERNS IN POULTRY: ADDRESSING FOOD-BORNE PATHOGENS AND ANTIMICROBIAL RESISTANCE

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2025-PSC-109

Abstract

Poultry is the largest growing livestock sector of Pakistan, providing eggs and meat to the community and is considered a rich and chief source of animal protein. However, Poultry meat and eggs are often reported as a source of foodborne illness due to the presence of pathogens Such as Staphylococcus aureus, Salmonella Paratyphoid, Campylobacter, Listeria monocytogenes and Escherichia Coli. From a pathological perspective, these pathogens are responsible for numerous diseases in poultry, ranging from enteritis to septicemia, and may also be zoonotic (e.g., when consumers or industry workers are exposed to contaminated meat, eggs, or processing environment). Despite Causing Foodborne illness worldwide, these zoonotic pathogens are an integral part of the global challenge posed by antimicrobial resistance (AMR). Irresponsible administration of antibiotics for the treatment of these Pathogens and their use as growth-promoting agents has largely contributed to the development of multidrug-resistant strains with sufficient resistance to available treatment options and has serious One Health implications.These Issues need urgent comprehensive solutionthat includes better biosecurity, good hygiene, use of antibiotics,and choosing sustain able methods like probiotics based additives, organic acids and Vaccines. It's also important to improve the monitoring and tracking of resistance genes at the molecular level to stop the spread of antibiotic use. This review highlights the two big challenges faced by the Poultry industry: harmful bacteria in food and growing resistance of these bacteria to antibiotics. It emphasises the importance of working together between researchers, businesses, and the Government to keep food safe and keep people healthy.

Key Words: Poultry, Food-Borne Pathogens, Antimicrobial Resistance, Public Health

INTEGRATING AI-BASED DETECTION AND PREVENTIVE MEASURES TO SAFEGUARD POULTRY FROM HPAI

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2025-PSC-110 **Abstract**

The world is currently facing an epizootic caused by highly pathogenic avian influenza (HPAI) H5N8 and H5N1, which are affecting both captive and wild bird species and can become panzootic in the near future. The disease also threatens public health, as certain HPAI strains (e.g., H5N1, H7N9) can infect humans, causing severe illness and death. To prevent the introduction of HPAIV from wild birds into poultry, strict biosecurity measures are necessary. To reduce the risk of avian influenza spreading from wild birds to poultry, combining preventive strategies with smart detection tools like YOLOX can help manage wildlife on farms. The process starts with the target phase, where the YOLOX model spots wild birds and identifies species that can carry avian influenza, such as gadwall and brown thrasher. This accurate detection helps farmers take focused action. Next is the track phase, where the model collects data to find areas with high bird activity. By mapping these spots, farmers can better understand how and where wild birds move around the farm. The final step is the preventive phase, where protective measures are taken to keep these birds away, reducing the chances of disease transmission. This study proposes the use of pyrotechnic sounds, human effigies, and drones to keep the birds away. Pyrotechnic sounds create a sudden, loud noise that startles and scatters birds. Effigies serve as visual deterrents, exploiting birds' innate caution around perceived human presence. Drones provide a moving and flexible option, able to follow and respond to bird activity in real time.

Key Words: Avian Influenza, Poultry, Biosecurity, YOLOX

PUERARIN ATTENUATES THIRAM-INDUCED CYTOTOXICITY IN CULTURED CHICKEN GROWTH PLATE CHONDROCYTES: INSIGHTS INTO THE IN VITRO THERAPEUTIC EFFICACY BY MODULATING HIF-1A, TIMP-3, AND BCL-2 EXPRESSIONS

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2025-PSC-111

Abstract

Endochondral ossification is a crucial process in longitudinal bone growth, relying on chondrocytes proliferation, hypertrophy and cartilage matrix secretion. Disruption in this process, particularly due to cytotoxic agents like tetramethyl thiuram disulfide (Thiram), can impair skeletal development and induce apoptosis. The present research aimed to explore the *invitro* protective role of Puerarin, a reputable bioactive isoflavone from Traditional Chinese Medicine on the growth plate (GP) chondrocyte's morphology and survival, as well as mRNA and protein expressions of hypoxia-inducible factor-1α (HIF-1α), tissue inhibitor of metalloproteinase-3 (TIMP-3), and B-cell lymphoma-2 (BCL-2) against Thiram-induced cytotoxicity in chicken growth plate chondrocytes. The chondrocytes from chicken tibial growth plates were obtained, cultured, refined, and divided into Control, Thiram and Puerarin groups. The chondrocytes in Thiram and Puerarin groups were subsequently treated with a sub-lethal dose of Thiram at 2.5 µg/mL to cause cytotoxicity, followed by an optimal dose of puerarin at 2.5 µg/mL to Puerarin group. Microscopy, RT-qPCR and Western blotting were used to investigate chondrocyte morphology and viability, and molecular expressions of key regulators i.e., HIF-1α, TIMP-3 and BCL-2. Thiram exposure resulted in diminished survival and drastic structural anomalies of chondrocytes, upregulated HIF-1α, and downregulated TIMP-3 and BCL-2. Nonetheless, puerarin treatment efficiently counteracted these Thiram-induced structural and molecular alterations ($P<0.05$).

Key Words: Chickens, Chondrocytes, Genes, Proteins, Puerarin, Thiram

EFFECT OF BROILER BREEDER EGG WEIGHT ON HATCHING TRAITS, POST-HATCH PERFORMANCE, AND WELFARE OF BROILERS

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2025-PSC-112

Abstract

This study was conducted to assess the influence of broiler breeder egg weight on hatching traits, post-hatch performance, welfare attributes, and carcass characteristics of broilers. A total of 400 Ross 308 broiler breeder eggs were divided into four weight categories (56–60 g, 61–65 g, 66–70 g, and 71–75 g) and incubated under standard hatchery conditions. Hatching traits, including hatchability, chick weight, hatch window, embryonic mortality, and culling percentage, were recorded. Subsequently, 240 chicks from these categories were reared under controlled conditions to evaluate post-hatch growth performance (feed intake, body weight gain, feed conversion ratio, and liveability), welfare traits (feather and gait scores, physical asymmetry), and carcass yield. Results indicated that medium egg weight categories (61–70 g) produced significantly better hatchability, chick quality, body weight gain, and feed conversion ratio compared with lighter or heavier eggs. Larger eggs exhibited higher infertility and culling percentages, whereas smaller eggs yielded chicks with reduced survivability and growth performance. Welfare traits such as gait score and asymmetry showed non-significant differences among treatments, although feather condition varied. Carcass yield remained unaffected by egg weight. Overall, the findings suggest that medium egg weights provide an optimal balance between hatchability, growth, and welfare, thereby supporting improved productivity and profitability in broiler production systems.

Key Words: Egg Weight, Hatchability, Feed Conversion Ratio, Carcass Yield, Broiler Breeder

COMPARATIVE EVALUATION OF PRODUCTIVE PERFORMANCE, EGG QUALITY, AND HATCHING TRAITS OF NAKED NECK CHICKENS UNDER DIFFERENT PRODUCTION SYSTEMS

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2025-PSC-113	**Abstract**

The present study was conducted to evaluate the productive performance, egg quality, and hatching traits of Naked Neck chickens reared under three production systems: free-range, aviary, and open-sided housing. A total of 540 birds, 25 weeks of age, were distributed into three treatment groups with six replicates of 30 birds each. Data were recorded for body weight, feed intake, egg number, egg weight, egg mass, egg geometry, internal and external quality traits, and hatchability parameters. Results revealed that birds in open-sided houses achieved significantly higher body weights, egg number, egg mass, and improved egg geometry compared to aviary and free-range groups. Aviary birds showed superior yolk weight and shell characteristics, while hatchability and fertility were highest in free-range birds. Statistical analyses confirmed significant differences ($p \leq 0.05$) among the systems for most parameters. It was concluded that open-sided housing is optimal for production traits, whereas free-range systems Favor reproductive efficiency in Naked Neck chickens.

Key Words:	Naked Neck Chicken, Open-Sided Housing, Free-Range, Aviary, Productive Performance, Indigenous Breeds

DECODING THE ENIGMA OF BURSAL DISEASE VIRUS: UNRAVELING THE COMPLEX INTERACTIONS OF PROTEINS AND MOLECULES FOR ENDURING STABILITY

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2025-PSC-114

Abstract

The project aimed to evaluate ten Indigenous isolates of the Infectious Bursal Disease (IBD) virus using in silico methodologies, including phylogenetic analysis, homology modelling, and molecular dynamics simulations. The study focused on understanding the physiological and chemical properties of the viral surface target proteins, the interactions between proteins and ligands, and the stability of various protein-ligand complexes. The results revealed differences in stability and interaction patterns among the complexes, highlighting the significance of specific residues and secondary structural elements. These findings provide valuable insights into the behavior of the viral isolates and their potential impact on Bursal Disease. The abstract emphasizes the need for future research to build on these findings to enhance our understanding of IBD genetic diversity and improve disease control measures by developing effective homologous vaccines.

Key Words: Infectious Bursal Disease virus (IBD), Phylogenetic Analysis, 3D Protein Structure, Molecular Docking

NUTRITIONAL STRATEGIES TO ENHANCE EGG PRODUCTION LONGEVITY AND QUALITY IN AGING COMMERCIAL LAYING HENS

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2025-PSC-115 **Abstract**

As laying hens age, they face physiological and metabolic challenges that compromise productivity and egg quality. Key risks include a decline in laying performance, increased egg size with thinner shells, reduced albumen viscosity, yolk oxidation, and weakened bone and liver health. These changes, often exacerbated by oxidative stress and heat, threaten the viability of flocks beyond 60 weeks, impeding the industry's goal of achieving 500 eggs in a 100-week cycle. Targeted nutritional interventions offer promising solutions. Hydroxy-selenomethionine, a highly bioavailable organic selenium source, enhances antioxidant defenses, restores redox balance, and supports immune modulation. Trials demonstrate its efficacy in improving laying rate, egg mass, shell strength, and liver health, while reducing cracked eggs and feed conversion ratio. Hydroxy-selenomethionine also increases selenium deposition in eggs, contributing to nutritional value and shelf life. Complementing this, protected butyric acids fortify gut integrity, modulate microbiota, and reduce inflammation. These acids improve nutrient absorption, yolk pigmentation, and intestinal morphology, while decreasing egg losses due to shell defects and microbial contamination. Their synergistic use with Hydroxy-selenomethionine further amplifies benefits, enhancing immunity, liver antioxidant capacity, and overall performance. Together, Hydroxy-selenomethionine and butyric acids represent modern nutritional tools that mitigate aging-related declines, sustain egg quality, and extend laying persistency, enabling producers to extend the productive lifespan of layers while maintaining welfare, sustainability, and profitability.

Key Words: Aging Layers, Hydroxy-Selenomethionine, Butyric Acid

COMPARATIVE EVALUATION OF FOWL ADENO VIRUS VACCINE DERIVED FROM LOCAL ISOLATES THROUGH STRUCTURAL AND PHYLOGENETIC ANALYSIS

Author(s): Sawaira Sabir[1], Muhammad Danish Mehmood[1], Huma Anwar[1], Ehsan Ali Aslam[1]

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2025-PSC-116 **Abstract**

The project highlights the genetic diversity and structural variability of Fowl Adenovirus (FAdV) isolates, utilising 100 liver samples from suspected infected birds. The confirmed FAdVs were adapted on different substrates and evaluated in-vivo for seroconversion in broilers to address the common problem of vertically transmitted viral antigen in commercial poultry. Polymerase Chain Reaction (PCR) was employed to amplify a segment of viral DNA for sequencing and phylogenetic analysis. The physicochemical properties of proteins from FAdV serotypes 4, 8, and 11 were analyzed, with DHEA identified as a suitable ligand for molecular docking studies. ADMET analysis assessed potential drug properties and toxicity. This study prepared 14 HPS vaccines with different antigens and adjuvants, inoculating 160 birds. The genetic and structural diversity is crucial for vaccine development and antiviral design. Hydro-Pericardium Syndrome (HPS) caused by FAdV-4 was evaluated concerning vaccine development. In Pakistan, inactivated liver homogenate vaccines (ILHV) are traditionally used, but can cause hypersensitivity. The Montanide-based HPS vaccine showed significantly higher antibody titers (1148.45) compared to aluminium hydroxide-based vaccines (137.2) ($P < 0.05$). Genetic diversity and vaccine substrate types are critical for FAdV control. Molecular docking provided drug targets, while serological evaluation confirmed the efficacy of Montanide-based vaccines, paving the way for effective immunoprophylaxis in poultry.

Key Words: Fowl Adenovirus vaccines, Hexon Protein Structure, Phylogenetic Analysis, Vero Cell Line

PREVALENCE AND DRUG SUSCEPTIBILITY OF *E.COLI*, *CAMPYLOBACTER*, AND *CITROBACTER* FROM THE EGGSHELL SURFACE OF TABLE AND HATCHABLE EGGS IN LAHORE, PAKISTAN

Author(s): Muhammad Danish Mehmood[1], Shan e Fatima[1], Huma Anwar Ul-Haq[1], Rabia Habib[1], Muhammad Usman Ghani[1]

[1] Ottoman Pharma, Lahore.

2025-PSC-117 **Abstract**

The poultry industry faces a significant and urgent challenge due to the increasing prevalence of bacterial infections such as *E. coli*, *Campylobacter* and *Citrobacter*. These bacteria can be transmitted through poultry and its by-products, potentially leading to outbreaks of colibacillosis and campylobacteriosis. A research study conducted in Lahore, Pakistan, aimed to detect and evaluate the presence and drug susceptibility of these bacteria on the surface of table and hatchable eggs. The study collected 630 egg samples from various sources, including small-scale farms, large commercial farms, and local markets. The bacterial contagions on the eggshell surface were analysed using standard microbiological techniques followed by PCR. The results showed that all three bacteria, *E. coli*, *Campylobacter* and *Citrobacter*, were present on the eggshell surface with varying degrees of prevalence. In table eggs *E. coli*, *Campylobacter* and *Citrobacter* were found to have prevalences ranging from 6%–30%, 0%–20% and 3%–26% respectively. Meanwhile, in fertile eggs the prevalences of these bacteria ranged from 6%–26%, 0%–16% and 3%–23% respectively. Moreover, the study brought to light a grave concern: the bacterial strains were resistant to commonly used antibiotics. This discovery underscores the urgent need for more potent control measures to curb the spread of antibiotic-resistant bacteria, a burgeoning threat in the poultry industry. The implications of these findings are significant, serving as a crucial foundation for developing effective strategies to mitigate the risk of bacterial infections caused by contaminated eggs.

Key Words: Enterobacteriaceae, Antimicrobial Resistance, Fertile Eggs, Polymerase chain reaction

IDENTIFICATION OF NOVEL SNPS IN PRKAG3 GENE ASSOCIATED WITH GROWTH TRAITS IN ASEEL CHICKENS

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2025-PSC-118

Abstract

The current study aimed to identify the genetic variations in PRKAG3 gene associated with growth traits including body weight (BW), body weight gain (BWG) and feed conversion ratio (FCR) in Aseel chickens. Blood sample and phenotypic data, up to 12wk of age, were collected from 1000 birds having their body weights ranging from 700-1400gm. The DNA samples were amplified for seven PCR primers and Sanger sequenced. The sequenced data were aligned by ClustalW algorithm in Mega-XI software and thirty-four variants (SNPs) were found in PRKAG3 gene. The results of goodness-of-fit revealed significant differences in genotypic frequencies of nine variants including SNP-6, 14, 20, 23, 26 and 30-33. The results of association analysis on monthly basis showed that among all identified SNPs, seven variants (SNP-16, 19, 22, 24, 27, 28 and 34) were significantly associated with BW, six SNPs (SNP-16, 17, 20, 22, 24 and 34) with BWG, while, nine variants (SNP-16, 18, 20, 22, 24, 25, 28, 30 and 34) with FCR at different weeks of age. However, four variants showed simultaneous significant association with BW, BWG and FCR such as SNP-16 showed association at 4wk, SNP-24 at 8wk, while, SNP-22 and 34 at nearly all weeks of age. Out of all these variants, SNP-22, 24 and 34 showed highly significant association ($P<0.001$) with growth traits up to 12th week of age. Hence, these variants could be used as genetic marker to select the Aseel birds for growth-related traits at 12wk of age.

