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From the Editor's Desk

'Power Blind'

There is a narrow line dividing a hero and a villain. One uses power with responsibility, and the other abuses it for personal gain. The Venezuelan President has been kidnapped with accusations in a fashion that is not acceptable to the civilised world. Libya, Iraq, Vietnam, Guatemala, Congo, Iran, Cuba, Afghanistan, Chile, Ghana, and Grenada are all examples that fell victim to absolute power. Indirect intervention in countries like the Maldives, Sri Lanka, Nepal, and Bangladesh, where the governments were dramatically changed with an obvious template. As a leader, a proclaimed superpower comes with an equal amount of responsibility and civilised leadership. Abuse of power will be suicidal for oneself. It appears that power can blind some people!

The ego war by the US through tariffs is a definite self-destructive policy. The high tariff imposed has to be remitted by the American citizens and not the exporters. India has wisely diversified its markets to the rest of the world, which is welcoming India under the current global crisis. Some countries need to recheck if their policies are Idealistic only and far away from ground reality?

The current strong government in India has been able to withstand many attempts of onslaught. The young Indian population with a lot of education and wisdom have been able to read between the lines about this foreign enemy, which has helped India to maintain its integrity. The future of common people depends on the 'digital social integrity '-which simply means to discriminate between information that is genuine and fake. Artificial intelligence today is capable of misleading the gullible and vulnerable individual by strategically developed misinformation to manipulate social impact. In this age, wisdom and patience to discriminate between real information and fake information are an absolute necessity.

Our western neighbour is known for her nuisance value, not only to India, but also a global headache due to their terrorist activity and condemnable behaviour. We have heard of mercenaries hired for killing, but what if the whole nation is willing to attack and kill even its own brothers just for money? Pakistan in the past has attacked Palestinians for money, Afghanistan Pathans for money, and now Iranians for money. The tragedy is that even our eastern neighbour is for sale and has become a similar proxy country to act on behalf of any foreign power that throws money at them. Pakistan has shown that it can be hired either by Americans, the Chinese, Turkey, or other Arab nations.

All farsighted farmers must invest in hygiene and high-quality production of safe chicken and eggs. The consumer awareness and stricter enforcement by FSSAI will definitely eliminate unhealthy producers. A food item necessarily demands the best possible attention when it comes to quality.

It is heartening to see some Poultry producers branding their eggs and chicken in their own regional market. This is a good example for the majority of other farmers to follow. By branding and adding assured quality in production, packaging, and delivery, the profit realisation will be better.

S R Publications strives to support the farmers in the Poultry and Livestock industry through media. We strongly encourage farmers and companies to promote their brand jointly with Poultry Technology to encourage more chicken consumption as a safe source of nutrition.

Editor

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Address:
1325-P, Second Floor,
Sector-32, Urban Estate
Near Hotel Noor Mahal
KARNAL-132 001 (Haryana) INDIA

E-mail
poultrytechno@gmail.com
dinesh@srpublication.com

Website
www.srpublication.com

Editor:
Dinesh Kumar Arora
+91-98965-23333, 86408-23333

Associate Editor:
Sudhir Aheriya
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Circulation Incharge
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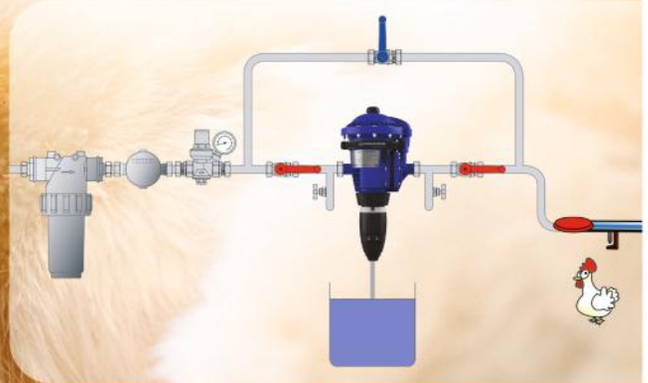

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Founder: Sandhu Feeds
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In the competitive world of poultry breeding, the focus often gravitates toward hen productivity. However, the true engine of flock success is the male breeder. Ensuring male breeding efficiency is not just a secondary concern; it is the foundation of high-quality chick delivery, optimal hatchability and sustained flock productivity.As male breeders age or face environmental challenges, their reproductive performance can decline, leading to significant economic losses. Understanding how to support their biological systems is essential for any producer aiming for excellence.

The Biological Blueprint of Fertility

Maintaining high fertility in a male flock requires a delicate balance of hormonal stimulation and physical health. The process is driven by the **Hypothalamus-Pituitary-Gonadal (HPG) axis.**

- **Hormonal Orchestration:** The hypothalamus releases GnRH, which triggers the anterior pituitary to secrete FSH and LH
- **Testicular Function:** LH stimulates Leydig cells to produce testosterone, while FSH acts on Sertoli cells to drive spermatogenesis (the production of sperm)
- **Semen Quality:** For successful fertilization, the semen must have a high count of viable, motile sperm, as well as appropriate volume and viscosity

Common Reproductive Challenges in Male Breeders

Maintaining peak fertility is a constant battle against biological and environmental pressures. As male breeders progress through their production cycle, they often face several critical issues that can compromise the entire flock's performance:

- **Age-Related Decline:** As roosters age, there is a natural reduction in testosterone levels and a decrease in the activity of the seminiferous tubules. This leads to lower libido and drop in the production of viable sperm
- **Heat and Environmental Stress:** High ambient temperatures are devastating to male fertility. Heat stress triggers the release of cortisol, which suppresses the Hypothalamus-Pituitary-Gonadal (HPG) axis, leading to "stress-related infertility" and poor semen quality
- **Oxidative Damage:** The membranes of avian sperm are rich in polyunsaturated fatty acids, making them highly susceptible to lipid peroxidation. Without adequate antioxidant defence, free radicals damage the sperm's DNA and motility, drastically reducing hatchability
- **Physical Exhaustion and Leg Health:** Heavy male breeders often suffer from physical fatigue or musculoskeletal issues. If a bird lacks the stamina or physical comfort to mate, even a high sperm count becomes irrelevant, leading to a spike in "clear eggs" or infertility in the hatchery
- **Incomplete Organ Maturity:** In younger flocks, delayed maturity of the primary and secondary reproductive organs can lead to a slow start in production, preventing the flock from reaching its genetic potential early on

The Science of Fertility Boosters

To achieve peak reproductive performance, modern poultry science is increasingly looking toward specific botanical compounds that have been used for centuries to bolster male vigor.

Kaunch (*Mucuna pruriens*): This powerful herb serves as a primary reproductive hormonal modulator by naturally increasing dopamine levels, which in turn stimulates the HPG axis. High L-Dopa content supports the stabilization of testosterone levels essential for sustained fertility

Kali Musli (Curculigo orchioides): Kali Musli serves as a potent aphrodisiac and energetic booster, making it vital for enhancing the overall reproductive efficiency of male breeders. It is traditionally recognized for its ability to restore vitality and combat physical weakness, ensuring roosters maintain the stamina required for consistent performance. Beyond its reproductive benefits, it acts as an immunomodulator, strengthening the bird's natural defenses to maintain health throughout the production cycle

Gokshuru (*Tribulus terrestris*): Renowned for its ability to enhance libido, Gokshuru works by increasing the levels of Luteinizing Hormone (LH), which signals the body to produce more natural testosterone. This increase in androgenic activity leads to a significant improvement in the development of secondary reproductive organs and physical stamina. Regular inclusion in the diet helps maintain a high "vigor" score in aging roosters

Ashwagandha (*Withania somnifera*): As a premier adaptogen, Ashwagandha plays a critical role in reducing the negative impacts of heat and environmental stress on the male reproductive system. It effectively lowers cortisol levels, which often suppress reproductive hormones, thereby maintaining a healthy hormonal balance even during peak summer months. Its antioxidant properties further protect the delicate seminiferous tubules from cellular damage