Key Words: PRKAG3 Gene, SNPs, Body Weight, FCR, Aseel Chickens

SCREENING OF COMMON POULTRY BIRD DISEASES AND EVALUATION OF MEDICINAL HERBS ON GROWTH PERFORMANCE OF BROILER CHICKENS IN SINDH, PAKISTAN

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2025-PSC-119

Abstract

The present study aimed to investigate the prevalence of major poultry bird diseases affecting broiler and layer chickens at the farm level across various regions of Sindh, and to evaluate the impact of selected medicinal herbs on the growth performance of broilers. Data were collected using a structured questionnaire administered to poultry farmers, focusing on common disease occurrences in their flocks.Among broilers, the most frequently reported diseases included *Escherichia coli* (81%), Infectious Bursal Disease (69%), Chronic Respiratory Disease (67%), Newcastle Disease Virus (37%) and Infectious Bronchitis (IB) (13%). Less prevalent conditions included mycotoxicosis (5%), salmonellosis (4%), and coccidiosis (2%). In layer flocks, Newcastle Disease (60.8%), Fowl Cholera (60%) and Avian Influenza (45%) were the most common, followed by *E. coli* (12%), CRD (11.3%), mycotoxicosis (10%), Infectious Bronchitis (8%), Marek's disease (5%), and others at lower rates. To assess alternative growth strategies, broilers were supplemented with various medicinal herbs. Groups receiving *Hing/Vaghayani*, *Gadamri/Imli*, *Giloy/Satgullo*, and other herbs showed improved feed intake, better feed conversion ratios (FCR), and higher final body weights compared to the control group. Notably, broilers in the *Hing/Vaghayani*-treated group exhibited the best performance metrics, suggesting that certain herbs can enhance productivity and possibly contribute to disease resistance. The study highlights the need for regular disease screening and supports the integration of herbal supplements as a sustainable approach in poultry management.

Key Words: Broiler, Medicinal Herbs, Growth Performance

EFFECT OF MESQUITE ON MEAT QUILTY AND OXIDATIVE STABILITY OF BROILER CHICKEN MEAT

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2025-PSC-120 **Abstract**

This study was conducted at the Poultry Experimental Station, Department of Poultry Husbandry, Sindh Agriculture University, Tandojam, to evaluate the effect of mesquite (Prosopis juliflora) on broiler meat quality and oxidative stability. A total of 240 day-old broilers were randomly divided into 10 groups with 3 replicates. Mesquite was treated with NaOH + Na_2CO_3, HCl, and polyethylene glycol (PEG), and incorporated into diets at 0%, 5%, 15%, and 25%, alongside a control group. Results indicated that PEG treatment consistently improved performance and meat quality. The highest live weight (2.3 kg) and dressing percentage (75%) were obtained in broilers fed 15% PEG. Water holding capacity peaked at 85% under the same treatment, while crude protein content reached 23% and malondialdehyde levels were lowest (0.2 nmol/g), indicating improved oxidative stability. In contrast, NaOH + Na_2CO_3 at 25% reduced live weight (1.9 kg), dressing percentage, and water holding capacity, while also increasing fat content (5.4%). HCl treatment had minimal effects, with pH highest (6.3) at 15% inclusion. Overall, PEG treatment at 15% showed superior effects across multiple parameters, including growth, carcass yield, protein content, and antioxidant stability, while minimizing fat deposition. In comparison, NaOH + Na_2CO_3 at higher inclusion levels negatively impacted meat quality, and HCl remained less effective. It is concluded that PEG is an effective agent for detoxifying mesquite and can be safely used in broiler diets at 15% to enhance meat yield, quality, and oxidative stability, supporting both production efficiency and consumer health.

Key Words: *Prosopis juliflora* , Meat Quilty, Oxidative Stability , Broiler Chicken

PREVALENCE AND ANTIBIOTIC RESISTANCE PROFILING OF *PSEUDOMONAS* AND *AEROMONAS* ISOLATED FROM FISH MEAL-BASED POULTRY FEED

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2025-PSC-121 **Abstract**

The widespread use of fish meal as a protein source in poultry feed raises concerns about microbial contamination and the dissemination of antibiotic resistance. Among the potential contaminants, *Pseudomonas* and *Aeromonas* species are of particular importance due to their role as opportunistic pathogens and their ability to harbor multidrug resistance. The present study was aimed at determining the prevalence and antibiotic resistance profiles of *Pseudomonas* and *Aeromonas* isolated from fish meal-containing poultry feed. A total of 40 feed samples were collected from local poultry farms and feed mills. A total of 25 *Pseudomonas* and 21 *Aeromonas* isolates were confirmed using Gram staining, biochemical tests, and 16S r RNA PCR analysis. Antibiotic susceptibility testing was conducted using the Kirby-Bauer disc diffusion method against a panel of antibiotics, including aminoglycosides, tetracyclines, and β-lactams, with results interpreted according to CLSI guidelines. The results demonstrated a considerable prevalence of both *Pseudomonas* and *Aeromonas* in fish meal-based poultry feed, with a high proportion of isolates showing resistance to tetracyclines, and aminoglycosides. The study underscores the role of poultry feed as a reservoir for antibiotic resistant bacteria and highlights the potential risk of resistance transfer through the food chain. Enhanced feed quality monitoring and prudent use of antimicrobials in poultry production are essential to mitigate the spread of resistance determinants.

Key Words: *Pseudomonas*, *Aeromonas*, Antibiotic Resistance, Aminoglycosides

GENOTYPIC AND PHENOTYPIC INSIGHTS INTO ANTIBIOTIC-RESISTANT *ENTEROCOCCUS FAECALIS* ISOLATED FROM SEMI-COOKED CHICKEN NUGGETS

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2025-PSC-122

Abstract

Enterococcus faecalis is an opportunistic pathogen frequently associated with foodborne transmission and increasing antibiotic resistance, posing a significant threat to public health. The present study was designed to isolate and characterize antibiotic-resistant *E. faecalis* from semi-cooked chicken nugget products using both phenotypic and genotypic approaches. Semi-cooked chicken meat samples were collected from local retail outlets, high end brands and homemade packed producted available on departmental stores. These categories were labeled as A,B, C. Presumptive isolates were identified based on colony morphology, Gram staining, catalase test, and biochemical characteristics, followed by confirmation through polymerase chain reaction (PCR) targeting *E. faecalis*-specific genes. Antibiotic susceptibility testing was performed using the Kirby–Bauer disc diffusion method against a panel of clinically relevant antibiotics, and resistance profiles were interpreted according to CLSI guidelines. Molecular detection of resistance genes, including *vanB*, *tetM*, *ermB*, amp and blatem and was carried out to elucidate genotypic determinants of resistance using specific primers. The findings revealed a notable prevalence of *E. faecalis* in semi-cooked chicken nuggets, with isolates exhibiting high resistance to tetracyclines and glycopeptides. Molecular analysis confirmed the presence of corresponding resistance genes, correlating well with the observed phenotypic resistance. This study highlights semi-cooked poultry products as potential reservoirs of antibiotic-resistant *E. faecalis*, underscoring the need for strict monitoring, judicious use of antibiotics in poultry production, and improved food safety measures to mitigate public health risks.

Key Words: *Enterococcus faecalis*, Nuggets, Glycopeptides

BEYOND HATCH: A FOLLOW-UP STUDY ON THE POST-HATCH OUTCOMES OF BROILERS INCUBATED UNDER VARIOUS DICHROMATIC LIGHT DURATIONS

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2025-PSC-123

Abstract

This study evaluated the effects of varying photo-periods of dichromatic light during incubation on the growth performance, stress response, welfare, carcass characteristics, and serum chemistry of broilers from 21 to 35 days post-hatch. A total of 875 Ross 308 eggs were incubated under seven dichromatic light [green and red (495-750 nm); 250 lux] photoperiods: 0, 4, 8, 12, 16, 20, or 24 h/day. At hatch, 350 straight-run chicks (50 per treatment) were allocated to 35 pens (5 replicates/treatment) in a completely randomized design. Incubation photoperiod had no significant effect ($p > 0.05$) on overall growth performance (FI, BWG, FCR), stress measures, welfare traits, or most carcass characteristics. A significant difference ($p \leq 0.05$) was observed in heart yield, with the 20 h group demonstrating a higher yield than the 0, 4, and 16 h groups. Serum biochemistry was also affected: total protein was higher in the 16 h group, glucose was elevated in the 20 h group, and uric acid was increased in the 12 h group compared to others. Under the conditions of this study, providing dichromatic light for varying durations during incubation did not meaningfully influence the overall post-hatch production performance of broilers up to 35 days. The significant but isolated findings on organ yield and blood parameters suggest that light photoperiod may trigger specific physiological pathways without translating to major performance outcomes. This indicates that the benefits of lighted incubation may be most pronounced during embryonic development and early post-hatch life, with effects diminishing by market age in a complex production environment.

Key Words: Dichromatic Light, Photoperiods, Post-Hatch Performance, Serum Chemistry

EFFECT OF DETOXIFIED *PONGAMIA PINNATA* SEED ON NUTRIENT DIGESTIBILITY OF BROILER CHICKEN

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2025-PSC-124

Abstract

This study was conducted in 2025 at the Poultry Experimental Station, Sindh Agriculture University, Tandojam, to evaluate the effect of detoxified *Pongamia pinnata* seeds on nutrient digestibility in broiler chickens. The research investigated the efficacy of various physical and chemical detoxification methods in reducing anti-nutritional factors (ANFs) and enhancing the nutritional value of *P. pinnata* seeds when incorporated into broiler diets. Seeds sourced from the Tandojam region were subjected to physical treatments (water washing and oven drying) and chemical treatments, including sodium hydroxide (NaOH), sodium carbonate (Na_2CO_3), hydrochloric acid (HCl), glacial acetic acid, methanol-water extraction, polyethylene glycol (PEG), and enzymatic hydrolysis. Both detoxified and untreated seed meals were incorporated into broiler diets at a 5% inclusion level. Results demonstrated that detoxification significantly reduced ANFs such as pongamol, tannins, and trypsin inhibitors, thereby improving nutrient digestibility. Among treatments, sodium carbonate–treated seeds yielded the highest digestibility values, particularly for crude protein (75.55%) and crude fat (83.10%). Dry matter digestibility also improved under detoxified treatments. Conversely, ash digestibility was found to be highest in the untreated control group (36.91%) and decreased with detoxification. In conclusion, detoxification of *P. pinnata* seeds enhances their potential as an alternative feed ingredient in broiler nutrition by improving nutrient digestibility. These findings highlight the possibility of developing natural, sustainable feed additives from *P. pinnata*. However, further research is required to evaluate their effects on growth performance, hematological parameters, and overall health of broiler chickens.

Key Words: Dichromatic Light, Photoperiods, Post-Hatch Performance, Serum Chemistry

LOCALLY ISOLATED *BACILLUS*-BASED PROTEASE: A SUSTAINABLE APPROACH TO BOOST BROILER GROWTH PERFORMANCE

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2025-PSC-125

Abstract

Proteases are hydrolytic enzymes that break down complex proteins into peptides and amino acids, which enhance feed efficiency and nutrient absorption in chickens. Given their crucial role in improving digestion and overall growth, identifying effective protease-producing microbes is essential. This study aimed to isolate and characterize protease-producing *Bacillus* strains and evaluate their application as a feed supplement. Soil samples were collected from poultry and fish market in Lahore and for the screening of proteolytic bacteria skim milk agar was used and submerged fermentation was used to maximize enzyme output (12.1 U/mL). Protease purification involved ammonium sulfate precipitation, ultrafiltration (>50 kDa cutoff), Sephadex G-100 gel filtration, and Fast Protein Liquid Chromatography (FPLC), which confirms the presence of protein on SDS-PAGE. The purified enzyme was incorporated into broiler feed at 100, 200, and 300 mg/kg and compared with a commercial control diet. Growth performance, feed conversion ratio, and protein degradation efficiency were all improved in the 300 mg/kg group. Crude protein content of fecal samples was lowest in this group, indicating efficient protein utilization and reduced nutrient loss. In conclusion, this study explored the potential of protease-producing *Bacillus* strains for enhancing protein digestion and nutrient absorption in poultry. The findings could contribute to developing cost-effective and sustainable feed supplements, improving poultry health and productivity while reducing dependency on synthetic additives.

Key Words: Protease, Bacillus, Enzyme Optimization, Broiler Growth

IMPACT OF BANANA WASTE SILAGE ON GROWTH AND FEED EFFICIENCY OF OSTRICH

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2025-PSC-126

Abstract

The present study was carried out at the Department of Poultry Husbandry, Faculty of Animal Husbandry & Veterinary Sciences, Sindh Agriculture University Tandojam. A total of 08 unsexed ostrich chicks were purchased for present study in simple randomized design to determine the effects of utilization of agriculture waste as feed ingredients on growth performance (weight gain, feed consumption and feed conversion) and nutrients digestibility. Ostrich chicks of one month of age was randomly divided into 02 groups (initial body weight 6 kg ±0.8). The 1st group (T1) of chicks were fed diet contained commercial feed + Lucerne, where the 2nd group (T2) was fed diet contained commercial feed + banana leaves and stems silage. Each bird was identified by shank tag. Chicks were allowed to walk outdoors during daytime and kept indoors at night. Chicks were exposed to 14:10 h light/dark cycle. During the experimental period all the chicks were kept under the similar management and hygienic conditions. Feed was provided *ad libitum* during the experimental period and fresh water was made available at all times. Results indicate that significantly ($p<0.05$) average feed intake of ostrich was higher in group A than the average feed intake of ostrich in group B. Livebody weight of ostrich was significantly ($p<0.05$) higher in group A than group B. FCR of ostrich was significantly ($p<0.05$) better in group A than B. Significantly ($P<0.05$) maximum moisture digestibility was determined in group A than B. Significantly ($P<0.05$) maximum crude protein digestibility was determined in group A than B. Maximum crude fat digestibility was determined in group B than A. Economically, the feed cost of ostrich production was lower in group B as compared to group A. Based on the observations, it was concluded that group A (Commercial feed + lucerne) demonstrated better feed intake, live body weight gain and feed conversion ratio (FCR) compared to group B (Commercial feed + banana leaves and stem silage).

Key Words: Banana Leaves, Stem Silage, Growth, FCR, Nutrients Digestibility

A BLEND OF ESSENTIAL OIL SIGNIFICANTLY IMPROVES GUT HEALTH, INFECTION CONTROL AND FCR IN BROILER BIRDS UNDER EXPERIMENTAL AVAIAN COCCIDOSIS

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2025-PSC-127

Abstract

Coccidiosis remains a major economic and health challenge in poultry production worldwide. Coccidiosis is a severe gastrointestinal disease in chickens caused by protozoan parasites of the genus Eimeria. Rapid sporulation and multiplication of Eimeria oocysts makes the disease prevention challenging following an outbreak on poultry farm. Anticoccidial drugs are no longer reliable for the disease control due to widespread resistance. Therefore, there is a desire need to use alternative strategies like use of essential oils against this parasitic disease. This study evaluated the anticoccidial efficacy of an essential oils blend in comparison with amprolium, focusing on intestinal health and growth performance in experimentally challenged broiler chickens. One hundred day-old ROSS-308 broilers were randomly allocated to five groups (n = 20): uninfected untreated control, infected untreated control, uninfected supplemented with essential oils blend, infected supplemented with essential oils blend, and infected amprolium-treated. Infected groups were orally challenged with 5,000 sporulated oocysts on day 8. Parameters assessed included oocyst shedding (OPG), growth performance, gut microbiota, and histopathological lesion scores. Data were analyzed using two-way ANOVA with Tukey's post hoc test. A significant increase in weight gain was observed in infected birds supplemented with essential oils blend (2280 ± 2.18 g) compared with that of controls (1900 ± 2.74 g; $p < 0.001$) and was similar to that of birds in the amprolium-treated group (2270 ± 1.79 g). The blend of essential oils also reduced OPG in infected birds (10,400 ± 2730 at 7 dpi) compared with infected untreated controls (15,600 ± 3870; $p < 0.001$), but the reduction was not upto the extent as seen in amprolium-treated birds (2390 ± 370; $p < 0.001$). Lesion severity was lower in essential oils blend groups, with partial villus preservation versus complete sloughing in controls. Essential oils blend supplementation also significantly reduced coliform counts (5.40 ± 0.05 log CFU/g vs. 6.44 ± 0.08; $p < 0.001$) and increased Lactobacillus populations. Although amprolium achieved greater parasite suppression, essential oils blend enhanced gut integrity, microbial balance, and growth performance under coccidial challenge, suggesting its potential as a phytogenic alternative or adjunct in coccidiosis management.