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Shatavari (*Asparagus racemosus*): Shatavari is essential for improving the physical characteristics of semen, specifically increasing semen volume and viscosity. It provides a "rejuvenating" effect on the reproductive tissues, ensuring that the sperm produced are highly motile and have strong membrane integrity. This ensures that the sperm can survive the transit within the hen's reproductive tract to achieve successful fertilization

Akarkara (*Anacyclus pyrethrum*): This herb is highly valued for its potent spermatogenic activity, directly influencing the count of viable and motile sperm. It acts as a sexual stimulant that helps in treating cases of low libido and physical exhaustion in breeders. By promoting better blood flow to the reproductive organs, it ensures that nutrient delivery to the testes is optimized for sperm production

Shilajit (*Asphaltum punjabianum*): Often referred to as the "conqueror of mountains," Shilajit is a mineral-rich resin that enhances the bio-availability and effectiveness of other herbs it is paired with. It provides over 84 trace minerals and fulvic acid, which work together to neutralize free radicals and protect testicular tissue from lipid peroxidation. This comprehensive protection is vital for maintaining fertility rates as the flock ages

Jivanti (*Leptadenia reticulata*): Jivanti is a potent "Life-Giver" herb that supports overall gametogenesis and helps in the maturation of primary reproductive organs. It possesses unique androgenic properties that assist in maintaining the physical health and "ideal body condition" of the male bird. Its inclusion ensures that the biological machinery of the bird is functioning at its maximum efficiency

Jaiphal (*Myristica fragrans*): Commonly known as Nutmeg, this botanical acts as a nervous system stimulant that enhances the bird's response to mating cues. It helps in maintaining a consistent mating rhythm and reduces the latency period between successful matings. Its mild vasodilatory effects also ensure healthy circulation, which is a prerequisite for peak reproductive performance

Conclusion: A Strategic Path to Reproductive Excellence

For producers aiming to achieve the highest standards of breeding performance, integrating a phytogenic management program is an essential strategy. By leveraging the synergistic power of potent botanical extracts and organic minerals, managers can provide a comprehensive solution that no single ingredient could achieve alone. These natural formulations act as total semen quality enhancers, ensuring that every mating counts by building the bird's internal biological capacity from within.

BULLETIN

सैंट्रल हरियाणा पोल्ट्री फारमर्स ऐसोसिएशन द्वारा मासिक मीटिंग का आयोजन

सैंट्रल हरियाणा पोल्ट्री फारमर्स ऐसोसिएशन, करनाल द्वारा दिनांक 26 दिसम्बर 2025 को होटल येलो सफायर, करनाल में मासिक मीटिंग का आयोजन किया गया। श्री सुभाष नरवाल, प्रेजीडेंट, सैंट्रल हरियाणा पोल्ट्री फारमर्स ऐसोसिएशन ने आए हुए सभी फारमर्स का स्वागत किया।

श्री सुरिन्द्र भुटानी, सेक्रेटरी, सैंट्रल हरियाणा पोल्ट्री फारमर्स ऐसोसिएशन ने सभी फार्मर को अण्डे का रेट 7 रूपये पहुंचने पर बधाई दी और बताया कि अण्डे का रेट 7 रूपये (फार्म गेट प्राइस) ऑल टाईम हाई रेट है और हम उम्मीद करते है कि भविष्य में यह ओर भी ऊपर जाएगा। लेयर फार्मस अण्डे के उत्पादन पर अधिक ध्यान दे सकेंगे।

श्री सुरिन्द्र भुटानी ने फार्म पर समय समय पर किए जाने वाले जरूरी कार्यों के बारे में भी बताया और कहा कि फार्म पर बायोस्क्योरिटी का पूरा ध्यान रखें और किसी बाहरी व्यक्ति को फार्म के अन्दर जाने से सख्ती से रोका जाना चाहिए। उन्होंने कहा कि कमजोर बायोस्क्योरिटी के कारण फार्म पर तरह तरह की बीमारियां आती है और इस कारण फारमर का बहुत नुकसान होता है। अंत में श्री नरवाल ने आए हुए सभी फारमर्स भाइयों का तहेदिल से धन्यवाद किया और एसोसिशन के मेंबर्स को नवम्बर 2025 में श्री ईश चोपड़ा, श्री जतिन सुखपाल, श्री नरेश मेहता, श्री पंकज मैहता और दिसम्बर 2025 में श्री अमित सरदाना, श्री राजेश कल्याण, श्री सोनू परूथी, हर्ष वर्मा को सम्मानित किया।

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The Synonym of Optimum Egg Production

BENEFITS :

- Improves egg production
- Help in getting high quality egg with well balance albumin and yolk content
- Improves egg shell thickness
- Improves immunity
- Reduces stress and discomfort for better egg laying.
- Increases fertility, Hatchability in breeders
- Improves digestion of feed and helps in better absorption of nutrients.

Dosage :

Layers- 500 gm to 1 kg per tonne of feed

Breeders - 2 kg per tonne of feed

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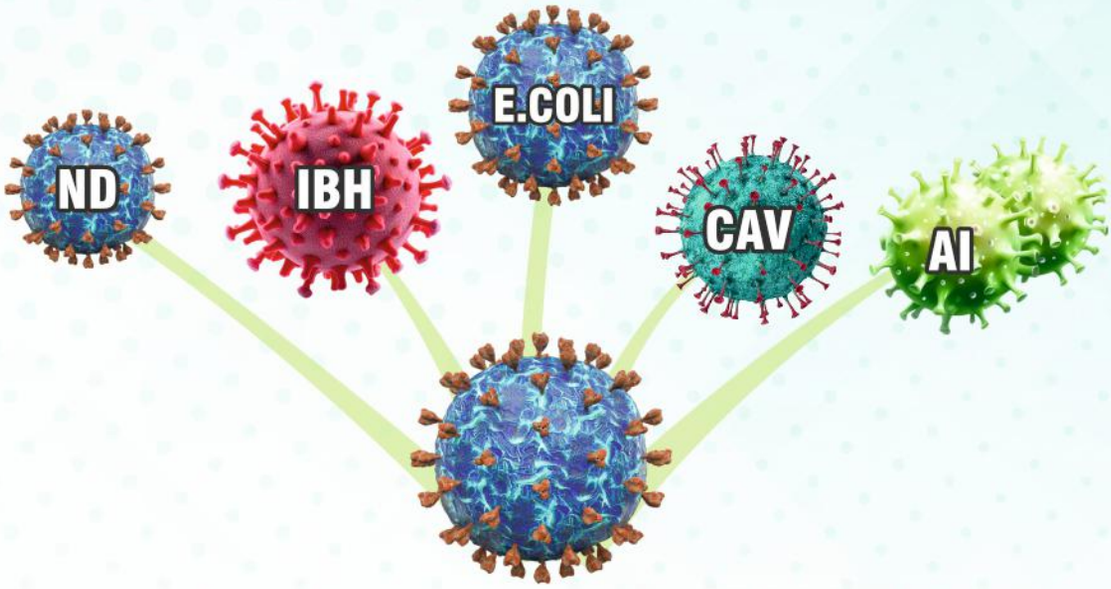
Yeast Bioactive Technology



THE IMMUNITY DOCTOR

- Anti Inflammatory
- Bind E.coli
- Salmonella Control
- Immune Cell Activator against Viral incidences (e.g. ND, AI, CAV, IBH)