Key Words: Amprolium, Coccidiosis, Essential Oils, Gut Health

ROLE OF ARTIFICIAL INTELLIGENCE IN SAFEGUARDING POULTRY HEALTH BY MAINTAINING HPAI FREE STATUS

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2025-PSC-128

Abstract

Highly pathogenic avian influenza(HPAI) is caused by RNA virus which belongs to family Orthomyxoviridae family, H5 and H7 strain of Influenza virus type A which causes considerable risk to poultry. Many outbreaks resulted in due to HPAI making it global threat to poultry production increasing the demand of fast and reliable diagnostic techniques. Recent control measures and prevention strategies are not enough to cope HPAI leading to demographic economic lose. The implementation of Artificial Intelligence(AI) has enhanced the detection of HPAI using AI enabled imaging and machine learning system. AI like Sensor Based Detection, Convolutional neural networks and Gradient boosted trees have been utilized to check virulence, specificity and sensitivity of HPAI strains. By collecting environmental, genomic and health statistic related data AI helps in prediction of outbreaks and early disease detection. Use of AI helps in maintaining HPAI disease free status, reducing risk of transmission of zoonotic disease and improve efficacy of diagnosis of disease. The review focuses on how AI helps in controlling HPAI and disease detection and surveillance. By knowledge and understanding of Ai in disease control we can ensure safety of poultry production and public health.

Key Words: HPAI, Artificial Intelligence, Disease Control

IMPACT OF LIVE YEAST AND YEAST METABOLITES SUPPLEMENTATION ON GROWTH PERFORMANCE, NUTRIENT DIGESTIBILITY, IMMUNE RESPONSE AND CARCASS CHARACTERISTICS OF BROILERS

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2025-PSC-129 **Abstract**

The study examined the comparative effect of live yeast and yeast metabolites supplementation on growth performance, nutrient digestibility, immune response and carcass characteristics in broilers. A total of 250 1-day-old Ross-308 chicks were randomly distributed into five treatment groups (5 replicates, each containing 10 chicks). The dietary treatments were as follows: Control (Basal Diet), T1 (Basal diet + 2 g/kg live yeast supplementation), T2 (Basal diet + 4 g/kg live yeast supplementation), T3 (Basal diet + 2 g/kg yeast metabolites) and T4 (Basal diet + 4 g/kg yeast metabolites). The data were analyzed using R software and means were compared with Tukey's test at significance level of (p>0.05). Weekly measurements of feed intake and weight gain were recorded to calculate the feed conversion ratio (FCR). Final feed intake, body weight and feed conversion ratio showed higher (p<0.05) by the yeast metabolites group supplemented at higher level of 4g as compared to live yeast and Control group. Nutrient digestibility (dry matter and ether extract) was significantly enhanced (p<0.05) by supplementation of live yeast 4g. Highest antibody titers against Newcastle disease and Infectious bronchitis disease (p<0.05) was showed by live Yeast 4g group as compared to yeast metabolites and control group. However, no effect was shown (p>0.05) by dietary treatment on the carcass characteristics and meat quality parameters at the end of trial. Live yeast and yeast metabolites can be useful for promoting the growth and immune response of broilers.

Key Words: Live yeast (*Saccharomyces cerevisiea*), Postbiotics, Broilers, Antibiotics resistance

EX-VIVO WHOLE BLOOD ASSAY UNCOVERS RAPID KINETICS OF *SALMONELLA GALLINARUM*-TRIGGERED APOPTOSIS AND CELL DEATH

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2025-PSC-130

Abstract

Salmonella enterica serovar Gallinarum (SG) causes fowl typhoid, a septicemic disease resulting in major economic losses for the global poultry industry. The critical need for alternative control strategies, driven by antibiotic resistance and suboptimal vaccine efficacy, mandates a deeper investigation into the early immunopathological mechanisms and immune evasion tactics employed by this host-restricted pathogen. This study aimed to quantitatively assess the direct ex-vivo impact of SG on avian immune cell viability over time, specifically characterizing the kinetics of apoptosis and necrosis. A new ex-vivo whole blood assay was established. Blood from healthy chickens was inoculated with a standardized SG culture. Infected samples were analyzed for four hours at precise 30 mins time intervals (0-240 mins) using multi-parameter flow cytometry with Annexin V-FITC and Propidium Iodide (PI) staining. Analysis revealed a highly significant ($p < 0.01$), rapid, time-dependent increase in immune cell death. A discernible increase in early apoptotic (Annexin V+/PI-) cells occurred within 30 minutes. This escalated sharply, with significant rises in late apoptotic (Annexin V+/PI+) and necrotic (Annexin V-/PI+) populations at 60 and 90 minutes. Peak total cell death, dominated by late apoptosis and necrosis, was recorded at 180 minutes ($p < 0.0001$). These results provide direct ex-vivo evidence that SG rapidly induces immune cell death as a crucial frontline immune evasion mechanism. This study advances our understanding of fowl typhoid immunopathogenesis and validates the ex-vivo assay as a robust platform for screening novel therapeutics and vaccines.

Key Words: *Salmonella gallinarum*, Fowl Typhoid, Host-Pathogen Interaction, Poultry Health

EFFECT OF SODIUM BUTYRATE AND CALCIUM BUTYRATE AS ALTERNATIVES TO ANTIBIOTIC GROWTH PROMOTERS ON BROILER PERFORMANCE TO SUPPORT ORGANIC MEAT PRODUCTION IN PAKISTAN

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2025-PSC-131

Abstract

Organic meat production in Pakistan is emerging as a sustainable approach to mitigate antibiotic resistance, driven by antibiotic growth promoters (AGPs) in the poultry industry. Thus, this study evaluated the effect of protected sodium butyrate and calcium butyrate as alternatives to AGPs on growth performance, nutrient digestibility, intestinal morphology, carcass characteristics, meat quality and economic returns of broilers raised for organic meat production in Pakistan. A total of 320 one-day-old male Ross 308 broilers were randomly allocated to four dietary treatments (10 replicates; 8 birds/replicate): T1, basal diet with AGPs; T2, basal diet without AGPs; T3, T2 + sodium butyrate (1,200 g/ton); T4, T2 + calcium butyrate (400 g/ton). Growth data were recorded weekly. Nutrient digestibility, intestinal morphology, carcass characteristics, and meat quality were assessed on the 35th day post-slaughter. Data were analyzed using a completely randomized design with Tukey's test ($p < 0.05$). Over 1-35 days, T1 exhibited the significantly highest body weight gain (BWG) and feed intake, but poorer feed conversion ratio. T2 and T3 showed superior feed efficiency, while T4 recorded the lowest performance ($P < 0.05$). Both T3 and T4 significantly improved nutrient digestibility and intestinal morphology compared to T1. The meat parameters, including breast muscle pH and shear force, and carcass traits, including weight of carcass, breast, shank, gizzard, intestine, abdominal fat, and dressing percentage, were unaffected, except for thigh weight, which was significantly higher in T1 and T4. At 35-d, T1 showed the highest BWG (2088.8 g) with the lowest total cost (263 Rs/kg BW). In contrast, T2 had lower BWG (1825.7 g) with the highest costs (276 Rs/kg BW), while T3 and T4 showed intermediate BWG (1815.8 and 1801.4 g) and costs (272 and 273 Rs/kg BW). This concludes that butyrate supports organic poultry by improving performance without AGPs. However, further optimization is required to achieve AGP-comparable performance.

Key Words: Antibiotic Growth Performance, Broiler, Butyrate, Organic Meat Production

SEQUENCE AND STRUCTURAL HOMOLOGY OF THE NEWCASTLE DISEASE VIRUS ISOLATES FROM THE POULTRY IN AND AROUND LAHORE

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2025-PSC-132 **Abstract**

Newcastle Disease (ND) is a highly contagious and destructive viral infection that affects a wide range of avian species worldwide. It is caused by Newcastle Disease Virus (NDV), which belongs to the family *Paramyxoviridae*. NDV poses a significant threat to both poultry health and the global economy due to its severe impact on the poultry industry in Pakistan. The virus exhibits extensive genetic variation, which contributes to the emergence of new genotypes. These genetic and structural differences are responsible for antigenic changes that often reduce the effectiveness of existing control strategies, including vaccines. Therefore, molecular surveillance of the NDV genome is crucial to identify new virulent strains and track their evolutionary patterns. This study focuses on isolating and detecting NDV strains from poultry farms in Pakistan, followed by molecular characterization and mutation analysis of the fusion (F) protein. The F protein is a critical determinant of viral infection and plays a key role in host immune response. Partial fusion gene sequencing and phylogenetic analysis provide insights into genetic diversity, mutation sites, and evolutionary relationships among field isolates. The findings emphasize the strain-to-strain variation among indigenous NDV isolates and highlight the role of nucleotide-level mutations in helping wild strains evade artificial immunity. Understanding these variations is essential for developing effective vaccines. The study suggests that homologous local isolates could be adopted as master seed viruses, reducing viral shedding and controlling infection more effectively.

Key Words: Newcastle Disease Virus, Fusion Gene, Molecular Characterization, Sequence Analysis

UNMASKING THE MECHANISM: HOW *SALMONELLA GALLINARUM* TRIGGERS PBMC DEATH TO CRIPPLE INNATE AVIAN IMMUNITY, AS MAPPED BY ADVANCED FLOW CYTOMETRY

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2025-PSC-133

Abstract

Salmonella enterica serovar Gallinarum (SG) is a host-restricted pathogen that causes fowl typhoid, a severe disease leading to substantial economic losses and animal welfare concerns in global poultry production. A critical gap exists in understanding the specific cellular mechanisms SG employs to subvert the avian immune response. This study investigated the in vitro immunomodulatory effects of SG on chicken peripheral blood mononuclear cells (PBMCs) to delineate the pathways of immune evasion. We utilized multiparameter flow cytometry to quantitatively assess key indicators of cellular health and function: overall cell death via propidium iodide exclusion, mitochondrial membrane integrity (MMI) using Rhodamine 123 fluorescence, and cell cycle progression dynamics via acridine orange staining. Our results demonstrate that SG infection triggers profound and statistically significant dysfunction in avian PBMCs. We observed a 5-fold increase ($p < 0.001$) in cell death, a severe 3.5-fold decrease ($p < 0.0001$) in MMI indicating mitochondrial damage, and a significant arrest ($p < 0.0001$) in the S-phase of the cell cycle. These findings collectively indicate that SG actively compromises cellular immune functionality by inducing rapid death, metabolic disruption, and proliferative paralysis in key immune cells. This research provides crucial, mechanistic insights into the pathogenesis of fowl typhoid, highlighting the pivotal role of innate immune evasion. The identified pathways offer a foundational platform for developing novel immunomodulatory interventions and effective vaccine strategies designed to enhance cellular immunity against SG.

Key Words: *Salmonella gallinarum,* Flow Cytometry; Host-Pathogen Interaction; Poultry Health.

COMPARATIVE PREVALENCE AND GENETIC DIVERSITY OF ESBL PRODUCING *ESCHERICHIA COLI* IN POULTRY, HUMANS AND THE ENVIRONMENT A ONE HEALTH PERSPECTIVE FROM PAKISTAN (2020–25)

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2025-PSC-134 **Abstract**

The 2024 updated list of critical priority pathogens by WHO includes third-generation cephalosporin-resistant bacteria such as Extended-Spectrum β-Lactamase producing *Escherichia coli* (ESBL). For past many years, this organism has been successfully utilized to serve as a subject for active surveillance of antimicrobial resistance (AMR). Here, we analyzed twenty peer-reviewed articles providing data from different regions of Pakistan, published over a period of five years (2020-2025). These studies included molecular epidemiology and meta-analysis mainly reported from regions including Lahore, Faisalabad, Islamabad and the Potohar. In poultry, cloacal swabs and retail chicken meat had 30-50% prevalence of ESBL *E. coli*, reported in studies conducted in the Punjab province. Whereas co-resistance to tetracyclines and quinolones antibiotics was prominent. In the same region, molecular characterization showed the dominance of $bla_{\text{CTX-M}}$ gene (60%), followed by bla_{TEM} (20-30%) and bla_{SHV} (<15%). The subtype $bla_{\text{CTX-M-15}}$ gene has been reported to occur as high as 90% in the droppings of migratory birds. Human-urinary isolates from Potohar region showed 57% ESBL frequency, with ceftriaxone resistance rising from 15.7% in 2020 to 48.7% in 2025. Studies on fecal carriage in hospitals and the community estimated a prevalence of about 42%. The dominance of $bla_{\text{CTX-M}}$ (27-40%) was verified by genetic data from hospitals in Faisalabad, followed by bla_{TEM} (14-30%) and bla_{SHV} (10-11%). Environmental studies showed that there was extensive contamination with detection rates of bla_{TEM} (~40%) and bla_{SHV} (~33%) in Islamabad's wastewater bodies. In conclusion, the comparative analysis shows that the prevalence of ESBL *E. coli* in humans (40-60%), poultry (30-50%) and the environment (40-90%) is consistently high. Therefore, one-health based effective control program is required at national level.

Key Words: Antimicrobial Resistance, ESBL-Producing *Escherichia coli*, One Health

EFFECT OF FEED BORN DISEASE ON POULTRY

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2025-PSC-135

Abstract

Any ailment brought on by consuming tainted food that contains harmful bacteria, viruses, or parasites is known as a foodborne disease, foodborne illness, or food poisoning. Foodborne illness can have serious financial repercussions for individuals, food manufacturers, and a nation's image. Worldwide, foodborne illness is still out of control, and outbreaks can result in both financial and health consequences. Unsanitary methods of growing, harvesting, and preparing food are the root reasons. There are 31 primary foodborne pathogens that cause illness; national authorities keep an eye on the major ones, including Shiga toxin-producing *Escherichia coli, Salmonella* non-typhoidal, *Campylobacter*, and *Listeria*, and evaluate outbreaks thoroughly to identify patterns and decide how best to prevent them in the future. Foodborne illnesses can range from minor illnesses that heal in a few days to serious ones that cause hospitalization and even death in certain cases. A brief discussion is given of the one health approach's recent introduction and its value in the study and management of foodborne illnesses. According to a number of studies, the primary vector for infections linked to foodborne illnesses is chicken, indicating that foodborne illnesses are dangerous for human health. The primary solution is recommended to be adequate safety and hygiene procedures by farmers and processors. The review provides information on the quality and microbiological safety of chicken, outlines diseases spread by eating poultry, identifies the causes and methods of poultry contamination, and suggests best practices in chicken manufacturing and processing, talks about the prevalence of antibiotic residues and antimicrobial resistance, and offers substitutes for contamination and antimicrobial resistance as possible instruments for the creation of safe and wholesome foods.

Key Words: Feed Contamination, Mycotoxin, Nutrient Degradation, Bacterial Contamination

BIOSECURITY ADVANCEMENTS TO PREVENT ZOONOTIC DISEASES IN POULTRY

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2025-PSC-136

Abstract

The global chicken business is a vital source of reasonably priced protein, but it is constantly threatened by a number of poultry illnesses that have a substantial negative influence on food security, economic stability, and public health. Understanding and analyzing the risk factors, environmental survival traits, and modes of transmission of the most significant diseases affecting chicken populations as well as the significance of rigorous biosecurity are essential. Indirect methods of transmission include infections through contaminated surfaces and vector-borne channels, such as insects and rodents, in addition to direct and vector-borne pathways. Newcastle disease and avian influenza viruses are conveyed by respiratory droplets, and the risk of transmission rises with increased stocking density. However, other infections (such Salmonella spp. and infectious bursal disease virus) have the potential to survive for a long time in surroundings like feed and litter, which raises the likelihood of infection. The ability of viruses to persist over time in a variety of environmental settings emphasizes how important biosecurity, sanitation, and hygiene measures are in halting disease outbreaks. Transmission hazards are further increased by production systems with high stocking densities, weak biosecurity controls, and suboptimal ventilation. Important disease transmissions are outlined in this study, which also emphasizes the necessity of stringent biosecurity measures and regular health monitoring to stop viruses from spreading both inside and outside of poultry operations. These tactics can help ensure public health and food safety, meet the increasing demand worldwide, and promote healthy poultry production.

Key Words: Poultry Disease, Transamination Routes, Biosecurity, Zoonosis

CREATION OF NEXT GENERATION VACCINES TO PREVENT AVIAN INFLUENZA AND NEWCASTLE DISEASE IN POULTRY

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2025-PSC-137

Abstract

One of the most terrible illnesses that severely impairs the chicken business worldwide is Newcastle disease (ND). ND is one of the avian illnesses that needs to be reported to the OIE as soon as it is discovered because of its significant socioeconomic significance and ability to spread quickly to nearby naïve birds. The gold standard for diagnosing ND at the moment is virus isolation followed by molecular or serological identification. However, in epidemic conditions where prompt diagnosis is critically needed, this approach is of little use because it is typically sluggish and necessitates a specialized laboratory with biosafety containment facilities. The great genetic variety of the virus guarantees that isolates with mutations at the primer/probe binding sites avoid detection using these tests, despite the fact that molecular-based diagnostics have developed to address some of these challenges. Modern technologies like next-generation sequencing (NGS), which have so far shown promise in identifying virulent Newcastle disease virus (NDV) isolates quickly, sensitively, and accurately even in mixed infections have emerged as a result of this diagnostic conundrum. Conventional ND vaccinations have proven to be effective in preventing disease over the past 60 years, so they have stood the test of time. These vaccinations, however, cannot stop the majority of the phylogenetically distinct virulent NDV isolates that are now in circulation from replicating and shedding. To overcome these vaccination-related obstacles, logically created vaccinations that target the prevalent genotypes known as genotype-matched vaccines are therefore desperately needed. Reverse genetics-based live attenuated vaccines clearly seemed to be the most promising of the newly developing technologies for the creation of genotype-matched vaccines. This review offers a thorough explanation of the most recent and developing developments in the identification, detection, and management of ND in poultry. Additionally, the advantages and disadvantages of each of those methods are highlighted.

Key Words: New Castle Disease, Avian influenza, Recombinant vaccines, Immunogenicity

ALTERING THE MICROBIOME TO INCREASE THE SAFETY OF MEAT AND EGGS IN POULTRY

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2025-PSC-138

Abstract

The most significant meal in a young chick's life is probably the first feed they are given. Early exposure and the initial days of life, prior to the formation of the microbial population, determine the intricate gut colonization process. Thus, at this time, it is essential to provide access to high-quality feed and an environment that is rich in helpful bacteria and devoid of harmful ones. The complex microbial community found in feed frequently includes major poultry pathogens as well as a variety of chemical contaminants, including heavy metals, mycotoxin, pesticides, and herbicides. Even in trace amounts, these contaminants can have a significant impact on the microbial community's development and have a long-term impact on the general health and performance of the bird. It is yet unknown how much of an impact they have on livestock gut colonization. Here, we outline the problems with animal feed quality that can have a major impact on the growth of the microbial population and, thus, negatively impact the health and performance of the bird.

Key Words: Nutrition, Gut Colonization, Microbiota, Pathogens

EVALUATE THE IMPACT OF PHYTOGENIC FEED ADDITIVE SUPPLEMENTATION ON BROILER GROWTH PERFORMANCE, IMMUNE RESPONSE, INTESTINAL MORPHOLOGY AND MEAT PARAMETERS

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2025-PSC-139

Abstract

Organic poultry production requires alternatives to antibiotic growth promoters (AGPs) to sustain bird health and productivity. This study evaluated the effects of a phytogenic additive (Elan® Cox liquid) on growth performance, immune response, intestinal morphology, and meat quality in broilers. A total of 504 one-day-old Ross-308 chicks were randomly assigned to seven treatments (6 replicates; 12 birds/replicate) in a completely randomized design: T1 (control), T2 (Elan® Cox 350 mL/1000L, days 19-23), T3 (Elan® Cox 350 mL/1000L, days 19-30), T4 (Elan® Cox 500 mL/1000L, days 19-23), T5 (Elan® Cox 500 mL/1000L, days 19-30), T6 (Elan® Cox 750 mL/1000L, days 19-23), and T7 (Elan® Cox 750 mL/1000L, days 19-30). All birds were fed a basal diet free from antibiotics and ionophores. Data were analyzed in R, and means were compared using Tukey's test ($P < 0.05$). Growth performance analysis showed that Elan® Cox supplementation had no statistical effect on body weight gain ($P = 0.495$), feed intake ($P = 0.938$), and feed conversion ratio ($P = 0.537$). However, T5 exhibited greater villus height on day 18 ($P < 0.001$) and day 30 ($P = 0.007$), while villus width increased on day 18 ($P = 0.018$). Crypt depth and VH:CD ratio were highest in T1 on day 18 ($P < 0.001$), whereas T4 had the greatest VH:CD ratio on day 30 ($P < 0.05$). Antibody titers against ND and IBD were highest in T5 on both day 18 and day 30 ($P < 0.001$). *Salmonella* titers increased in T7 on day 18 ($P = 0.018$) and were highest in T4 on day 30 ($P < 0.001$). Meat quality analysis revealed greater cohesiveness in T4 ($P < 0.001$) and higher meat pH in T3 ($P < 0.03$). It is concluded that phytogenic feed additive supplementation improved intestinal morphology, humoral immunity, and selected meat quality traits, but did not enhance growth performance in broilers.

Key Words: Organic Poultry Farming, Phytogenic Feed Additive, Elan® Cox, Intestinal Morphology

EFFECT OF USING VARIOUS LEVELS OF CORN BASED DDGS IN BROILER RATION ON GROWTH PERFORMANCE AND NUTRIENTS DIGESTIBILITY

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2025-PSC-140 **Abstract**

Distiller Dried Grains with soluble (DDGS) is a by-product of ethanol industry that can be used as feed ingredient in broiler feed due to its high protein and energy content. The present study was conducted to evaluate the effect of different levels of corn DDGS inclusion in broiler ration on growth performance and nutrients digestibility. Total of 240 broiler chicks were procured from hatchery and randomly distributed to four groups, D1, D5, D10 and D15, after a week of adaptation period. Each group had three replicates. Chicks in group D1 were provided basal ration. For other groups, three special rations were formulated. Ration for group D5 was formulated with the inclusion of 5% DDGS. For group D10 and group D15 the ration was formulated with the inclusion of 10% and 15% DDGS respectively. The trial continued till day 42. Results showed that growth performance was significantly affected ($P<0.05$) with corn DDGS. Chicks in group D_5 showed significantly higher ($P<0.05$) weight gain (2164.4±7.98) and FCR (1.74±0.85) as compared to other treated group and was like control group. However, DDGS in feed did not have any significant effect ($P>0.05$) on feed intake among the groups. There was significant effect ($P<0.05$) of DDGS on nutrients utilization. Treated groups D_5 and D_{10} showed better nutrients digestibility as compared to group D_{15}. Group D_5 showed the best digestibility percentage for dry matter (80.65±2.88), crude protein (78.0±2.15), crude fat (73.33±2.45), crude fiber (69.66±1.45) and ash content (55.67±1.55). However, the digestibility of these nutrients was not significantly different from control group. Dressing percentage and apparent metabolizable energy decreased with gradual increase of DDGS level in feed. DDGS inclusion also significantly affected ($P<0.05$) the economics. Cost of feed production gradually decreased with the increase in DDGS level. However, due to less weight gain at higher levels gross margin was comparatively decreased than D_5 which gave the highest gross margin (12.77±3.18). It is concluded that DDGS can be included in broiler ration up to 5% without compromising its performance however inclusion at higher levels may have some negative impact on performance, nutrients digestibility and economic returns.

Key Words: Distilled Dried Grains, Digestibility, Protein Efficiency Ratio

USE OF SACCHAROMYCES CEREVISIAE IN DIFFERENT BIOTIC FORMS AS GROWTH PROMOTER AND IMMUNE MODULATOR IN BROILERS

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2025-PSC-141 **Abstract**

The current study was conducted in broilers to evaluate the effects of Saccharomyces cerevisiae (SC) as probiotic, its extract Mannan oligosaccharide (MOS) as prebiotic and their mixture as synbiotic (SC + MOS) on various parameters including growth performance and immune modulation. One hundred and twenty birds were divided into four equal groups i.e. Control A, Probiotic B, Prebiotic C and Synbiotic D in completely randomized design and were fed on basal diet, probiotic (1g/kg), prebiotic (1g/kg) and synbiotic (SC+MOS 0.5g/kg each) respectively for six weeks including one week of adaptation period. All the groups treated with supplements showed significant increase (P<0.05) in growth performance with the highest weight gain recorded in synbiotic treated group D (2225±4.35). Treated groups also showed significant increase in anti body titer against Newcastle disease, the highest antibody titer was recorded in group synbiotic D (6.3±0.33) followed by group probiotic B (5.7 ± 0.33) and group prebiotic C (4.3±0.33). The treated groups also showed significant increase (P<0.05) in blood parameters. Highest RBCs level was recorded in group Probiotic B (2.4±0.01). As compared to control group A, there was also significant increase (P<0.05) in WBCs count in treated groups, Hb concentration and packed cell volume were also significantly higher (P<0.05) among the treated groups as compared to control group A. It was concluded from the study that Saccharomyces cerevisiae and MOS in synbiotic form had better performance as growth promoter and immune modulator as compared to control group as well as from probiotic and prebiotic forms.

Key Words: *Saccharomyces cerevisiae*, Mannan Oligosaccharide, Synbiotic, Immune Modulator

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DETECTION AND CONTROL OF *LISTERIA MONOCYTOGENES* IN POULTRY PROCESSING ENVIRONMENT

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2025-PSC-142

Abstract

Listeria monocytogenes is a significant foodborne pathogen associated with severe human illnesses, including listeriosis, posing a critical public health and food safety concern. Poultry products and processing environments provide favorable conditions for the persistence and transmission of this pathogen, making its detection and control essential. This study focuses on effective strategies for the identification and management of *L. monocytogenes* in poultry processing facilities. Advanced molecular detection techniques, such as PCR and whole-genome sequencing, along with traditional culture and biochemical methods, enhance the accuracy and speed of pathogen identification. Environmental monitoring programs, including swab sampling of equipment, surfaces, and water sources, are crucial in identifying contamination hotspots. Control measures such as strict sanitation protocols, temperature management, equipment design improvements, and employee hygiene training play a vital role in reducing contamination risks. Additionally, the implementation of Hazard Analysis and Critical Control Point (HACCP) systems ensures continuous assessment and mitigation of hazards. Integrating rapid detection methods with robust control strategies is critical to preventing cross-contamination and ensuring the microbial safety of poultry products. This approach not only minimizes public health risks but also supports regulatory compliance and consumer confidence in poultry production systems.

Key Words: *Listeria monocytogenes*, Contamination Hotspots, Strict Sanitation Protocols, HACCP Systems, Assessment And Mitigation.

THE EFFECTS OF PRECISION FEEDING ON GUT MICROBIOTA, IMMUNITY AND GROWTH IN POULTRY

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2025-PSC-143

Abstract

Host derived variables in the intestine are encoded genetically and challenging to change. However, dietary factors can easily modify the gut Microbiota, which is more malleable. Furthermore, it is increasingly clear that the microbiome may have an effect on the physiology of chickens by influencing energy balance, digestion, nutrient absorption, mucosal immune response shaping, and the creation or modification of a number of putative bioactive metabolites. The micro biota's metabolic capability and abundance, which are mostly determined by nutrition, are necessary for these functions. Therefore, changes in the Microbiota brought on by nutrition may be used to influence host physiology, including the onset and course of disease. Because of its flexibility, the gut microbiome is a potential "organ" for precision nutrition to induce precision microbiomics, which is the use of the gut microbiome as a biomarker to predict responsiveness to particular dietary constituents to create precision diets and interventions for the best possible health and performance of poultry. Finding the causative links and mechanisms, however, by which food additives and components impact the gut Microbiota, which in turn affects avian physiology, is crucial. Furthermore, a deeper comprehension of the functional and geographical links between the various avian gut sections and their respective bacteria will help to clarify how the food affects intestinal microbiome regulation.

Key Words: Intestinal Physiology, Metabolites, Biomarkers, Gut Microbiome

THE ROLE OF AI IN POULTRY FARMING: FROM DISEASE DETECTION TO ANTIMICROBIAL RESISTANCE MONITORING

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2025-PSC-144

Abstract

Poultry production is a critical contributor to global food security but remains highly vulnerable to infectious diseases and the escalating challenge of antimicrobial resistance (AMR). Conventional diagnostic approaches are often labor intensive and limited in real-time applicability. Recent advances in Artificial Intelligence (AI) notably Convolutional Neural Networks (CNNs), Support Vector Machines (SVMs), Random Forest classifiers, and deep learning frameworks such as TensorFlow and PyTorch offer innovative solutions for precision disease surveillance and resistance monitoring. AI technologies have demonstrated promising applications in the detection of key poultry diseases including Avian Influenza, Newcastle Disease, Infectious Bronchitis, Coccidiosis, and Salmonella infections. Voice recognition algorithms have been employed for the early identification of respiratory disorders, while computer vision and CNN-based image analysis enable recognition of intestinal lesions in coccidiosis. Moreover, predictive machine learning models are increasingly utilized to analyze genomic and microbiological datasets, supporting early identification of resistance trends in *Escherichia coli* and *Salmonella*, thereby guiding antimicrobial stewardship. Future applications are anticipated in the diagnosis of Mycoplasmosis, Marek's Disease, Infectious Bursal Disease, Fowl Cholera, and Aspergillosis, leveraging integrative platforms that combine biosensors, molecular diagnostics, and big data analytics. The incorporation of AI driven systems into poultry health management can significantly reduce economic losses, improve flock welfare, and strengthen food safety by mitigating zoonotic and resistant pathogen transmission. Integration of AI with veterinary microbiology and epidemiology provides a sustainable pathway for enhancing productivity while addressing the dual challenges of infectious diseases and AMR in the poultry sector.

Key Words: Artificial Intelligence Tools, Disease Detection, Antimicrobial Resistance, Food Safety

SPATIOTEMPORAL SURVEILLANCE OF ANTIMICROBIAL SUSCEPTIBILITY PATTERNS OF MAJOR POULTRY BACTERIAL PATHOGENS AT UDL, UVAS, LAHORE

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2025-PSC-145 **Abstract**

The global poultry industry faces a critical threat from antimicrobial resistance (AMR), a challenge significantly exacerbated by the widespread and often indiscriminate use of antibiotics. This necessitates continuous local surveillance to inform effective stewardship programs. This study aimed to conduct a detailed spatiotemporal analysis of AMR patterns in key bacterial pathogens *Escherichia coli*, *Staphylococcus aureus*, and *Salmonella* spp. isolated from poultry samples across four major districts in Punjab, Pakistan (Lahore, Sheikhupura, Gujranwala, Sialkot) during the period from March to August 2024 and processed at UDL, UVAS, Lahore. A total of 100 clinical samples were collected and processed for bacterial isolation using standard selective media: Eosin Methylene Blue (EMB) for *E. coli*, Mannitol Salt Agar (MSA) for *S. aureus*, and Salmonella-Shigella Agar (SSA) for *Salmonella*. Presumptive isolates were rigorously confirmed through Gram staining and a series of biochemical tests and differential culture media. Antimicrobial susceptibility testing (AST) was subsequently performed using the Kirby-Bauer disk diffusion method on Mueller-Hinton agar, with zone diameters interpreted according to the latest Clinical and Laboratory Standards Institute (CLSI) performance standards. Of the 100 samples processed, 52 were confirmed as *E. coli*, 31 as *Salmonella* spp. noting a notable temporal increase in prevalence during the months of July and August—and 11 as *S. aureus*. The AST results revealed stark contrasts in efficacy. Oxytetracycline demonstrated the lowest efficacy (a mere 5% susceptibility in *E. coli*), indicating severe and widespread resistance. In contrast, fluoroquinolones showed high efficacy, with ciprofloxacin (84%) and enrofloxacin (73%) remaining highly effective against *E. coli*. For other pathogens, azithromycin was identified as the most reliable agent against *Salmonella* spp., while vancomycin remained highly effective against *S. aureus*. This surveillance provides crucial, data-driven insights into the dynamically evolving AMR landscape within Punjab's vital poultry sector. The documented spatiotemporal variations and the alarmingly high resistance to a commonly used antibiotic like oxytetracycline underscore the urgent and critical need for implementing region-specific, evidence-based antimicrobial stewardship programs. These findings are essential for guiding veterinary practices and public health policies to mitigate the further development and spread of AMR, thereby protecting both animal and human health.