- Improve chick quality & immune response
- GIT Development
- Tight Ileal Junctions
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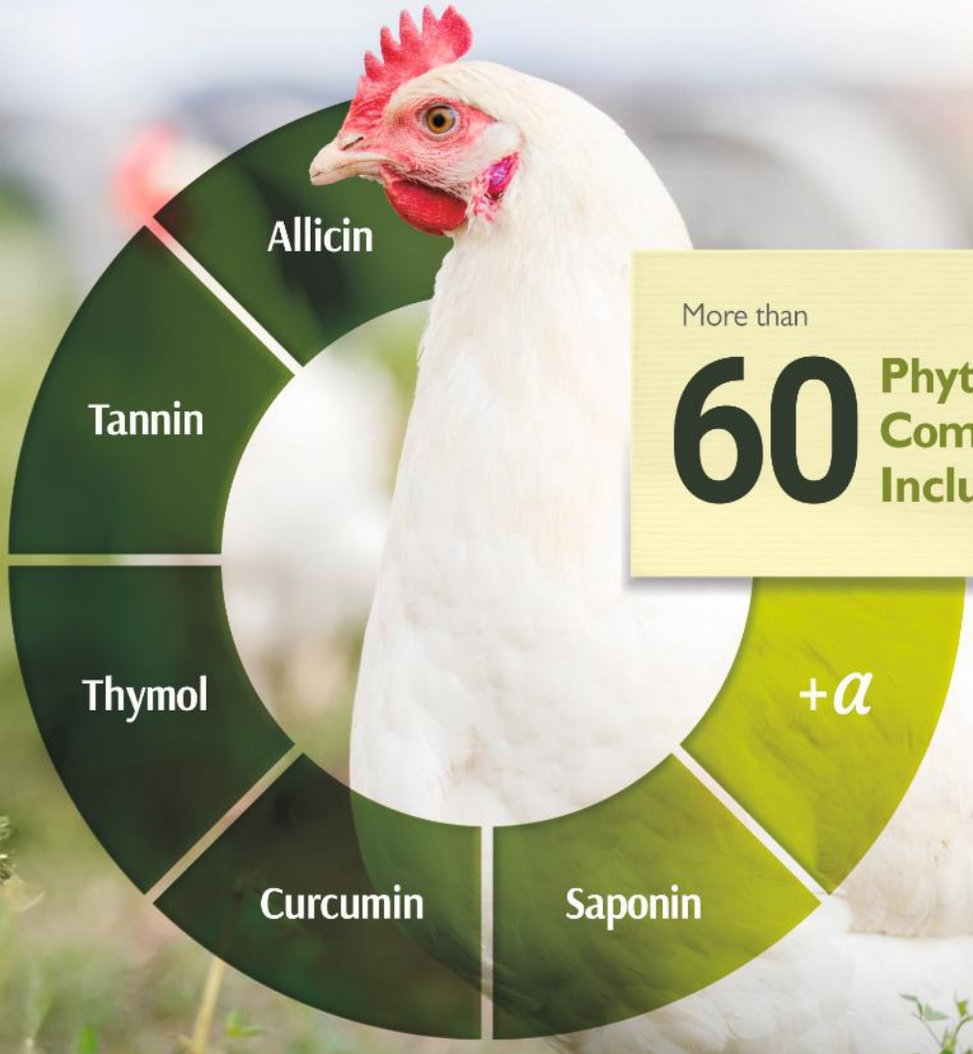

More than **60** Phytogenic Compounds Included

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Plant-derived multi-phytogenic complex

Broad Action
Controls oocyst load in the bird and in the environment

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Supports gut integrity and protects against intestinal damage

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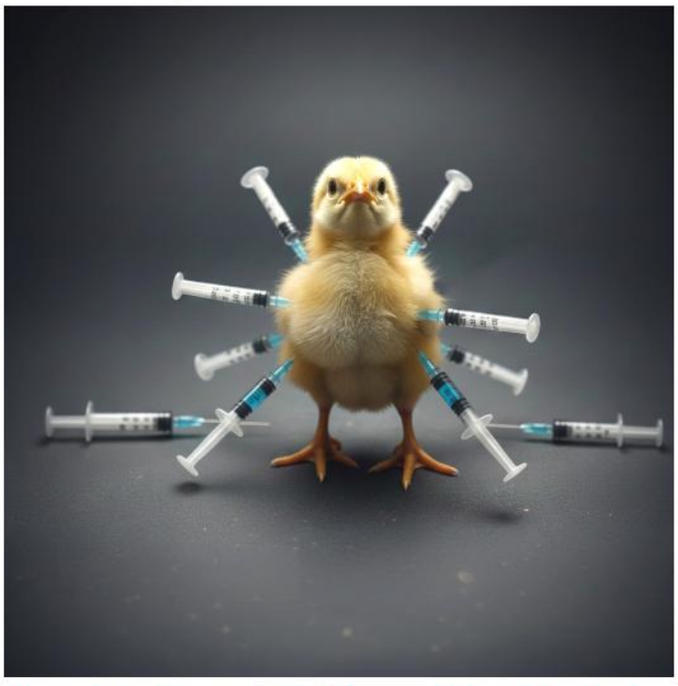
एनकाउंटर न. 272- वैक्सीन पर वैक्सीन एवं पोल्ट्री में बीमारियां 'तब' और 'अब'?

यहाँ 'तब' का तातपर्य बैकयार्ड पोल्ट्री से नहीं। दशक 1960 के प्रारम्भ में ही भारत में तीन ब्रीडिंग फार्म बड़े पैमाने पर अमेरिका और कनाडा के टॉप तीन ब्रीडिंग फार्म के कोलैबोरेशन में खुल चुके थे। नए–नए पोल्ट्री फार्म बहुत तेजी से खुलने लगे। उस समय इसमें महाराष्ट्र और पंजाब बहुत आगे था। वैसे तो गुजरात, कर्नाटका, राजस्थान, तमिलनाडु ने भी अच्छी रफ्तार पकड़ ली थी।



पोल्ट्री तो फैलती जा रही थी विशेष रूप से लेयर्स की और लेबर (पोल्ट्रीमैन) भी काफी आसानी से मिल जाते थे–परन्तु उन्हें पोल्ट्री शेड में कैसे चलना चाहिए यह भी मालूम नहीं था। हर काम कैसे करना है उन्हें समय–समय पर सिखाना पड़ता था। यह सिखाने वाले भी ना के बराबर भारत में उपलब्ध थे। अल्लाह भला करे सरदार प्रताप सिंह कैरों का जो जो उस समय पंजाब के जिसमे हरियाणा भी शामिल था के मुख्यमंत्री थे। उन्होंने सन् 1961–62 में शायद सपना देखा और डायरेक्टर AH को आदेश दिया कि चार जिलों में किसानों को पोल्ट्री ट्रेनिंग देने के लिए आधुनिक पोल्ट्री फार्म बनाये। उस समय पूरे विश्व में आधुनिक पोल्ट्री के लिए डीप लीटर शेड होते थे, वही बनाये गए। साथ ही यह भी आदेश दिया कि वेटनरी कॉलेज में 6 महीने या साल का डिप्लोमा कोर्स शुरू करवाएं, जिसमे सिर्फ आधुनिक पोल्ट्री पर ही ट्रेनिंग होगी। मुझे याद है यह ट्रेनिंग सेंटर हिसार वेटनरी कॉलेज में खुला और किसान ट्रेनिंग सेंटर गुडगाँव, अम्बाला एवं दो और जगह खुला जो अब मुझ याद नहीं। इन सबके बावजूद भी नई तेज रफ्तार बढ़ती पोल्ट्री फार्मिंग को ट्रेन्ड स्टाफ नहीं मिल पा रहा था। भला करे उन 'गोरों' का जो अपनी–अपनी कंपनियों की तरफ से भारत में भेजे गए थे, उन्होंने बड़ी मेहनत की दसवीं, बाहरवीं एवं ग्रेजुएट पास पोल्ट्री के भिन्न–भिन्न विभागों में ट्रेन्ड कर बाहर निकाला। उस समय 'वेटनेरियन' इस काम को बहुत छोटा समझते थे और उन्हें वैसे भी पोल्ट्री के विषय में गंभीरता से कुछ बताया या पढ़ाया नहीं जाता था।

पंजाब में जहाँ कुछ शेड अच्छे भी बने परन्तु गाँव में अधिकाँश शेड सफेदे की लकड़ी के पटरो की छत वह भी कुछ किसानों ने डबल स्टोरी कर रखी थी। कुछ ने मोटा फूस का छप्पर ही डाल रखा था और प्रदेशों में शुरू से अधिकाँश पक्के शेड बने। पंजाब में अधिकांश लेयर फार्मों की कैपेसिटी 2000 से 10000 की थी, हाँ कुछ 30000 तक पंहुच गए थे। वहीं महाराष्ट्र में 2000 से लेकर एक लाख तक के शेड आ गये थे। यह प्रारंभ की बात है, अब तो हर जगह लाखों की बात है।