Key Words: Antimicrobial Resistance, Poultry, Spatiotemporal Analysis, Disk Diffusion

USE OF AI AND IOT FOR TRACKING THE HEALTH, WELL BEING, AND PRODUCTION OF BIRDS

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2025-PSC-146 **Abstract**

In order to satisfy the rising demand for poultry meat worldwide, the broiler business is essential. Nonetheless, preserving the health and wellbeing of broiler chickens is essential to guaranteeing both maximum output and animal welfare. The rising broiler chicken mortality rate became an inevitable problem that needed to be addressed. In order to prevent the spread of diseases and maintain the health of the flock as a whole, the main objective of this research is to monitor individual chickens for early disease detection. This will enable the timely isolation and treatment of sick birds. The selected model, YOLOv5s (You Only Look Once), had the best accuracy, 96%. The program was able to classify broiler birds according to their age. After custom training, the centroid tracker is employed for real-time tracking, and the model is transferred to ONNX (Open Neural Network Exchange) format. The output data is then stored for subsequent use in a MySQL (My Structured Query Language) database. This model is installed locally using the Open CV (Open-Source Computer Vision Library) library. Using the tracker, this model aims to recognize, categorize, and keep track of the broiler chickens in the video frame. The birds are categorized according to their age. They are separated into four age groups since the majority of monitoring is needed between the ages of one and four weeks. This model may be used to detect temperature, weight, flock behavior, and other variables.

Key Words: Artificial Intelligence (AI), Internet of Things (IoT), Smart Farming, Bird Health Monitoring

CHARACTERIZATION OF VIRULENCE GENE INVA AND ANTIBIOTIC RESISTANCE PROFILE OF *SALMONELLA ENTERICA* ISOLATES FROM DOMESTIC BIRDS

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2025-PSC-147

Abstract

Virulent and multidrug-resistant MDR *Salmonella* is a highly persistent pathogen inhabited by domestic and non-domestic birds. Strains of *Salmonella* pose a significant risk of zoonotic transmission to humans and are a serious public health concern worldwide. Therefore, the present study was undertaken to investigate the prevalence and antimicrobial resistance profiles of *Salmonella enterica* (*S. enterica*) serovars recovered from resident bird species in the Jhang district of Punjab, Pakistan. Fresh droppings and cloacal swab samples (n=130) collected from Parrots (*Psittaciformes*), Pigeons (*Columba livia*), and Chickens (*Gallus gallus*) were sequentially cultured in Rappaport Vassiliadis (RV) broth and Xylose Lysine Deoxycholate (XLD) agar for selective growth of *Salmonella*. Black centered translucent colonies were tested biochemically (catalase, triple sugar iron, indole, methyl red, Voges-Proskauer, and citrate utilization) for phenotypic confirmation. Virulent strains of *S. enterica* were screened by polymerase chain reaction PCR targeting the *inv*A gene. The overall prevalence of *S. enterica* was 36.15% (47/130) found highest in chicken (61.70%; 29/47), followed by 48.93% (21/47) in pigeons and 29.78% (14/47) in parrots. The *inv*A gene was detected in 65.9% (31/47) of *S. enterica* isolates. Phenotypically, the virulent strains of *S. enterica* isolates were examined for 9 antibiotics using the Kirby–Bauer disk diffusion test. Among 9 antibiotics, higher resistance (≥ 50%) was found to gentamycin (83.87%), cefotaxime (70.96%), neomycin (61.29%), and erythromycin (58.06%), while meropenem (100%), imipenem (96.77%), and ciprofloxacin (80.64%) remain sensitive. The detection of a virulent strain of *Salmonella* among domestic birds with high levels of antibiotic resistance highlights the role of avian reservoirs in the potential dissemination of virulent and antibiotic-resistant *Salmonella* and poses a significant public health threat.

Key Words: Antibiotic Resistance, Cloacal Swab, Domestic Birds, MDR, *Salmonella enterica* Serovars, Virulent Strains

MODERNIZATION AND ARTIFICIAL INTELLIGENCE IN POULTRY PRODUCTION

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2025-PSC-148

Abstract

Artificial Intelligence (AI) is quickly transforming poultry farming by providing innovative solutions to challenges like disease detection, farm management, and animal welfare. By analyzing data from various physiological and behavioral signals such as movement patterns, vocal sounds, body temperature changes, and excreta characteristics, AI algorithms can effectively identify early signs of illness and health issues in poultry. This ability significantly improves disease management strategies, helping to reduce economic losses in poultry farming. Key technological advances such as high-resolution image and video analysis, non-invasive monitoring methods, thermal imaging, and precise tracking systems have also been essential in detecting health problems. These tools also help assess stress levels and other abnormal behaviors, leading to better overall poultry welfare and productivity. AI technologies, including machine learning and computer vision, are being used to monitor bird health, optimize feeding practices, and automate routine tasks like cleaning and egg collection. By enabling real-time data analysis and predictive insights, AI helps farmers detect diseases early, improve environmental conditions, and boost overall productivity while lowering costs. Despite some challenges related to costs, data management, and ethical concerns, these innovative technologies offer a promising path toward more sustainable, efficient, and welfare-friendly poultry production systems. Continued progress and wider adoption of AI tools have the potential to revolutionize the poultry industry, resulting in higher yields, healthier animals, and improved food security.

Key Words: Artificial Intelligence, Poultry Farming, Food Security

EFFECT OF PROBIOTIC SUPPLEMENTATION ON PHYSIOLOGICAL AND HEMATOLOGICAL PARAMETERS OF BROILER CHICKENS

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2025-PSC-149

Abstract

The present study was conducted to evaluate the effects of probiotic supplementation on the physiological and hematological parameters of broiler chickens. Probiotics have been reported to stabilize the gut microbial ecosystem, enhance mucosal immunity, and inhibit pathogenic bacteria such as *Clostridium spp.* and *Escherichia coli*, thereby improving overall health and performance. In this experiment, twelve (12) broiler chickens aged 5–6 weeks and weighing between 500–800 g were procured and acclimatized under controlled housing conditions. The birds were randomly divided into two groups, each comprising six chickens. Group A served as the control and was offered a standard basal diet without probiotics, whereas Group B received the same basal diet supplemented with a commercial probiotic formulation. Physiological parameters including growth rate, body weight gain, feed conversion ratio (FCR), body mass index (BMI), body temperature, heart rate, and respiratory rate were recorded. Blood samples were collected from the wing vein into EDTA-coated tubes and analyzed for hematological indices including hemoglobin concentration (Hb), packed cell volume (PCV), red blood cell (RBC) count, white blood cell (WBC) count, and differential leukocyte counts (neutrophils, lymphocytes, monocytes, eosinophils, and basophils). Additional erythrocytic indices such as mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentration (MCHC) were also measured. Oxidative stress biomarkers, including superoxide dismutase (SOD), catalase, malondialdehyde (MDA), and glutathione peroxidase (GPx), were evaluated. The results demonstrated that probiotic supplementation improved growth performance, enhanced hematological indices, and supported better physiological responses compared to the control group.

Key Words: Broiler Chickens, Probiotics, Growth Performance,

PROBIOTIC SUPPLEMENTATION AS A MODULATOR OF GROWTH, HEMATOLOGY, AND PHYSIOLOGICAL TRAITS IN BROILER CHICKENS

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2025-PSC-150

Abstract

This study investigated the influence of dietary probiotic supplementation on physiological and hematological responses in broiler chickens. Twelve broilers (5–6 weeks old; 500–800 g) were acclimatized and randomly assigned into two groups (n=6). The control group received a basal diet, while the treatment group was provided with the same diet enriched with a commercial probiotic. Growth traits (body weight gain, growth rate, FCR, and BMI) and physiological parameters (body temperature, heart rate, and respiratory rate) were monitored. Blood samples collected from the wing vein were analyzed for hematological indicators including Hb, PCV, RBC, WBC, differential leukocyte counts, and erythrocytic indices (MCV, MCH, MCHC). Additionally, oxidative stress biomarkers such as SOD, catalase, MDA, and GPx were assessed. Findings revealed that probiotic supplementation enhanced growth performance, improved hematological indices, and strengthened physiological adaptability compared to the control group.

Key Words: Probiotics, Broiler Performance, Hematology

EVALUATING THE PERFORMANACE OF MONOGLYCERIDE AND BUFFERED ACID BLEND (BEX-MICRODEFEND) ON GROWTH PEFORMANCE , IMMUNITY AND GUT HEALTH OF BROILERS

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2025-PSC-151

Abstract

This study evaluated the impact of BEX-Micro-Defend Liquid (a blend of buffered acids and monoglycerides) on growth performance, gut health, and immune response in broilers. A total of 240 chicks were divided into eight treatment groups under negative and positive controls, with or without antibiotics, at inclusion levels of 0.5, 1.0, and 1.5 cc/L, alongside control groups. The trial lasted five weeks, during which weekly body weight, feed intake, and feed conversion ratio (FCR) were recorded. Results revealed that treatments B1 (0.5 cc/L with antibiotics) and B3 (1.5 cc/L with antibiotics) significantly improved cumulative body weight gain and feed intake, while also achieving the most efficient FCR. Nutrient digestibility (protein, fat, fiber, and ash) was also enhanced in these groups. Mortality remained low (2%) and non-significant across all treatments. Carcass and organ weights improved notably, with B1 showing the highest values. Immune response was significantly stronger in B1, as indicated by higher antibody titers and improved hematological parameters. Gut health was improved through reduced pathogen load (particularly in B1 and B4), and histological examination showed longer villus height and optimal crypt depth in B1, indicating superior gut morphology. Litter quality improved due to reduced water pH, further supporting gut health. However, oxidative stress markers were non-significant. In conclusion, BEX-Micro-Defend at 0.5 cc/L (B1), especially when combined with antibiotics, proved most effective, enhancing growth performance, nutrient utilization, gut morphology, and immune response, offering a promising alternative to antibiotic growth promoters in broiler diets.

Key Words: Broilers, Buffered acids, Growth performance, Immunity

COMBINED AND SOLITARY EFFECTS OF *BACILLUS SUBTILUS* AND *BACILLUS LICHENIFORMIS* ON GROWTH PERFORMANCE, GUT HEALTH AND IMMUNITY IN BROILERS

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University of Agriculture Faisalabad, Constituent College, Toba Tek Singh

2025-PSC-152

Abstract

This study evaluated the effects of *Bacillus subtilis* and *Bacillus licheniformis* on growth performance, gut health, and immunity in broilers. A total of 360 Ross 308 chicks were assigned to six treatments with three replicates of 20 birds each. The groups included a positive control (commercial feed with antibiotics), a negative control (feed without antibiotics), and four probiotic-supplemented diets: *B. subtilis* (1000 g/ton, C), *B. licheniformis* (200 g/ton, D), and two combinations of both species (E: 500 g + 150 g/ton; F: 1000 g + 200 g/ton). Treatments were administered from day 1 to 35, and data on feed intake, body weight, mortality, feed conversion ratio (FCR), immunity, nutrient digestibility, and oxidative stress markers were collected. In the starter phase, maximum feed intake occurred in the antibiotic-fed control group (707 g), while during the grower phase, the highest feed consumption was recorded in treatment D (2918 g). At the finisher phase, feed intake was greatest in group C (3521 g) and lowest in group D (3138 g), with significant differences observed. Body weight trends indicated that probiotics improved performance, with group F achieving the highest slaughter weight (2400 g), compared to the lowest in the negative control group (2102 g). Gut morphology showed enhanced villus height in probiotic-supplemented birds, while Virginiamycin had no effect. Serum oxidative stress markers (CAT and SOD) were not significantly influenced, though maximum CAT was observed in group D and SOD in group F. In conclusion, supplementation with *B. subtilis* and *B. licheniformis*, particularly in combination (group F), enhanced growth performance, carcass traits, and gut morphology, suggesting probiotics as effective alternatives to antibiotics in broiler production.

Key Words: Broilers, *Bacillus subtilis, Bacillus licheniformis*, Growth & Immunity

IMPACT OF FREQUENTLY USED PESTICIDES AND HERBICIDES ON REPRODUCTIVE PERFORMANCE AND HISTOPATHOLOGICAL CHANGES IN VITAL ORGANS OF JAPANESE QUAIL (*COTURNIX JAPONICA*)

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2025-PSC-153

This study was conducted to evaluate the effects of chlorpyrifos and atrazine on the vital organs and physiological parameters of male and female Japanese quails. A total of 150 adult quails were randomly divided into 5 treatments replicated 3 times (10 birds in each): A (positive control with mitomycin C), B (chlorpyrifos 5 mg/kg body weight), C (chlorpyrifos 7 mg/kg), D (atrazine 150 mg/kg), and E (atrazine 200 mg/kg). Pesticides were orally administered for two weeks, with ad libitum feed provided. Weekly feed intake, body weight, and feed conversion ratio (FCR) were recorded, while mortality was observed daily. On day 14, blood samples were collected to assess serum biochemistry (glucose and cholesterol levels), and tissues (testes, ovary, kidney) were sampled for histopathological analysis. Nutrient digestibility was also measured in the final week. Results showed that feed intake was highest in quails receiving 200 mg/kg atrazine, followed by 5 mg/kg chlorpyrifos, 7 mg/kg chlorpyrifos, 150 mg/kg atrazine, and mitomycin C. However, these differences were non-significant ($P > 0.05$). Similarly, FCR was highest in quails treated with 150 mg/kg atrazine, followed by chlorpyrifos (5 and 7 mg/kg), 200 mg/kg atrazine, and mitomycin C, though again non-significant. In contrast, serum glucose levels increased significantly, with the highest values in the 200 mg/kg atrazine group, followed by 150 mg/kg atrazine and both chlorpyrifos treatments. Cholesterol levels also reflected treatment effects. In conclusion, atrazine and chlorpyrifos influenced feed intake, FCR, and serum biochemistry, with atrazine (200 mg/kg) exerting the strongest impact on glucose levels, while histopathological evaluations provided further insights into organ health.

Key Words: Japanese Quails, Chlorpyrifos, Atrazine, Serum Biochemistry, Histopathology

EFFECT OF INSECT MEAL AS AN ALTERNATIVE PROTEIN SOURCE ON NUTRIENT RETENTION AND GROWTH PERFORMANCE OF FAYOUMI MALE CHICKENS

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2025-PSC-154

Abstract

This study aimed to evaluate the potential of black soldier fly (BSF) larvae meal as an alternative and sustainable protein source for Fayoumi chickens. A total of 120 male Fayoumi chickens (8 weeks old) were randomly assigned to four dietary treatments containing 0%, 1.75%, 2.5%, and 5% BSF larvae meal, with three replicates of 10 birds each. Birds were reared under standard floor housing and management conditions. Results showed that live body weight was significantly ($P<0.05$) higher in the 5% group (1200 g) compared to the control (1060 g). Feed conversion ratio improved with BSF inclusion, with the best FCR (2.58) observed in the 5% group. Digestibility of protein (75.61%) and fat (25.00%) was also maximized at the 5% level, while moisture digestibility decreased at higher inclusion levels. Organ weights were not significantly affected. In conclusion, inclusion of up to 5% BSF larvae meal in the diet of Fayoumi chickens improved growth performance and nutrient utilization. Beyond production efficiency, insect meal provides a sustainable, eco-friendly alternative to conventional protein sources such as soybean meal, thereby addressing both economic and environmental challenges in poultry production.

Key Words: Black Soldier Fly, Insect Meal, Alternative Protein, Sustainability

FOOD SAFETY CHALLENGES OF FOODBORNE PATHOGENS AND ANTIMICROBIAL RESISTANCE IN POULTRY PRODUCTION

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2025-PSC-155

Abstract

Foodborne pathogens and antimicrobial resistance (AMR) remain critical threats to poultry production and public health. Pathogens such as *Salmonella*, *Campylobacter*, and *Escherichia coli* are leading causes of foodborne illnesses, while the indiscriminate use of antimicrobials in poultry has accelerated the emergence of resistant strains. Advanced diagnostic and monitoring techniques, including polymerase chain reaction (PCR), real-time PCR, enzyme-linked immunosorbent assay (ELISA), and whole-genome sequencing (WGS), have improved the rapid detection and characterization of pathogens and resistance genes. Additionally, antimicrobial susceptibility testing (AST) and molecular typing methods such as pulsed-field gel electrophoresis (PFGE) and multilocus sequence typing (MLST) provide critical insights into resistance mechanisms and epidemiology. At the production level, Hazard Analysis and Critical Control Point (HACCP) systems, combined with enhanced biosecurity and antimicrobial stewardship programs, are essential for minimizing contamination and reducing antibiotic dependence. By integrating these approaches, the poultry industry can strengthen food safety, mitigate the spread of resistant microbes, and ensure the supply of safe, sustainable, and high-quality poultry products.

Key Words: Foodborne pathogens, Antimicrobial resistance, Poultry safety, Public health

BRIDGING THE KNOWLEDGE GAP: INTERNAL PARASITES AND POULTRY HEALTH

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2025-PSC-156

Abstract

Internal parasites function as a major but frequently overlooked problem which affects modern poultry production systems. The advancement of nutritional methods along with vaccination and biosecurity protocols has enhanced flock health but internal parasitic infections particularly those caused by nematodes, cestodes and protozoa continue to limit poultry production. These parasites interfere with nutrient uptake and cause slower growth rates and lower egg production and increase the risk of secondary infections which damages both animal welfare and economic performance. The occurrence of internal parasitism in poultry continues to be widespread yet this area of research is an underexplored research priority which creates deficiencies in epidemiological data and diagnostic systems and sustainable control methods. This review demonstrates the need to reconsider neglected research about parasite biology and host–parasite interactions and conventional anthelmintic resistance. This data points out how environmental management together with alternative therapies and control strategies need to be adapted to different farming systems including large-scale settings and smallholder production units. The management of internal parasitism extends beyond veterinary practice because it serves as an essential element for sustainable poultry health management and food security and rural livelihoods. Veterinarians along with parasitologists and poultry producers together with policymakers need to join forces to create economical and environmentally friendly solutions which are tailored to specific regions. Protecting poultry productivity while improving animal welfare and meeting worldwide poultry product needs requires us to focus on this neglected poultry health element.

Key Words: Poultry Health, Internal Parasites, Anthelmintic Resistance, Sustainable Control

COMPARISON OF OXIDATIVE STABILITY AND FATTY ACID COMPOSITION OF EGGS OF DOMESTIC HENS FED WITH FOOD WASTES, WHEY AND COMMERCIAL FEED

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2025-PSC-157

Abstract

The study was conducted to evaluate the oxidative stability and fatty acid profile of eggs produced by domestic hens fed with kitchen food waste (KFW) and dairy waste (whey). Ninety-six laying hens were divided into two broad categories (BC1 and BC2), each further split into four groups (12 birds per group). In BC1, the control group received 100% commercial feed, while three treatment groups received diets with 15%, 30%, and 45% kitchen waste. In BC2, all four groups were provided 5% whey in drinking water along with either 100% commercial feed or 15–45% kitchen waste-based diets. Egg yolk oxidative stability was measured by malondialdehyde (MDA) content using the TBAR-test, while fatty acid composition was analyzed following lipid extraction methods. Fresh, 10-day, and 20-day stored eggs were assessed. Results showed that oxidative stability decreased with increasing replacement of commercial feed with kitchen waste in BC1 groups. However, the addition of 5% whey in BC2 significantly reduced MDA values, indicating greater resistance to oxidation. Furthermore, whey supplementation decreased saturated fatty acids (SFA) and increased unsaturated fatty acids in egg yolk, likely due to the lipid profile of whey. Importantly, kitchen waste inclusion did not negatively affect the fatty acid profile. In conclusion, combined use of kitchen food waste and whey enhanced egg quality, improved oxidative stability, and enriched fatty acid composition. This strategy can reduce feed costs, utilize natural waste resources effectively, and mitigate environmental pollution linked to food and dairy waste disposal.

Key Words: Oxidative Stability, Fatty Acid Profile, Kitchen Food Waste (KFW)

COMPARISON OF OXIDATIVE STABILITY AND FATTY ACID COMPOSITION OF EGGS OF DOMESTIC HENS FED WITH FOOD WASTES, WHEY AND COMMERCIAL FEED

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2025-PSC-158

Abstract

The increasing ban of antibiotic growth promoters (AGPs) in broiler production has led to an increased prevalence of enteric diseases, including necrotic enteritis (NE). Consequently, there is a dire need to explore viable alternative solutions to replace AGPs effectively. This study assessed the efficacy of antibiotic, probiotic, and antimicrobial peptide (AMP) supplementation in alleviating the detrimental effects of necrotic enteritis (NE) in broilers. A total of 720 one-day-old male broiler chicks (Ross-308) were randomly allocated to five different feeding regimens, with each treatment including six replicates of 24 birds. The treatments were: (1) Uninfected control (UC), only fed basal diet; (2) Infected control (IC); + basal diet with NE challenge; (3) CP-AGP: NE challenge + virginiamycin (Stafac® 500) at 200 g/ton, (4) CP-Pro: NE challenge + 200 g/ton probiotic *B. subtilis* PB6 (Clostat dry®), and (5) CP-AMP: NE challenge + 200 g/ton antimicrobial peptide (LassoTide Plus®). The experimental NE challenge model was established by predisposing birds with an overdose (tenfold) of coccidia vaccine on day 15 (1ml/bird; orally), followed by inoculation with a pathogenic field strain of *Clostridium perfringens* type G (1×10^8 CFU/ml/ bird; 1 ml) on days 19 and 20 via oral gavage. The findings demonstrated that administering AMP and probiotics to broilers affected by NE led to increased body weight gain (23.93% and 19.70%, respectively) and reduced mortality (76.59% and 70.27%, respectively) in comparison to the positive control ($P < 0.05$). Likewise, AMP supplementation improved ($P < 0.05$) gut morphology, carcass yield (5.82%), meat water holding capacity (14.73%), and decreased cooking loss (10.01%), dripping loss (20.87%), and shear force (25%) relative to the PC. Moreover, the excreta score, litter quality, and welfare parameters were considerably improved ($P < 0.05$) with the addition of AMP. In conclusion, the results indicate that AMP surpassed both antibiotics and probiotics, highlighting its potential as a superior alternative to AGPs in broilers.

Key Words: Broiler; Necrotic Enteritis; Antibiotic Alternatives; Antimicrobial Peptide

POULTRY CLOSTRIDIOSIS : MICROBIAL MECHANISM AND CONTROL STRATEGIES

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2025-PSC-159

Abstract

Clostridium is the genus of anaerobic, Gram-positive, spore forming bacteria. Genus of *Clostridium* inhabit in intestine of human as well as in animals, and in soil. Species like *Clostridium perfringen*s and *Clostridium colinum* perform a toxogenic role in poultry as well as human side. In poultry point of view *C. perfringens* causes Necrotic Enteritis (NE), leading to necrosis of intestinal lining, dyspepsia, dysbiosis, gastroparesis, including symptoms like bloating and gas, diarrhea, nutrient deficiencies and abrupt weight loss. *Clostridium colinum* causes Ulcerative Enteritis (UE), leading watery to hemorrhagic diarrhea, anorexia and sudden death. Due to their ability to form spores , they form resistant structures that survive in extreme environment , withstand heat , chemicals , radiations , pH and remain dormant for extended period. *Clostridium* infection not only compromise poultry health but also impose a significant impact on economical losses by increasing mortality rate, poor growth and nutrition. To combat these obstacles , commercially available vaccines for *C. perfringens* are alpha-toxoid (CPA) , NetB toxin , and using live Salmonella-based vector vaccine showed a sustainable decline in incidence of necrotic enteritis (NE). Ongoing research focuses on improving vaccine efficiency and developing innovative prevention strategies. However, a specific vaccine for *C. colinum* remains unavailable, emphasizes the need for future research and development to address this critical gap in poultry health protection and microbial industry.

Key Words: *Clostridum*, Necrotic Enteritis, Poultry Health, Economic Impact

EFFECT OF DIETARY SUPPLEMENTATION OF TRACE MINERALS WITH CALCIUM CARBONATE ON EGG QUALITY AND PRODUCTION PERFORMANCE OF LAYING HENS

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2025-PSC-160

Abstract

This study evaluated the effects of dietary supplementation with trace minerals combined with calcium carbonate on production performance and egg quality in laying hens. A total of 252 Lohmann Brown layers (52 weeks old) were randomly assigned to four treatments: a control group fed a basal diet and three groups supplemented with 50, 75, or 100 g of a trace mineral–calcium carbonate blend per 100 kg of feed. Egg production percentage and egg mass were significantly higher in the 75 and 100 g groups compared with the control ($p < 0.05$), with peak performance observed at 100 g. Egg weight increased dose-dependently ($p < 0.05$). Eggshell thickness and shell-to-egg weight ratio improved significantly in supplemented groups ($p < 0.05$), indicating enhanced mineral deposition and shell integrity. Internal quality, measured by Haugh unit, was significantly higher in the 100 g group ($p < 0.05$). Shape index did not differ among treatments ($p > 0.05$), while yolk color score increased in the 75 and 100 g groups ($p < 0.05$), likely reflecting improved carotenoid utilization. Serum vitamin D_3 concentrations were significantly elevated in all supplemented groups ($p < 0.05$), demonstrating improved calcium metabolism. In conclusion, dietary inclusion of trace minerals with calcium carbonate, particularly at 100 g/100 kg feed, enhanced egg production, egg weight, shell quality, internal quality, yolk pigmentation, and nutrient metabolism in laying hens. These findings suggest that higher supplementation levels support sustained productivity and better egg quality in late-phase layers.

Key Words: Egg Shell Quality, Egg Production, Shell Thickness

SALMONELLOSIS IN WILD AVIFAUNA: AN OVERVIEW FROM THE RELEVANT STUDIES

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2025-PSC-161

Abstract

The comprehensive analysis of *Salmonella* infection in pet and wild-captive birds across various Asian countries reveals considerable variation in prevalence depending on bird species, geographic region, and management practices. As a review from some of the previous relevant studies. Pigeons show notably high prevalence rates, with studies reporting approximately 37% in Bangladesh, 20% in Iran, and 13% in China, highlighting significant regional disparities. Wild migratory birds such as house crows (Corvus splendens) and Asian pied starlings (*Gracupica contra*) exhibit even higher prevalence rates, up to 65–67%. Other commonly kept pet birds—including parrots, budgerigars, finches, canaries, and sparrows—also test positive, with prevalence typically ranging between 10% and 30%, depending on environmental conditions and diagnostic methods. Frequently isolated serovars include *Salmonella* Typhimurium and S. Enteritidis, with emerging reports of multidrug-resistant strains like S. Kentucky ST198 and S. Albany. Risk factors strongly associated with increased infection rates include poor cage hygiene, contaminated feed and water, overcrowding, mixed-species housing, stress from transportation or captivity, and sourcing from informal pet markets. Birds housed in unregulated conditions and live animal markets show significantly higher infection rates compared to those bred under controlled environments. Additionally, the emergence of antimicrobial resistance among *Salmonella* isolates further complicates control efforts. These previous studies underscore the zoonotic potential of Salmonella transmission from pet birds to humans, especially in densely populated urban and peri-urban settings where bird ownership is common. Strengthening biosecurity protocols, implementing routine microbial screening, improving husbandry and sanitation practices, and increasing public awareness are crucial steps to reduce the risk of *Salmonella* infection and safeguard both avian and human health across Asia.

Key Words: *Salmonella*, Prevalence, Serrovar

EFFECT OF SOLITARY VERSUS BLEND STRAINS' PROBIOTIC *BACILLUS* ON GROWTH PERFORMANCE, NUTRIENT DIGESTIBILITY AND HEALTH OF BROILER

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2025-PSC-162

Abstract

The present study was designed to examine the effects of encapsulated butyric acid on growth performance, carcass characteristics, and nutrient digestibility in broilers. A total of 360-day-old Ross-308® chicks were randomly assigned to four dietary treatments, each comprising 9 replicates with 10 birds per replicate. The treatments included T1 (basal diet without encapsulated butyric acid), T2 (0.2 ml of encapsulated butyric acid/kg of feed), T3 (0.3 ml of encapsulated butyric acid/kg of feed) and T4 (0.4 ml of encapsulated butyric acid/kg of feed). The experimental period lasted for 35 days. Data on feed intake, body weight gain and feed conversion ratio were recorded on a weekly basis. Nutrient digestibility was determined on day 35 of the trial using the indirect marker method. Carcass characteristics, including carcass yield (%), breast yield (%), thigh yield (%) and organ weights such as heart (%), liver (%), gizzard (%), pancreas (%) and proventriculus (%) were also assessed on day 35. Mortality percentage was recorded throughout the trial. The collected data were analyzed using the General Linear Model procedure in Minitab and treatment means were statistically compared using Tukey's test. The results showed that no significant differences ($p>0.05$) were observed among treatments in body weight gain (BWG), feed intake (FI) and feed conversion ratio (FCR) during the first week. Similarly, FCR remained statistically unaffected during weeks 3 and 4. However, significant differences ($p<0.05$) were noted among treatment groups during the overall performance period (1-35 days). Similarly, nutrient digestibility at day 21st and 35th was enhanced ($p<0.05$) with supplementation of butyric acid as compared to control group. Carcass characteristics such as dressing%, carcass%, breast%, and thigh% were showed significant ($p<0.05$) results while head% and wings% showed no significant ($p>0.05$) results. Organ characteristics such as gizzard% and liver% were significant ($p>0.05$) results while heart%, spleen%, lungs%, pancreas% and proventriculus were not affected ($p<0.05$) by the supplementation of butyric acid.

Key Words: Probiotic, Cobb®, Bacillus, FCR, Carcass, Nutrient Digestibility

LYSOZYME AS A THERAPEUTIC AGENT IN *ESCHERICHIA COLI*–INDUCED POLYSEROSITIS IN BROILERS: HEMATOBIOCHEMICAL AND HISTOPATHOLOGICAL EVALUATION

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2025-PSC-163

Abstract

Polyserositis caused by *Escherichia coli* is a leading problem in broiler production, resulting in high mortality, poor performance, and economic losses. The present study evaluated the therapeutic efficacy of lysozyme against *E. coli*–induced polyserositis in broilers, focusing on hematobiochemical and histopathological alterations. A total of 150 day-old broiler chicks were allocated into control, infected untreated, and infected groups treated with graded doses of lysozyme. Following experimental infection, clinical signs, mortality, and gross lesions were monitored. Blood samples were analyzed for hematology (hemoglobin, packed cell volume, total and differential leukocyte counts) and serum biochemistry (ALT, AST, ALP, creatinine, uric acid, total protein). Histopathological examination was conducted on liver and heart. The infected untreated group exhibited depression, ruffled feathers, and reduced feed intake, with mortality reaching 30%. Hematological changes included anemia and leukocytosis, while serum analysis revealed elevated hepatic and renal markers with decreased total protein. Histopathology showed severe necrosis, congestion, and inflammatory cell infiltration in liver and heart. In contrast, lysozyme treatment significantly improved hematological and biochemical indices, reduced lesion severity, and restored near-normal histoarchitecture in a dose-dependent manner. Mortality was markedly lower in treated groups compared with untreated controls. The study demonstrates that lysozyme provides therapeutic benefits against *E. coli*–induced polyserositis by improving systemic responses and limiting tissue damage. These findings highlight lysozyme as a promising antibiotic alternative for controlling colibacillosis in broiler production.