बेहर हाल हर जगह ट्रेन्ड स्टाफ की कमी थी। जो कुछ सीखते थे वह फार्म पर ही सीखते थे।

अब बिमारियों को लेकर बात करते हैं। तुलना करते हैं कि 'तब' और 'अब' में कितना अंतर आ गया है। ट्रेन्ड स्टाफ के अभाव के बावजूद किसानों की अपनी मेहनत से अच्छा उत्पादन मिला जो उस समय के इंटरनेशनल मानकों से कम नहीं था। कुदरत की मेहरबानी थी कि उस समय बीमारियां बहुत कम थी। अतः वैक्सीनेशन प्रोग्राम भी बहुत हल्का–फुल्का था।

- बैक्टीरियल में इ–कोलाई या FT (फाउल टाईफाइड) मिलना था।
- वायरल में कभी–कभी रानी खेत (ND) और अक्सर फाउल पॉक्स मिल जाता।
- प्रोटोजोयन में प्रायः कोक्सिडियोसिस मिलती। हम कह सकते है कि हर लाट में 8–10 सप्ताह तक किसी भी समय मिल जाती।
- बाहरी परजीव में लाईस, माईटस और कभी कभी टिक्स मिल जाते।
- अंदरूनी परजीव में रांउड वर्म और कभी–कभी टेप वर्म मिलते। उस समय सभी लेयर डीपलीटर पर ही पलती थी।
- फफूंद रोग में एसपरजेलेसिस भी अक्सर मिल जाता था।
- उस समय दवाएं भी बहुत कम थी। दो तरह के एंटीबायोटिक पानी में या फीड में मिलाने के लिए ही उपलब्ध थे।
- नैफटिन या फ्यूरासाल (फ्यूराजालिदान) दाने या पानी के लिए उपलब्ध था।
- सलमेट या सल्फा कॉम्बिनेशन उपलब्ध था जो रामबाण कहलाता था।
- बाईफ्यूरान पाउडर और टेबलेट उपलब्ध था कोक्सी प्रेवेन्शन या ट्रीटमेंट के लिए।
- एक्सटर्नल पैरासाइट के लिए मात्र मेलोथियान उपलब्ध था।
- डीवर्मिंग के लिए वेरमेक्स उपलब्ध था।
- वैक्सीन में रानी खेत (ND) और फाऊल पॉक्स थी जो सरकारी संस्थानों से ही मिलती थी।

सन् 1972–73 तक पोल्ट्री में बस यही गिनी–चुनी बीमारियां व दवाएं थी, जिनका इलाज भी आसानी से हो जाता था।

- वैक्सीनेशन प्रोग्राम बड़ा सरल था।


PREVEXXION®
ARE YOU READY FOR A CHANGE IN MAREK'S DISEASE PREVENTION?
Take a different approach to Marek's Disease vaccination with PREVEXXION®.
Ask your Boehringer Ingelheim representative about improved lifelong immunity.
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Marek's Disease Vaccine Serotype 1, Live Herpesvirus Chimera PREVEXXION RN For the use only of Registered Veterinary Practitioner. **Composition:** Marek's Disease virus, Serotype 1, RN1250 strain at least 952 PFU/dose Excipient q.s. 1 dose. **Indication:** This vaccine is recommended for in ovo vaccination of 18to19-day-old embryonated chicken eggs. This vaccine is also recommended for subcutaneous vaccination of healthy one- day-old chickens. This frozen vaccine contains a Marek's disease chimera consisting of three Serotype 1 strains. **Dosage and administration:** Administer only as recommended. In Ovo Administration: Dilute vaccine at 4,000 doses per 200 mL diluent. Inject a 0.05 mL dose into each embryonated egg. Subcutaneous Injection: Dilute the vaccine at 1,000 doses per 200 mL diluent. Inject 0.2 mL per chicken. **Age-** This vaccine is recommended for in ovo vaccination of 18 to 19-day-old embryonated chicken eggs. This vaccine is also recommended for subcutaneous vaccination of healthy one-day-old chickens.. **Pregnancy and Lactation:** Not applicable. **Contraindications:** None known **Special warnings and precautions:** Do not mix with other products, except as specified on the label. Use the entire contents of the vaccine container within one hour after mixing the vaccine with diluent. Use entire contents when first opened. Do not vaccinate diseased embryonated eggs or diseased chickens. Avoid contact with eyes, hands and clothes when using the vaccine. **Adverse reactions:** None **Withdrawal period: -** Do not vaccinate within 21 days of slaughter. **Shelf Life and Storage:** Shelf life is 36 months, AMPULES: Store in liquid nitrogen container. DILUENT: Store at room temperature. **MAH Holder: -** Boehringer Ingelheim India Pvt Ltd, Unit No. 202, 2nd Floor Godrej 2, Pirojsha Nagar, Eastern Express Highway, Vikhroli (E) | Mumbai 400079. **Last review date:** 09/08/2024 *Additional information is available on request.*
IN-POU-0016-2025 Dec27

1. 5–7 दिन पर F वैक्सीन रानी खेत के लिए

2. 6–7 सप्ताह पर फाउल पॉक्स वैक्सीन

3. 8–9 सप्ताह पर R2B वैक्सीन रानी खेत के लिए

4. 13–14 सप्ताह पर फाउल पॉक्स रिपीट

5. 15–16 सप्ताह पर R2B वैक्सीन रिपीट करते थे।

उस समय लसोटा भारत में उपलब्ध नहीं थी। इस 5 बार के वक्सीनेशन से उनकी जिन्दगी का सफर पार हो जाता था। जब पहला वैक्सीन R2B (ND) का लगाते थे तो रिएक्शन तगड़ा होता था, 6–10% तक जिसमे आधे से ज्यादा रिकवर कर जाते थे। परन्तु कुछ पैरों में समस्या रह जाती थी। कुछ में लिम्बर नेक समस्या भी मिलती थी। इसका भी रास्ता निकाला गया, पहला R2B का आधा डोज लगाना शुरू कर दिया गया – हल्का फुल्का रिएक्शन हुआ। 15–16 सप्ताह पर जो R2B लगाया वह पूरा डोज लगाया गया–न के बराबर रिएक्शन रहा।

सचमुच उस समय की पोल्ट्री में जब भी कोई बीमारी आई, आसानी से उसका इलाज हो जाता, जहाँ कुछ परेशानी होती वहां 'रामबाण' अर्थात एक ऐंटीबायोटिक और सलमेट को मिला कर देते–कामयाब हो जाते।

ध्यान रहे उस समय 'तब' कोई भी टोक्सिन बाइंडर भारत में उपलब्ध नहीं था, अतः डालने का कोई सवाल ही नहीं उठता। अक्सर लोग कॉपर सल्फेट 250 ग्राम से 500 ग्राम प्रोटीन फीड में मिलाते थे।

यह सब बातें 'तब' की हैं जब पोल्ट्री नई–नई भारत में पैर पसारने लगी थी। सन् 1972–73 तक भारत में कोई और बिमारी दिखी नहीं या प्रवेश नहीं कर पाई। परन्तु यही वह समय था 'मैरिक्स' भारत में आयातित पैरेंट के साथ प्रवेश कर गयी।

अब मैरिक्स के प्रवेश के साथ भूचाल सा आ गया। प्रारम्भ में उसे एवियन लियुकोसिस माना गया, परन्तु जिस कंपनी के जरिये यह पैरेंट शायद जापान से मंगवाया था उसने स्वयं इसे मैरिक्स घोषित किया, तब हमें पता चला यह भी कोई बीमारी है जो भारत में पहले ना कभी देखी–ना सुनी थी। बहर हाल विश्व में वैक्सीन का नया–नया उत्पादन शुरू हुआ। भारत सरकार ने आयात की मंजूरी दे दी और हमारे वैक्सीनेशन प्रोग्राम में एक नया टीका और जुड़ गया।