Key Words: Lysozyme, *Escherichia coli*, Polyserositis, Broilers

LYSOZYME SUPPLEMENTATION FOR ENHANCED GROWTH PERFORMANCE IN BROILER CHICKENS

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2025-PSC-164

Abstract

Lysozyme, a natural antimicrobial enzyme, has emerged as a promising candidate due to its bacteriolytic, immunomodulatory, and gut-protective properties. This study was conducted to evaluate the growth-promoting potential of lysozyme in broilers. A total of 150 day-old chicks were divided into control and treatment groups receiving graded levels of dietary lysozyme. Growth performance parameters, including body weight gain, feed intake, and feed conversion ratio (FCR), were recorded throughout the trial. Hematological and biochemical indicators were measured to assess systemic health, and intestinal morphology was examined to evaluate gut development. Broilers supplemented with lysozyme showed improved weight gain and significantly better FCR compared with controls. Enhanced villus height and villus height-to-crypt depth ratio were observed, indicating improved nutrient absorption. Lysozyme supplementation also maintained favorable hematobiochemical profiles, suggesting overall health benefits. These findings suggest that lysozyme is an effective natural growth promoter in broilers, offering a sustainable and safe alternative to antibiotics for enhancing poultry production.

Key Words: Lysozyme, Broiler, Body Weight, Growth Promoter

FOWL ADENOVIRUS-4 INFECTION AGGRAVATES AFLATOXIN B1–INDUCED IMMUNOSUPPRESSION IN BROILERS

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2025-PSC-165

Abstract

Aflatoxin B1 (AFB1), a prevalent mycotoxin in poultry feed, impairs growth, increases disease susceptibility and suppresses immune function in broiler chickens, increasing vulnerability to secondary infections. This study investigated the immunosuppressive effects of AFB1 and its synergistic interaction with fowl adenovirus serotype 4 (FAdV-4) in broilers. One hundred twenty day-old chicks were randomly assigned to six groups (A–F): Group A (negative control), Groups B and C (AFB1 at 100 and 200 µg/kg feed, respectively), Group D (FAdV-4 alone), and Groups E and F (FAdV-4 with AFB1 at 100 and 200 µg/kg, respectively). Over 35 days, immune responses were evaluated via humoral immunity (anti-SRBC antibody titers by hemagglutination inhibition), cellular immunity (PHA-P-induced lymphoproliferation assay), and phagocytic activity (carbon clearance test). Groups C, E, and F exhibited significantly reduced skin thickness post-PHA-P injection, indicating suppressed T-cell-mediated immunity. Phagocytic activity was significantly decreased in Groups B, C, E and F, while Group D showed no significant difference from controls. Co-infected Groups E and F displayed the most pronounced reductions in total immunoglobulin and IgM levels, suggesting synergistic immunosuppression by AFB1 and FAdV-4. These findings demonstrate that dietary AFB1 compromises innate and adaptive immunity in broilers, with co-infection by FAdV-4 exacerbating these effects. Data were analyzed using ANOVA with Duncan's Multiple Range Test in M-Stat C software.

Key Words: Aflatoxin B1, Fowl Adenovirus Serotype 4, Immunosuppression, Humoral Immunity, Cellular Immunity, Broiler Chicken

GREEN MEDICINE FOR POULTRY: PHYTOCHEMICAL INNOVATIONS AGAINST NECROTIC ENTERITIS

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2025-PSC-166	**Abstract**

Necrotic enteritis (NE) in poultry is a complex disease primarily caused by *Clostridium perfringens*, often compounded by *Eimeria* infections and mycotoxins. Traditionally, NE has been managed with in-feed antibiotics and antimicrobial growth promoters (AGPs), which not only control the disease but also enhance growth performance in poultry. However, concerns over antimicrobial resistance and the transmission of resistant microorganisms through the food chain have led to global bans on AGPs in animal feed. This regulatory shift has contributed to the re-emergence of NE, resulting in significant economic losses in the poultry industry. As a result, there is a growing demand for alternative solutions to manage NE. Natural plant extracts, particularly tannins and essential oils, have emerged as promising alternatives to AGPs. These plant-based compounds offer a range of benefits, including antimicrobial, anti-inflammatory and immune-enhancing properties. Research has demonstrated that tannins and essential oils can inhibit the growth of *C. perfringens* and *Eimeria* species both in vitro and in vivo, suggesting their potential for controlling NE. In addition, these extracts promote gut health by balancing the gut microbiota, reducing inflammation and supporting immune function, all of which contribute to better overall intestinal health in poultry. Beyond their antimicrobial effects, tannins and essential oils have also been shown to improve poultry productivity, mimicking the benefits of AGPs without the associated risks. These findings highlight plant extracts as viable, sustainable feed additives that can replace antibiotics in poultry production. This review focuses on the potential of phytochemicals and essential oils as alternative feed additives, examining their mechanisms of action, effectiveness, and future prospects for developing antibiotic-free solutions to prevent NE and promote long-term poultry health.

Key Words:	Necrotic Enteritis, Medicinal Plants, Phytochemicals, Gut Health, Poultry

BIOLOGICAL DEGRADATION OF *CLOSTRIDIUM PERFRINGENS* ENDOTOXINS IN POULTRY THROUGH BIOACTIVE DIETARY SUPPLEMENTATION

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2025-PSC-167 **Abstract**

Clostridium perfringens, a spore-forming, Gram-positive, anaerobic bacterium prevalent in soil, sediments, and fecal matter, is a significant pathogen causing infections in humans and animals. Its heat-resistant spores enable prolonged environmental persistence, complicating control measures, while its production of six major toxins (alpha, beta, epsilon, iota, netB and enterotoxins) disrupts intestinal linings, leading to diarrhea and necrotic enteritis, particularly in poultry. Classified into seven types (A–G), types C (alpha and beta) and G (alpha and netB) are primary contributors to poultry necrotic enteritis, a disease with substantial economic impact. With global restrictions on antibiotic growth promoters due to rising antimicrobial resistance, dietary supplementation with probiotics, phytochemicals, and prebiotics has emerged as a promising alternative to mitigate *C. perfringens* toxins. Probiotics compete with pathogens for gut colonization, phytochemicals disrupt toxin activity and prebiotics foster beneficial microbiota, collectively reducing pathogen virulence. Recent studies highlight biological detoxification as an efficient, sustainable approach to neutralize both vegetative cells and spores, improving gut health and resilience. This review evaluates the protective mechanisms of these bioactive dietary supplements, emphasizing their potential to enhance poultry health and welfare without antibiotics. It also explores recent advances in developing and applying these supplements as viable replacements for traditional growth promoters in poultry production. By elucidating the biological degradation of *C. perfringens* toxins, this review underscores dietary interventions as a transformative strategy to improve poultry health, reduce economic losses and address global antibiotic resistance. Continued research is essential to optimize these interventions for scalable, cost-effective application in poultry production and beyond.

Key Words: *Clostridium perfringens*, Necrotic Enteritis, Probiotics, Phytochemicals

TARGETING MYCOTOXIN AND NECROTIC ENTERITIS-INDUCED GUT DYSBIOSIS IN POULTRY USING *BACILLUS LICHENIFORMIS*

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2025-PSC-168

Abstract

Mycotoxins disrupt intestinal integrity, alter gut microbiota, and increase susceptibility to enteric infections, such as necrotic enteritis (NE), in poultry. This study evaluated the protective effects of *Bacillus licheniformis* against mycotoxin-induced toxicity and *Clostridium perfringens*-associated NE in broiler chickens. In a 35-day trial, 280 day-old broilers were randomly assigned to eight groups (A–H). Group A (control) received standard feed, while groups B–H received *B. licheniformis* (1×10^6 CFU/kg), mycotoxins (150 ppb aflatoxin B1 + 150 ppb ochratoxin A), *C. perfringens* (3×10^{10} CFU/mL), or combinations thereof. Group E received both mycotoxins and *C. perfringens*, while groups F, G and H included *B. licheniformis* with mycotoxins, *C. perfringens*, or both, respectively. Groups challenged with mycotoxins and/or *C. perfringens* (C, D, E, H) showed reduced body weight and feed intake compared to the control, whereas *B. licheniformis*-supplemented groups (B, F, G) maintained growth performance similar to group A. Organ weight analysis indicated elevated liver, kidney and intestinal weights in group E, but *B. licheniformis* supplementation (B, F, G) normalized these metrics. Hematological analysis revealed decreased erythrogram parameters (TEC, Hb, PCV) and altered leucogram values in groups C, D, E and H, with group E most severely affected. Hepatic and renal biomarkers were elevated and serum protein levels (total protein, albumin) were reduced in these groups, reflecting systemic stress. *B. licheniformis* supplementation in groups B, F and G attenuated these effects, maintaining parameters comparable to the control. These findings confirm *B. licheniformis* efficacy in mitigating mycotoxin-induced toxicity and NE susceptibility under single-stressor conditions. However, its protective effects were reduced under combined mycotoxin and *C. perfringens* challenge, indicating a need for synergistic interventions.

Key Words: *Bacillus licheniformis*, Gut Microflora, Mycotoxins, Necrotic Enteritis, Poultry Health

RETAIL CHICKEN MEAT AS A RESERVOIR OF ANTIBIOTIC-RESISTANT *ESCHERICHIA COLI* IN ISLAMABAD, PAKISTAN

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2025-PSC-169 **Abstract**

Escherichia coli is a natural inhabitant of the gastrointestinal tract of humans and poultry, also acts as an important reservoir for antimicrobial resistance (AMR). Through its capacity to acquire and disseminate resistance genes, it has emerged as a significant opportunistic pathogen. Resistant strains can enter the human food chain via contaminated meat, contributing to infections such as urinary tract infections, septicemia, gastroenteritis, neonatal meningitis, and intra-abdominal infections. This work explored both the occurrence and resistance patterns of *E. coli* detected in poultry meat retailed across Islamabad, Pakistan. A total of 60 broiler meat samples were analyzed, of which 40 (66.6%) yielded *E. coli*. Antimicrobial susceptibility testing revealed high resistance to ampicillin and cefotaxime, and carbapenems, while moderate resistance was recorded against gentamicin, amikacin and trimethoprim-sulfamethoxazole. Molecular confirmation of *E. coli* was achieved by amplification of the *uidA* gene. Screening for resistance determinants identified extended-spectrum β-lactamase (ESBL) genes, predominantly *blaCTX-M*, *blaTEM,* and *blaSHV*. Moreover, carbapenemase-associated genes, including *blaNDM*, *blaKPC*, *blaOXA-48*, were also detected. Our results demonstrate that poultry-derived *E. coli* carry resistance genes of major clinical concern. The detection of ESBL-producing *E. coli* in retail chicken meat, along with the presence of carbapenemase genes in poultry-associated strains, is alarming. These results underscore the importance of judicious antimicrobial use, effective surveillance, and the adoption of One Health strategies to prevent the transmission of resistant bacteria from animals to humans.

Key Words: *Escherichia coli*, Antimicrobial Resistance. Extended-spectrum ß-lactamase, Carbapenemase genes

PCR-BASED DIAGNOSIS OF *ASCARDIA COLUMBAE* ISOLATED FROM PIGEONS OF AZAD KASHMIR, PAKISTAN

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2025-PSC-170

Abstract

Parasitism is a divesting problem that is frequently overlooked and may result in severe prominent clinical manifestation in companion animals, including pigeons. The present study was aimed to investigate the prevalence of the gastrointestinal nematode, *Ascaridia columbae* (A. columbae) infections among domestic pigeons in District Rawalakot, Azad Kashmir, during the period from May to August, 2025. The internal organs of 81 domestic pigeons were examined for the presence of *A. columbae*. After morphological identification of isolated worms, DNA was extracted and subjected towards PCR. The morphological investigations were supplemented by molecular analysis of ITS (I and II) and COX genes. The data showed that the present *A. coulmbae* is deeply embedded in the Ascaridia genus with a 95-100% sequence similarity to other species. The ascaridiid species examined belong to the Ascaridia genus and displaced a close relationship with the previously described *A. coulmbae*. The results of current study revealed that *A. columbae* is the first account of this genus as an endo-parsite from the domestic pigeon inhabiting Azad Kashmir. Therefore, the combination of morphological and molecular studies helps to identify this specie correctly and identified as *Ascaridia columbae*.

Key Words: *Ascardia columbae*, Birds, Pigeons, Molecular Identification

IMPACT OF *MORINGA OLIFERA* ON GROWTH PERFORMANCE AND BLOOD BIOCHEMISTRY OF BROILERS

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2025-PSC-171

Abstract

This study evaluated whether adding Moringa oleifera leaf powder (MOLP) to broiler diets could improve growth and blood indicators. A 2-week feeding trial (weeks 5 to 6) was conducted with 300 broilers divided into five groups with three replicates & consisted of 20 birds each. Each group received a diet with 0, 5, 10, 15, or 20 g of MOLP per kg of feed and measured body weight, weight gain, feed intake, feed conversion ratio (FCR). At the end of the trial, blood samples were analyzed for glucose, uric acid, and creatinine. Results showed that MOLP supplementation significantly ($p < 0.05$) improved growth and feed efficiency. In particular, the highest level of MOLP (15 & 20 g/kg, group G4 & G5) produced the best outcomes. Birds in G4 (2035.15±22.38) g & G5 (2067.90±25.95) g final body weights were observed significant as compare to control and other groups, and a weight gain of 779 & 806 g, with the favorable FCR (2.74±0.32) & (2.64±0.21) respectively. Whereas G4 & G5 had the similar means. The group 5 also had the highest blood glucose (253.10±1.196 mg/dL) and maintained normal uric acid (7.22±0.005 mg/dL) and creatinine (0.780±0.32 mg/dL) levels along with G4 and observed significant ($p < 0.05$).Feed intake was similar across all groups, this study concluded, that supplementing 15 to 20 g/kg MOLP markedly enhanced broiler growth, nutrient utilization (feed efficiency), and metabolic response without any major adverse effects. These findings support the use of MOLP as a beneficial feed additive for broilers.

Key Words: *Moringa Olifera,* Leaf Powder, Broilers, Growth Performance, Blood Biochemistry

EXPLORING BIODEGRADING MICROORGANISMS FROM WASTE DUMPING SOIL IN MULTAN

Author(s): Atif Nisar Ahmad[1], Ahmad Hassan[1], Zeeshan Ali[1], Muhammad Jamshed khan[4],Malka Uzma[3] , Muhammad Tauseef Sultan[2],Uzma Batool[1], Muhammad Raza Hameed[1]
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2025-PSC-172

Abstract

Plastic pollution has become a global environmental concern, prompting the exploration of biodegradation strategies to mitigate its impact. The microbial isolates, comprising bacterial and fungal strains, were cultured on both solid and liquid media to assess their ability to degrade polyethylene. A comprehensive analysis involving biochemical tests, Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), and weight loss measurements was conducted to evaluate the efficacy of microbial degradation. The results revealed substantial plastic-degrading activity among both bacterial and fungal isolates. Through FTIR analysis, changes in functional groups were observed indicating the polyethylene breakdown. SEM imaging provided visual evidence of surface alterations in degraded polyethylene samples, highlighting the physical changes caused by microbial activity. Weight loss measurements further demonstrated the effectiveness of microbial degradation, with a higher degree of degradation observed in samples treated in liquid media compared to those treated in solid media. The bacterial species showing biodegradation potential were identified as Bacillus sp, E.coli, staphylococcus aureus, and Staphylococcus citrus. The fungal species were identified as Aspergillus sp and Penicillium sp showing biodegradation of polyethylene samples. The results indicate the liquid environment offers a more favorable setting for microbial polyethylene degradation, potentially due to the increased mobility and accessibility of the microbial isolates. Polyethylene samples were degraded 43% and 14% by Bacillus sp, 21% and 4% by E. coli, 31% and 10% by Staphylococcus aureus, and 28% and 7% by Staphylococcus citrus, 25% and 7% by Penicillium sp and, 48% 11% by Aspergillus sp in solid and liquid medium respectively following 4 weeks' incubation in the weight loss method. As a result, the current research gave a scientific justification that bacteria and fungus could be further developed as promising candidates for plastic bioremediation. Overall, the findings of this study contribute valuable insights into microbial plastic degradation mechanisms and underscore the potential of microbial isolates in addressing plastic waste management challenges. This research lays the groundwork for further exploration of microbial biodegradation strategies and underscores the importance of environmental factors in optimizing plastic degradation processes.