विश्व में IB, ILT एवं माइकोप्लाज़्मा एक गंभीर समस्या बन गयी थी। भारत में ऐसी कोई समस्या नहीं थी–भारत लगभग 'पाक' था। यह समझ में नहीं आया उस समय ब्रीडर ने क्यों पैरेंट के बचाव के लिए IB, ILT वैक्सीन के आयात के लिए सरकार से अनुरोध किया? सरकार ने ना जाने कैसे IB वैक्सीन की आज्ञा दे दी? इसका फल हुआ कि यह कुछ ही दिनों में पूरे भारत की समस्या बन गयी। कैसे आप मात्र ब्रीडर्स के लिए ही वैक्सीन आयात की इजाजत दे सकते हैं ? यह लाइव वैक्सीन थी, फैलना तो था ही फिर खुला आयात शुरू हो गया। हमारे वक्सीनेशन प्रोग्राम में एक और वैक्सीन जुड़ गयी।

मैरिक्स और IB वैक्सीन भारत में आने लगी और राहत मिली, यही कहानी खत्म हो गयी परन्तु सन् 80 के दशक के अंतिम चरणों में एक और परन्तु बहुत जोर का धमाका हुआ। नमक्कल जो लेयर इंडस्ट्री की शान माना जाता वहां लेयर चिक्स और ग्रोअर्स में बहुत अधिक मोर्टिलिटी शुरू हो गयी 25–75% तक। यह खबर पूरे भारत की लेयर इंडस्ट्री में फैल गयी और यह इंडस्ट्री इलाके में बीमारी आने से पहले ही घबरा उठी। 'बीमारी' का कोई अता–पता नहीं था–अधिकाँश फीड पर शक जाहिर करने लगे क्योंकि इसमें शरीर पर हैमरेज मिलते थे। जिसे पोल्ट्री में हैमरेजिक सिंड्रोम के नाम से पहले से ही जाना जाता था। कुछ ही दिनों में इस बीमारी ने पूरे देश को अपनी चपेट में ले लिया। ब्रायलर भी नहीं बचा।

सरकार जागी और हाई–लेवल की वैज्ञानिकों की टीम को नमक्कल भेजा। जो उनकी रिपोर्ट थी वह बड़ी भयावह थी। यह बीमारी 'गम्बोरो' थी जिसे हम 'गमकरो' भी कह सकते हैं। भारत में पहले कहीं से रिपोर्ट नहीं हुई थी। पता नहीं सरकार ने कैसे दो प्राइवेट वैक्सीन कंपनियों को इसकी वैक्सीन बनाने का लाइसेंस दे दिया था। उन्होंने लूकर्ड स्ट्रेन वैक्सीन बनाई जो अपनी श्रेणी में बहुत ही हलकी वैक्सीन थी। दुर्भाग्य से इस वैक्सीन का आप ट्रायल कहें नमक्कल में ही हुआ वह भी बेचकर, ऑउटब्रेक वहीं से शुरू हुआ। अब आप स्वयं निष्कर्ष निकाल लें जिस बीमारी का हम भारत में नाम ही नहीं जानते वह वैक्सीन कैसे और क्यों भारत में उपलब्ध करवाई गयी ? लेयर हो या ब्रायलर–किसान तो हताश था। दबा कर लुकर्ड का उपयोग पूरे भारत में होता रहा इसके बावजूद यह चिंगारी से शोलों में तब्दील हो गयी। अल्लाह भला करे Indovax का जहाँ स्वर्गीय डॉक्टर ललित बेलवाल और उनकी टीम लुकर्ड की जगह दूसरी वैक्सीन 'जर्जिया' ले आये जिसने इस बीमारी पर लगभग रोक लगा दी। पहले Indovax वैक्सीन सेल्स में तीन नंबर पर आता ता परन्तु 'जर्जिया' वैक्सीन जिसने पोल्ट्री इंडस्ट्री में जान फूंकी के आते ही यह छलांग मारकर एक नंबर पर आ गयी। चलिए अब एक और नयी वैक्सीन हमारे वक्सीनेशन प्रोग्राम में आ गयी। ध्यान रहे जब भी कोई वैक्सीन हमारे प्रोग्राम में जुड़ती है तो एक बार नहीं लगती है–कम से कम दो बार तो जरूर लगती है और कभी–कभी तीन बार भी।

इसके बाद लम्बा समय पोल्ट्री में शांतिपूर्वक गुजरा परन्तु बहुत लम्बा नहीं रह पाया। पकिस्तान से हमें 'अंगारा' जैसी बीमारी जम्मू और पंजाब में सौगात के रूप में मिली। पूरे भारत में फैल गयी। क्या ब्रायलर या लेयर सब में ऑउटब्रेक हो रहा था। डॉक्टर श्रीनिवास गौड़ा का भला हो उन्होंने हमें इसकी ऑटो वैक्सीन बनाने की सलाह दी जिसने पोल्ट्री इंडस्ट्री को बचाया। इसकी लाइव वैक्सीन नहीं बन सकती थी। किल्ड वैक्सीन अच्छी भारतीय कंपनियां लेकर आ गयी जो कामयाब हुई। अब एक और वैक्सीन हमारे वैक्सीनेशन प्रोग्राम में जुड़ गयी। जब नयी–नयी यह बीमारी भारत में आई थी हमारे यहाँ इसे लीची कहा गया क्योंकि दिल की शकल लीची जैसी लग रही थी–दिल बीज और जो पानी भरा था वह लीची की गोदे की तरह से था। पकिस्तान में यह 'अंगारा' कहलाया क्योंकि 'अंगारा ग्रोथ' में पहली बार मिली थी। वास्तव में यह IBH (इन्कलजन बॉडी हेपेटाइटिस)–INCLUSION BODY HEPATITIS जो विश्व पोल्ट्री जगत में पहले से ही मौजूद थी।

कुछ दिन शांति के बाद एक भयंकर समस्या बरवाला लेयर बेल्ट से शुरू हुई। अनोखी और अजीब समस्या थी। मोर्टिलिटी बहुत नहीं थी परन्तु अंडा सिर्फ तेजी से ही नहीं घटा बल्कि साथ ही बहुत छोटा भी हो गया–कुछ अंडे तो कबूतर के अंडे के साइज के हो गए। पूरे भारत के वैज्ञानिक टूट पड़े–वैक्सीन प्रोडूसर भी टूट पड़े। राय किसी की आपस में मिलती नहीं थी। एक वर्ग था जो इसे 'ND वेरिएंट' कह रहा था जो नाम भारतीय पोल्ट्री जगत के लिए बिलकुल नया था और किसी भी पोल्ट्री डिजीज बुक में यह नाम नहीं मिल रहा था।

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मंझे हुए वैज्ञानिक इस बात को मानने के लिए तैयार नहीं थे। सबसे ज्यादा चकित करने वाली बात थी कि यह बहुत तेजी से कस्बा दर कस्बा – शहर दर शहर फैलने लगी और 5–6 हर जगह हाहाकार मचाती रही। मात्र एक वैक्सीन कंपनी और कुछ IVRI एवं कुछ सरकारी वैज्ञानिक इस बिमारी का असल नाम नहीं बता रहे थे। सभी ND वैरिएंट पर जोर दे रहे थे। सच तो यह था कि भोपाल स्थित हमारी विशेष लैब ने H9N2 कन्फर्म कर दिया था। जिसे सरकारी फाइल में दबा रखा था। ऐसा क्यों किया जा रहा था यह लम्बी कहानी है–इसका विवरण करके आपका समय बर्बाद होगा। यह कहानी सच्ची है कन्फर्म हो गया जब एक वैक्सीन कंपनी ने 'बरवाला एपिसोड' के बाद दो–तीन महीने के अंदर 'गुमनाम' वैक्सीन बेचना शुरू कर दिया। तर्क यह था कि यदि H9N2 का नाम लिया तो फार्मों पर बुल्डोजर चल जायेगा। 'हमें तुम मारो, हम चिल्ला कर रो भी ना सकें'। बाद में दूसरी वैक्सीन कंपनी भी बेनाम या गुमनाम वैक्सीन ले आई। लगभग 20–25 साल तक यह वैक्सीन गुप्त रूप से चलती रही– धंधा चलता रहा। अंत में भारत सरकार ने लम्बे अंतराल के बाद इस वैक्सीन को बनाने के लिए इजाजत दे दी। सरकार ने उन सबको झुठला दिया जो इसे ND वेरिएंट या कुछ और कह रहे थे एवं वैक्सीन दो नंबर में बेच रहे थे।

इस सारे खेल तमाशे होने का एक प्रमुख कारण था। H9N2 लो पैथ एवियन इन्फ्लुएंजा या बर्ड फ्लू है। यह पोल्ट्री को तो नुक्सान कर सकती है परन्तु कंज्यूमर को नहीं। इसका हव्वा इसलिए खड़ा किया गया कि इसका वायरस 'बरवाला काण्ड' में काफी पहले एक ब्रीडिंग फार्म पर मिल चुका था जिसे वैक्सीन कंपनी मोनोपोली के तौर पर दो नंबर में चलाये रखना चाहती थी। बेहर हाल वैक्सीन कामयाब रही–काफी बचाव रहा – हाँ ब्रायलर में इधर उधर लटक–पटक अक्सर होता रहता है क्योंकि वहां यह वैक्सीन आमतौर से लगती नहीं। अगर लगी भी तो सुकून मिलने के बाद छोड़–छाड़ देते हैं लगाना। हाँ लेयर इंडस्ट्री बहुत जागरूक है वह समयबद्ध इसे वैक्सीनेट करते रहते हैं। चलिए इस प्रकार हमारे वैक्सीनेशन प्रोग्राम में एक और वैक्सीन बढ़ गयी।

H9N2 वैक्सीन चाहे दो नंबर की थी या अब एक नंबर की, इंडस्ट्री को राहत मिली। यह राहत अधिक समय तक ना टिक सकी। 5–6 साल बाद गुजरात–महाराष्ट्र बॉर्डर पर एक अच्छे पोल्ट्री बेल्ट में समस्या प्रारम्भ हुई। फिर वही बहस शुरू हो गयी– माइकोप्लाज्मा है, फीड प्रॉब्लम है और कोई कहता है ND वेरिएंट है। ऐसे समय में TV चैनल वाले बड़ा मजा लेते हैं। एक चैनल पर विशेषज्ञ टीम के लीडर इसे रानी खेत की ऑउटब्रेक बता रहे थे, परन्तु इस प्रोग्राम के तुरंत बाद उस समय के कृषि मंत्री दादा शरद पंवार को टीवी रेपोएर्टर घेरे हुए थे जो जरा जल्दी में थे क्योंकि उन्हें लाहौर पहुंचना था क्रिकेट विश्व कप का फाइनल देखने के लिए उन्होंने उन सबके प्रश्नो का उत्तर एक लाइन में देकर आगे बढ़ गए "अभी हाई सिक्योरिटी लैब भोपाल से कन्फर्म रिपोर्ट आई है कि यह HPAI H5N1 है। हमारी टीम सक्षम है उसे वहीं रोक देने में"। यह कह कर वह क्रिकेट मैच का आनंद लेने चले गए।

यहाँ देश में इस खबर से पोल्ट्री इंडस्ट्री में मातम छा गया। यह हाईपैथोजैनिक एवियन इन्फ्लुएंजा और पोल्ट्री को तो बर्बाद करती ही है, साथ में मनुष्य में भी फैल सकती है। सरकार की निति के तहत विशेष दायरे के अंतर्गत आने वाली सभी पोल्ट्री को मारकर गहरे गड्ढे में दबाना है। किसान को प्रति पक्षी के हिसाब से कम्पनसेट कर दिया जाता है। वैसे निर्धारित कंपन्सेशन बहुत कम है। सरकार ने यह कार्य तुरंत पूरा किया और बीमारी को फैलने से रोक दिया। इससे कहीं ज्यादा नुक्सान हुआ 'भौपू मीडिया' के प्रचार प्रसार से। कई देशों ने इसकी भी वैक्सीन बना ली है परन्तु भारत अभी इसके पक्ष में नहीं है – कारण यह वायरस बहुत जल्दी म्यूटेट कर जाता है। इसके चलते जल्दी–जल्दी नयी वैक्सीन लगानी होगी क्योंकि पिछली लगी वैक्सीन फैल हो जाएगी। इसके बाद हर साल भारत में कहीं न कहीं धमाका होता है। सरकार बिना वैक्सीन के इसी प्रकार रोक लेती है एवं पूरे भारत में फैलने नहीं देती।

H9N2 को हम नहीं रोक पाए जो LPAI था परन्तु H5N1 जो HPAI है इसे सरकार रोकने में सक्षम है।

अभी इसी साल (2025) रामपुर काशीपुर बेल्ट में हाहाकार मचा। हमारी गलती थी कि हमने मरी हुई मुर्गी खेतों में फेंक दी। लोगों ने पुलिस में शिकायत की फिर क्या था आनन–फानन में टीम पहुँच गयी, जांच हुई, मुर्गियां काफी शहीद की गयी और कब्र में डाल दी गयी। इस इलाके में काफी बड़े और अच्छे फार्म है। अगर खबर सही है तो बहुत गलत हुआ–उन्होंने पता नहीं किस वैज्ञानिक या कंसलटेंट की राय से चीन से दो नंबर में नेपाल के रास्ते H5N1 की वैक्सीन लगा रखी थी। स्वर्गीय डॉक्टर J. L. वेगड बार–बार चिल्ला–चिल्ला कर कहते थे "कभी भी LPAI या HPAI की वैक्सीन आयात करके नहीं लगाना। यह बहुत जल्दी म्यूटेट कर लेती है अगर ऐसा हुआ तो कहाँ से नयी वैक्सीन लाकर फ्लॉक प्रोटेक्ट करोगे"? अगर सचमुच आयात की हुई वैक्सीन लगा रखी थी तो यह गलत हुआ।

इस बात पर एक बात और याद आ गयी स्वर्गीय डॉक्टर S. K. खन्ना हरियाणा सरकार में पोल्ट्री के डिप्टी डायरेक्टर थे जो प्रारम्भ से ही पोल्ट्री से जुड़े थे, अतः पोल्ट्री के अनुभवी विशेषज्ञों में से एक थे। प्रान्त से बाहर ही नहीं बल्कि कुछ विकासशील देशो में भी अक्सर जाते रहते थे। रिटायर होने के कुछ महीने पहले शायद सन् 2020-2021 में उनका फोन आया कि "आपके गुडगांव जोन में ILT की क्या स्थिति है"? यह एक वायरल डिजीज है और मेरी जानकारी में यह बीमारी भारत में कहीं नहीं मिली थी। मैंने उनसे कहा "हमारे इलाके में फरीदाबाद से लेकर महेंद्रगढ़ तक कहीं भी इस बीमारी की रिपोर्ट नहीं मिली है"। डॉक्टर साहब ने बताया "हमारे कुछ जगह पर इसकी काफी ऑउटब्रेक है। मैंने स्वयं इसके सैंपल लेकर भोपाल भेजा जहाँ से इसकी कन्फर्मेशन आ गयी है और हरियाणा सरकार इसे 'नोटिफाई' करने जा रही है"। मैंने डॉक्टर साहब से आग्रह किया कि "आप एक घंटे का समय दें एवं इसके बाद आगे की कार्यवाही करें"। वह मान गए। मुझे याद आया कि किसी कंपनी के डॉक्टर ने मुझे बताया था कि "कुछ इलाकों में CRD का प्रकोप बहुत ज्यादा है और लोग ILT वैक्सीन के आयात का प्रोग्राम बना रहे हैं"। मैंने कहा कि "यदि CRD है तो ILT वैक्सीन क्या करेगी, IB चेक करवाएं"। यह बात मुझे याद आई तो उधर के एक अच्छे कंसलटेंट को फोन किया उसने बताया कि "हाँ नेपाल रुट से ILT वैक्सीन मंगवा कर बहुत से फ्लॉक में लगवाया गया परन्तु सारे में नहीं लगा है"। मैंने डॉक्टर खन्ना को फोन मिलाया सब कुछ बता दिया। मैंने यह भी कहा कि "दोबारा जांच कर लें और नोटिफाई करने की जल्दी ना करें"।