Key Words: Microbial Degradation, Polyethylene, Environmental Sustainability, Waste Dumping Soil

CHARACTERIZATION AND ANTIMICROBIAL ACTIVITY OF GREENLY SYNTHESIZED *CASSIA FISTULA* NANOPARTICLES AGAINST PATHOGENIC *ESCHERICHIA COIL*

Author(s): Zeeshan Ali[1], Uzma Batool[1], Muhammad Jamshed khan[3], Malka Uzma[2], Umme-e-amen[1] , Muhammad Raza Hameed[1], Safeena Rani[1], Atif Nisar Ahmad[1]

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2025-PSC-173

Abstract

The rapid increase of antimicrobial resistance has created a serious global health issue. That issue calling for safer and more effective alternative as compared to conventional antibiotics. Nanotechnology offers promising solution particularly through the use of silver nanoparticles. In this study, silver nanoparticles were synthesized using a green method with *Cassia fistula* plant extracts. These plants extract serves as the natural reducing and stabilizing agents in the formation of silver nanoparticles. The synthesis of silver nanoparticles was confirmed by characterization techniques such as UV-Visible spectroscopy, FTIR, XRD,SEM and zeta potential analysis. These techniques confirm the formation of the stable nanoparticles. The antimicrobial activity of the green synthesized AgNPs was evaluated against pathogenic *Escherichia coil*. Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) assays were used which demonstrated that the nanoparticles exhibited significant antibacterial effects even at low concentrations. The enhanced activity can be attributed to the small particle size and phytochemical capping due to the *Cassia fistula* extracts which cause cell death of the bacteria through reactive oxygen species generation and membrane disruption. This study highlights the potential of the green synthesized silver nanoparticles as a cost effective and sustainable antimicrobial agent. The finding suggest that such nanoparticles could serve as promising alternative to the traditional antibiotics by further research.

Key Words: Green Synthesis, Silver Nanoparticles, Antimicrobial Activity

CHITOSAN ASSISTED ZINC OXIDE NANOPARTICLES ALONG WITH THEIR ANTIMICROBIAL AND CYTOTOXICITY CAPACITIES

Author(s): Lubabah Numan[1], Zeeshan Ali[1], Malka Uzma[3], Muhammad Jamshed Khan[4], Umme-e-Amen[1], Muhammad Tauseef Sultan[2], Safeena Rani[1], Atif Nisar Ahmad[1]

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2025-PSC-174

Abstract

The search for safe and effective nanomaterials with strong biological activity has gained momentum due to rising antimicrobial resistance and increasing demand for biocompatible alternatives. Zinc oxide nanoparticles (ZnO-NPs) are among the most widely studied nanomaterials owing to their broad-spectrum antimicrobial activity and unique physicochemical properties. In this study, chitosan, a natural biopolymer derived from chitin, was used as a stabilizing and capping agent to assist in the synthesis of ZnO nanoparticles. Chitosan enhances the biocompatibility of the nanoparticles and prevents agglomeration, thereby improving their stability and functionality. The synthesized chitosan-assisted ZnO-NPs were characterized using UV–Visible spectroscopy, FTIR, XRD, SEM, and zeta potential analysis, which confirmed their crystalline structure, uniform morphology, and surface functionalization. Antimicrobial assays demonstrated strong activity of the ZnO-NPs against both Gram-positive and Gram-negative bacteria, attributed to their ability to generate reactive oxygen species (ROS), disrupt cell membranes, and interfere with microbial metabolism. Cytotoxicity analysis revealed that the nanoparticles showed dose-dependent effects on cancer cell lines while maintaining acceptable biocompatibility at lower concentrations, highlighting their potential as therapeutic agents. Overall, this study demonstrates that chitosan-assisted ZnO nanoparticles combine eco-friendly synthesis, strong antimicrobial activity, and promising cytotoxic potential. These features suggest wide applications in biomedical fields, including drug delivery, antimicrobial coatings, and cancer therapeutics.

Key Words: Zinc Oxide Nanoparticles, Chitosan, Green Synthesis, Antimicrobial Activity

GREEN SYNTHESIS AND CHARACTERIZATION OF PULLULAN MEDIATED SILVER NANO PARTICLES (P- AGNPS) USING PULLULAN AS REDUCING AND CAPPING AGENT

Author(s): Umme-e-amen[1] , Uzma Batool[1], Lubabah Numan[1], Zeeshan Ali[1], Muhammad Jamshed khan[3], Malka Uzma[4], Muhammad Raza Hameed[1,] Atif Nisar Ahmad[1]

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2025-PSC-175

Abstract

Green synthesis of nanoparticles has emerged as a sustainable alternative to conventional physical and chemical methods. In this study, silver nanoparticles (AgNPs) were synthesized using pullulan, a natural water-soluble polysaccharide, as both a reducing and capping agent. Pullulan's non-toxic and biocompatible properties make it an excellent candidate for eco-friendly nanomaterial fabrication. The synthesis of pullulan-mediated silver nanoparticles (P-AgNPs) was visually confirmed by a characteristic color change and further characterized using UV–Visible spectroscopy, FTIR, XRD, SEM, and zeta potential analysis. These techniques validated the successful formation of nanoparticles. The functional groups in pullulan not only reduced silver ions to metallic silver but also stabilized the nanoparticles by forming a protective organic layer. The study highlights the dual role of pullulan in nanoparticle synthesis, offering an efficient, cost-effective, and environmentally safe method. The P-AgNPs synthesized through this approach are promising candidates for biomedical, pharmaceutical, and environmental applications due to their stability, dispersity, and potential antimicrobial properties.

Key Words: Green synthesis, Pullulan, Silver nanoparticles, Characterization, Biopolymer

CHARACTERIZATION AND ANTIMICROBIAL ACTIVITY OF GREENLY SYNTHESIZED CASSIA FISTULA NANO EMULSION AGAINST *BACILLUS SUBTILIS*

Author(s): Zeeshan Ali[1], Uzma Batool[1], Muhammad Jamshed khan[4], Malka Uzma[3], Lubabah Numan,[1] Muhammad Raza Hameed[1], Muhammad Tauseef Sultan[2], Atif Nisar Ahmad[1].

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2025-PSC-176

Abstract

Nanotechnology provides a great alternative to the growing problem of antimicrobial resistance especially through the development of plant based nanoemulsion. In this study, a nanoemulsion of Cassia fistula (commonly known as the golden shower plant) fruit and leaf extracts was synthesized using green synthesis and tested its antimicrobial activity against *Bacillus subtilis*. The synthesis of the nanoemuslion was confirmed by the different characterization techniques such as UV-Visible spectroscopy, FTIR, XRD, SEM and zeta potential analysis. These techniques confirm the formation of the nanoparticles within the emulsion. The phytochemicals present in Cassia fistula acted as the natural reducing and stabilizing agents which enhance the stability of the nanoemulsion. Antimicrobial activity was evaluated through minimum inhibitor concentration (MIC) and minimum bactericidal concentration (MBC) assays. The results shows that the *Cassia fistula* nanoemulsion showed strong antibacterial activity against *Bacillus subtilis* likely due to the synergistic effect of the nano-sized particles and phytochemical capping which leads to cell death through bacterial cell membrane disruption and generation of oxidative stress. These findings suggest the potential application of Cassia fistula nanoemulsion in biomedical fields to combat antimicrobial resistance.

Key Words: Nanotechnology, Green Synthesis, *Cassia fistula,* Nanoemulsion, Antimicrobial Resistance

EFFECTS OF MULTI-WALLED CARBON NANOTUBES ON PATHOGENIC *ESCHERICHIA COLI*

Author(s): Atif Nisar Ahmad[1], Zeeshan Ali[1], Uzma Batool[1], Muhammad Jamshed khan[3], Shahid Nisar Ahmad[2], Malka Uzma[3], Raza Hameed[1],

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2025-PSC-177

Abstract

Carbon nanotubes (CNTs) are gaining wide importance in nanomedicine because of their unique shape, structure, and chemical behavior. Their small size and large surface area make them suitable for biological applications, especially in antimicrobial research. In this study, both single-walled and double-walled CNTs were obtained from the National Institute of Health (NCP) and processed using an ultrasonicator to achieve uniform dispersion. The prepared CNTs were then characterized using UV–Visible spectroscopy, Fourier-transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), scanning electron microscopy (SEM), and zeta potential analysis. These techniques confirmed their crystalline nature, stable morphology, and successful functionalization. The antimicrobial activity of the CNTs was tested against *Escherichia coli* (E. coli), a Gram-negative bacterium commonly associated with infections. The bacterium was identified using selective culture, biochemical tests, and PCR analysis. Antimicrobial assays, including the Kirby–Bauer disc diffusion method and minimum inhibitory concentration (MIC), revealed that CNTs strongly inhibited bacterial growth. Moreover, when CNTs were combined with selected antibiotics, their activity was enhanced, showing a synergistic effect compared to antibiotics alone. This study shows that CNTs, after proper preparation and characterization, have strong antibacterial potential. Their ability to improve antibiotic action highlights their promise as next-generation antimicrobial agents with applications in medicine and pharmaceuticals.

Key Words: Carbon nanotubes, *Escherichia coli*, Antimicrobial activity, Single-walled CNTs, Double-walled CNTs

CALIBRATING FUNCTIONAL CARBOHYDRATES AND SHORT CHAIN FATTY ACIDS BLEND TO REDUCE *SALMONELLA INFANTIS* PROPAGATION IN BROILER CHICKENS IN ANTIBIOTIC FREE FEED PRODUCTION SYSTEM

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2025-PSC-178

Abstract

S.Infantis propagation is still under strict surveillance, was reported in 2019 in Pakistan and highest prevailing serotype in the whole European community, with 95% of cases connected to chicken production and processing products. This serotype not only posses traits of multidrug resistance but most concurrent at chicken production facilities which makes it a priority topic in aspect of antimicrobial resistance to be addressed further. As short chain fatty acids appeared to be effective solution against Salmonella in general, specific studies of this serovar is not documented yet. The main objective of this experiment was to calibrate a blend of functional carbohydrate and an organic acid additive against S.Infantis in broiler and test its efficacy. Trial designed on Ross 308 of a total of 396 birds placed in groups of 22 birds per pen, with each treatment having 09 pens. Birds were given a commercial, pelleted, diet, with phase 1 being between days0-11, phase 2 betweendays11-28 and phase 3 between days28-39. On day 39 a feed withdrawal was applied before the final sampling on day 40. Two treatments were administered: (1) control diet without feed additives, (2) additive diet, which was the control diet with Fysal Fit 4 (3 kg/t, Selko, Tilburg, The Netherlands) mixed in feeding phases1 and 2,and no additive given in feeding phase 3. Seeder birds were fed the control diet and housed separately until first inoculation. On day 5 and 6, seeder birds (5/pen) were orally inoculated with 109CFU/ml Salmonella Infantis. On days13, 19 and 40, four non-seeder birds per pen were selected for cecal Salmonella counting via plating. Morphologic gut health scoring based on factors of inflammation , ballooning , flaccidity , translucency, abnormal content and undigested feed particles was done in 5 non-seeder birds per treatment on days 13 and 19. Growth performance was measured on days0, 5, 11, 28, 39. Less number of salmonella positive birds are found in treatment group vs control group on day 40 (P=0.033).In the first feeding phase(0-11) gut health had significant improvement in treatment group vs control group ($p = 0.0331$, $p< 0.05$). Compared to the control group, the additive group had tended to a lower feed conversion ratio (P=0.04) and higher body weight (P=0.037) at day 0-11.There is no significance difference was observed between treatments on mortality (3.7 % in both groups).Since trial was not designed for growth performance but to develop a strategy to control salmonella propagation with less effect on gut health. In conclusion, feeding Fysal Fit-4, a feed additive based on selected blend of functional carbohydrates ,tended to reduce *Salmonella Infantis* positive birds in absence of AGPs, while improving gut health and growth performance.

Key Words: *S.Infantis*, Gut Health, Growth Performance

INFLUENCE OF PRENATAL DICHROMATIC LIGHT ON HATCHABILITY AND GROWTH OF JAPANESE QUAIL

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2025-PSC-179

Abstract

Light during incubation is increasingly recognized as a tool to improve hatchability and bird performance in poultry production. This study investigated the effects of prenatal exposure to dichromatic light on the hatching outcomes and post-hatch growth of Japanese quail. A total of 1200 eggs were incubated under three dichromatic light combinations (Green + Red, Green + Blue, and Blue + Red; 250 lux, 12 h daily), while a dark group served as control. Results showed that the Green + Red (GR) light combination significantly improved hatchability, chick quality, and growth performance compared with other treatments. Chicks from the GR group exhibited higher body weight, improved feed efficiency, better livability, enhanced morphometric traits (keel, shank, drumstick, and body length), and elevated serum glucose and protein levels. Carcass weights were also superior in the GR group. These findings highlight that exposure of quail eggs to green–red light during incubation can enhance both hatchability and post-hatch performance, offering practical implications for sustainable quail and poultry production systems.

Key Words: *S.Infantis*, Gut Health, Growth Performance

MODELING GIZZARD ULCERS IN BROILERS: CO-INFECTION DYNAMICS OF *BACILLUS CEREUS* AND *ASPERGILLUS FUMIGATUS*

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Abstract

Ulceration in stomach has persistently been stated in livestock and poultry. It frequently causes tenacious diarrhea and poor absorption in animals, which leads to economic loss. Bacillus sp. mainly *Bacillus cereus*, is being extensively used as probiotics in animal feed, plant pesticides or human food chains. Though some *B. cereus* isolates have been proved to be pathogenic and considered responsible for causing GEU in birds and have probable dangers to cause diarrhea, vomiting and ulcers in birds, pigs as well as humans. *Aspergillus fumigatus* is a fungus which causes mainly respiratory infection in poultry. The goal of the current study was to estimate the damage caused by combined effect of *Bacillus cereus* and *Aspergillus fumigatus* to poultry birds in terms of gizzard ulceration and organ weights. In this study, fourteen day old chickens were randomly allocated into four groups with 15 birds in every group. Group D served as control negative group while Groups A, B and C were given 1x108 CFU of Bacillus cereus, 1x106 CFU spores of *Aspergillus fumigatus* and combination of both (B. cereus: 1x108 CFU + A. fumigatus: 1x106 CFU for the period of fourteen days. The parameters studied comprised of absolute and relative organ weight, absolute and relative immune organ index and gross lesions. Relative weights of spleen, bursa and thymus were lower as compared to control groups while relative weights of other organs like liver, gizzard, intestine, lungs, heart and kidneys were greater than control group. Grossly, the bacillus cereus and combination group (*Bacillus cereus* + *Aspergillus fumigatus*) showed lesions in gizzard which leads to ulceration by damaging the layer of gizzard. These findings suggested that there is an association between mycotoxins caused by *Aspergillus fumigatus and Bacillus cereus*. To control the GEU in poultry birds, long-standing surveillance and monitoring are crucial accompanied by implementing different set of measures.

Key Words: *Bacillus cereus*, GEU, *Aspergillus fumigatus*, Organ Weights

MOLECULAR CHARACTERIZATION AND PATHOLOGY OF FOWL ADENOVIRUS SEROTYPE-2 (FADV-2) IN BROILERS

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Abstract

Fowl adenovirus falls in the category of emerging and re-emerging diseases in the poultry sector causing heavy economic losses throughout the world. The present study was designed to investigate the presence and pathology of the fowl adenovirus serotype-2 in poultry industry. Samples were collected through simple random sampling technique throughout the division of Faisalabad and its surroundings for detection of fowl adenovirus and specifically fowl adenovirus serotype-2. Liver, lungs and kidney were taken from the mortalities suspected of fowl adenovirus DNA of the samples were extracted using the thermo-scientific molecular kit and then run through real-time PCR. The samples having high cycle threshold (CT) value were then run through conventional PCR to confirm serotype specificity. Confirmed positive samples were then further processed for histopathology. Suspected samples were then run through PCR with strain specific primers having the product size 719 bp which confirmed the specificity of the virus. The PCR positive samples were subjected to microscopic pathology. Histopathological studies of liver, lungs and kidney indicated more severe and aggressive tissue damage compared to other prevalent serotypes. Histopathological examination demonstrated pronounced lesions in the liver and heart, consistent with hydropericardium syndrome. Microscopically the liver had prominent intranuclear inclusion bodies along with vacuolar degeneration in liver and kidney as well. Lungs showed severe pneumonic changes. Our findings highlighted the genetic diversity and pathogenic potential of FAdV-2, underlining the need for improved surveillance and control strategies. The development of effective vaccines and antiviral therapies is crucial for managing FAdV-2 outbreaks and reducing their impact on the poultry industry

Key Words: Adeno Virus, Liver, Inclusion Bodies, Molecular Characterization

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