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उन्होंने जांच दुबारा की और पाया कि आयात की हुई ILT वैक्सीन बहुत से फार्म पर लगी है और उसके पास ही बहुत से फार्म है जिनपर नहीं लगी है। अतः ऑउटब्रेक तो होना ही था।

अपने देश की बड़ी विडंबना है जब पोल्ट्री फार्मर कामयाब होता है तो कुछ ही सालों में अपने को 'डॉक्टर' समझने लगता है और जब ब्रीडर या कॉर्पोरेट हाउस कामयाब होता है तो अपने को 'वैज्ञानिक' समझने लगता है। यह फैसला किसकी राय से लिया गया ? निश्चित रूप से वह विशेषज्ञ किसी इंटरनेशनल वैक्सीन कंपनी का भारत में अधिकारी होगा।

1975 तक भारत में CRD (MYCOPLASMA) हम लोगों को कभी–कभी मिलती थी। इसके बाद लसोटा जब भारत में उपलब्ध हुई तो समझ में नहीं आया कि जो वैक्सीन **US** के कुछ स्टेट में बैन है यहाँ इस वैक्सीन का उत्पादन करने की क्या आवश्यकता पड़ी। वही हुआ जिसका डर था, हर जगह CRD का प्रकोप और टायलोसिन एवं टायमियूटिन की सेल बढ़ती गई। इसके बाद भारत ने MG और MS का आधार कार्ड बना दिया और परमानेंट नेशनलिटी दे दी। अब हम जूझते रहते हैं। इसकी भी वैक्सीन आ गयी है।

कोरयजा और फाउल कालरा भारत में बहुत पहले से 'तब' भी था और कभी–कभी मिल जाता था और इसका इलाज एंटीबायोटिक या सलफा जैसे प्रोडक्ट से हो जाता था। अब उसके लिए भी किल्ड वैक्सीन बना दी गयी है। लगाइये–एक–एक वैक्सीन दो–दो बार लगेगी। पहले जब यह बीमारी अगर किसी फार्म पर आ गयी तो इलाज हो जाता था, अब क्यों नहीं हो सकता।

इस प्रकार सालमोनेल्ला का जिक्र भारत में सन् 1925 में छपी किताब जिसे लखनऊ स्थित पोल्ट्री ब्रीडर Mrs. Fawk ने लिखा मौजूद है। उन्होंने उसका ट्रीटमेंट भी दिया है। यह एक ऑस्ट्रेलियन लेडी थी और पोल्ट्री की माहिर थी। बहर हाल यह कोई गंभीर समस्या नहीं थी। क्योंकि सन्न 1963 में जब रानी–शेवर पोल्ट्री ब्रीडिंग फार्म–गुडगाँव में ग्रैंड पैरेंट लेयर और ब्रायलर का प्रोडक्शन शुरू हुआ तो शेवर कनाडा का फोन आया कि 10% प्रोडक्शन पर किसी सरकारी एजेंसी से सालमोनेल्ला के लिए टेस्ट करवाएं। सारे नेगेटिव होने के बाद ही अंडे सेट होंगे। कृषि मंत्रालय भारत सरकार में एक पोल्ट्री डेवलपमेंट ऑफिसर होते था और वह थे स्वर्गीय डॉक्टर तुलसा राम। उन्हें फोन गया वह चौंके यह क्या बला आ गयी। उन्होंने IVRI को फोन लगाया पता चला उनके पास एंटीजन मौजूद है–टेस्ट कर देंगे। वहां से टीम आई टेस्ट हुआ और 100% क्लियर का सर्टिफिकेट दिया। इसके बाद ही अंडे हैचरी को भेजे गए। बाद में हिसार से टीम आने लगी और 20–25 हजार पैरेंट टेस्ट होते। आश्चर्य की बात है सदैव 100% क्लियर ही निकलता रहा। अब हमारा ध्यान इस ओर से हट गया है। अब ब्रीडिंग फार्म इतने अधिक हो गए हैं–शायद उन्हें कभी भी इस टेस्टिंग की चिंता नहीं रही। अतः केसेज फाउल टाईफाइड के मिलने लगे हैं। दुखद है या सुखद अब इसकी भी वैक्सीन आ गयी है जिसमे सालमोनेल्ला के कई स्ट्रेन हैं। जो भारत में कभी नहीं थे वह स्ट्रेन भी शामिल हैं। यह कहाँ तक उचित है?

इस प्रकार हम पूरे विश्व में एक 'समानता' ला रहे हैं। चलिए यह भी हमारे वैक्सीनेशन प्रोग्राम में जुड़ गया। अब दो–तीन टीके और ठोकिये। जिस तरह से भारत का पोल्ट्री बाजार 'खुला' हुआ है, 'विश्व कुटुंब' के नाम पर अभी और नई–नई वैक्सीन आने की सम्भावना है। नंबर बढ़ता जायेगा। मुझे सदैव से एक बड़ा खतरा महसूस होता है कि प्रायः हर बीमारी के कई–कई स्ट्रेन हैं। जो स्ट्रेन भारत में नहीं है इस माध्यम से हमारे देश में वह भी आ जायेगा और कुछ दिनों में भारतीय स्ट्रेन से बनी वैक्सीन फैल होने लगेगी। हमारे वैज्ञानिकों को इस ओर ध्यान देना चाहिए ओर सही मार्ग दर्शन देना चाहिए।

चलिए वैक्सीन पर वैक्सीन नई–नई आती जाएँगी और हम दीवानों की तरह उसके पीछे लग जायेंगे। अजीब विडंबना है 'तब' अर्थात पहले वैक्सीन का यंत्र, तंत्र और मंत्र सभी गवर्मेंट इंस्टीट्यूशन के हाथ था परन्तु अब यह सारा का सारा वैक्सीन उत्पादन प्राइवेट उत्पादकों को चला गया है। तय है उसी यंत्र, तंत्र और मंत्र से अधिक से अधिक वैक्सीन भिन्न–भिन्न बिमारियों की निकालेंगे। चंद महत्वपूर्ण वैक्सीन से 'सब्र' नहीं होगा। भिन्न–भिन्न प्रकार की अधिक से अधिक उत्पादन से कंपनी अधिकतम लाभ अर्जित करेगी।

चलिए कंपनी तो चलती रहेगी लेकिन जो 'पोल्ट्री' पर वैक्सीन के बाद वैक्सीन ठोकने का वैक्सीनेशन प्रोग्राम दिया जा रहा है उस पर हमें अपने निष्पक्ष वैज्ञानिकों को गहन चर्चा करने की अत्यंत आवश्यकता है। एक कमर्शियल लेयर फार्म पर जो वैक्सीनेशन प्रोग्राम चल रहा है उस पर चर्चा कर लेते हैं।

पहले सप्ताह के 6 दिनों में 8 वैक्सीन जिसमे लाइव और किल्ड दोनों शामिल हैं।

मुझ जैसा मामूली फील्ड वर्कर यह सोचकर घबरा जाता है कि एक दिन का 35–40 ग्राम का चूजा इतनी वैक्सीन को कैसे झेल लेगा? क्या इम्युनिटी बनाने वाले तंत्र इतने सक्षम हैं कि इस 'कॉकटेल' को अब्सॉर्ब करके सक्षम इम्युनिटी बना सके? इसका उत्तर हमारे वैज्ञानिक ही दे सकते हैं।

- 14 दिन से 19 दिन तक 6 वैक्सीन जिसमे फिर लाइव और किल्ड शामिल हैं।
- 22 से 27 दिन में 3 वैक्सीन
- 28 से 32 दिन में 4 वैक्सीन
- इसके बाद 10 सप्ताह तक हर सप्ताह एक वैक्सीन
- न जाने क्यों दो सप्ताह का गैप देकर 12 सप्ताह से 30 सप्ताह तक हर सप्ताह एक वैक्सीन।
- इस तरह पहले सप्ताह से 30 सप्ताह तक कुल 44 वैक्सीन लग गयी। एक दिन का लेयर चिक्स अगर 50 रूपए का है तो उतना ही या उससे कुछ अधिक 44 वैक्सीन का खर्च है। अभी पिक्चर यहीं खतम नहीं होती है। इसके बाद भी हर 6–8 सप्ताह पर कोई–ना–कोई वैक्सीन ठोकी जा रही है–किल्ड या लाइव। ब्रीडर में भी वैक्सीन के बाद वैक्सीन इसी प्रकार ठोकी जा रही है। सितम है MG का टीका भी लगा रहे हैं और इसका प्रीवेंटिव प्रोग्राम भी करवा रहे है।

आमतौर से 35 सप्ताह के बाद ND और IB लाइव वैक्सीन 6–8 सप्ताह के अंतराल से पीने के पानी के साथ दिया जाता था जो काम भी करता था और स्ट्रेस भी कम होता था। आज भी हो रहा है और सफल भी है। अब कुछ जगह पर इसकी जगह किल्ड वैक्सीन ने ले ली है, जो डबल स्ट्रेस करता है–वैक्सीन और हैंडलिंग। इससे उत्पादन भी कुछ दिनों के लिए घटता है।

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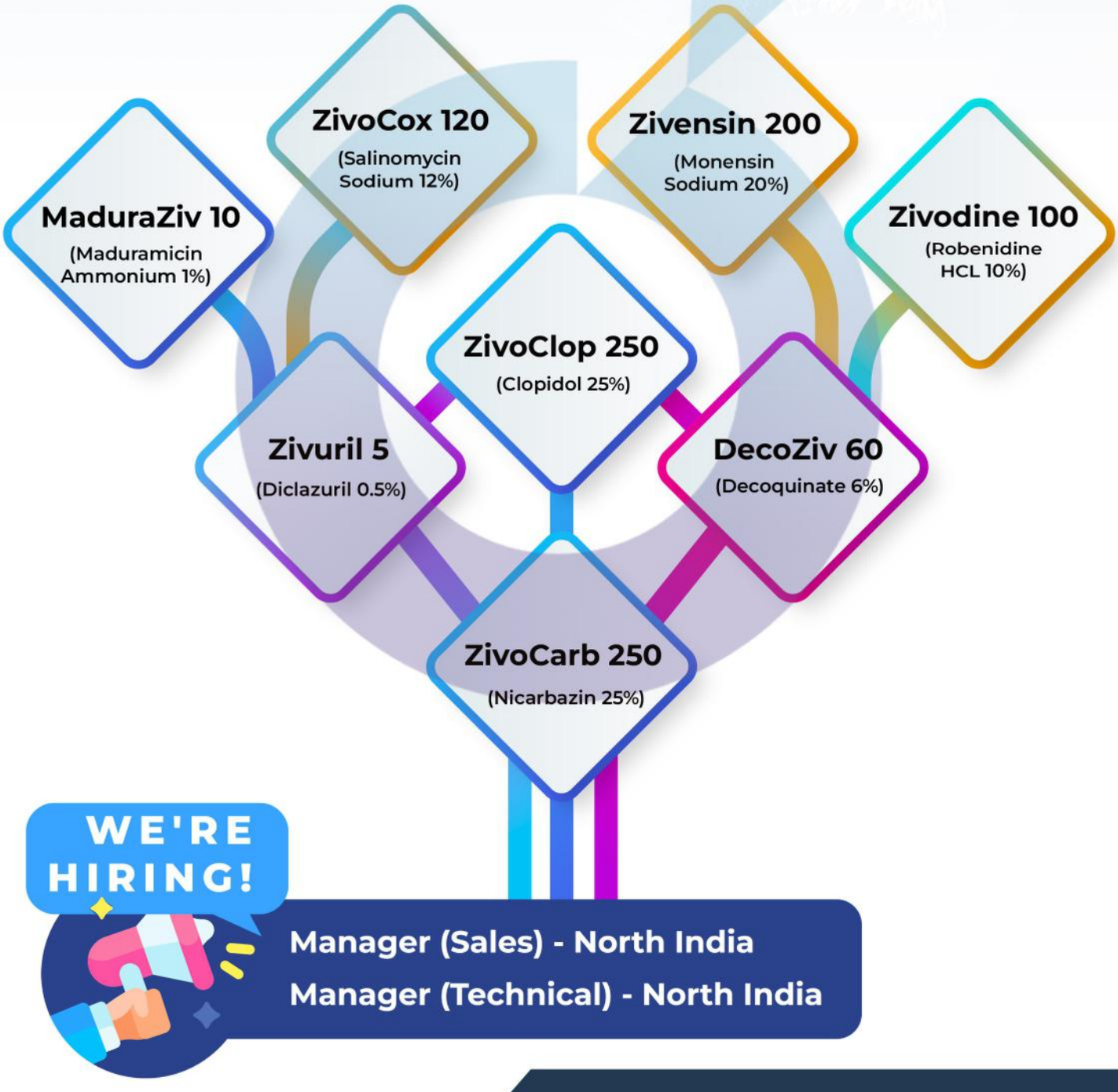

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कुछ दिन में प्रोडक्शन ठीक हो जाती है परन्तु जो अंडे पहले कम हुए थे वह दुबारह मिलने नहीं जा रहे है। अतः 330 या 340 हेनहाउस (HH) कहना गलत होगा।

एक बात हम समझ लें जबसे पोल्ट्री में वैक्सीन का उपयोग शुरू हुआ है यह कुछ न कुछ स्ट्रेस फ्लॉक पर डालता है। यह बात प्रारम्भ से ही कही जा रही है। पहले जब भी वैक्सीन देते थे तो स्ट्रेस को ध्यान में रखते हुए कुछ दिन पहले से ही पूरा प्रिवेंटिव बिंदुओं पर ध्यान देते थे, जैसे उम्र के हिसाब से पानी में विटामिन का उपयोग या बड़ी उम्र में डिवर्मिंग फिर एंटीबायोटिक का प्रिवेंटिव कोर्स और विटामिन। अब तो बहुत अच्छे अच्छे इम्युनोमाडेलेटर और नॉन –एंटीबायोटिक एंटी स्ट्रेस प्रोडक्ट आ गये हैं। फिर भी कम ही लोग उपयोग में लाते हैं। समय पर भी ध्यान दिया जाता है। आज हम निर्भय होकर दिन में 10–11 बजे वैक्सीन लगाकर सीधे क्रेट में डालते हैं और उन्हें शहर की सड़कों की हवा खिलाते हैं, और अपने दूसरे फार्म पर शिफ्ट कर देते हैं। एक साथ 3–4 स्ट्रेस देते हैं। यह स्ट्रेस इम्युनिटी बनने में बाधा डाल सकता है। कायदे से वैक्सीनेशन के बाद उन्हें वहीं 5–6 दिन रखना चाहिए – फिर नयी जगह शिफ्ट करें। 'नयी जगह' भी स्ट्रेस पैदा करती है।

वैज्ञानिक तथ्यों के आधार पर प्रारम्भ के 2–3 सप्ताह तक वह सभी ऑर्गन डेवेलोप या मच्योर होते रहते हैं, जिन्हे इम्युनिटी डेवेलोप करना है फिर यह पहले दिन से 6 दिन तक 8 वैक्सीन का लगाना कहाँ तक उचित है? क्या लगी हुई वैक्सीन भी 'लाइन' में खड़ी होकर अपने समय का इंतजार करेगी।

जब सन् 1971–72 के आस–पास MD वैक्सीन नयी–नयी बनी, जिसकी सख्त जरुरत भी थी कहा गया कि इस वैक्सीन को हैचरी में ही लगा कर फार्मों पर भेजना है। एक बार चूजे अगर फार्म पर एक्सपोज हो गए तो इसे लगाना बेकार सा होगा। आज एक वैक्सीन हैचरी से लग कर आ रही है तो दूसरी फार्म पर क्यों लगवाई जा रही है। तर्क है हैचरी में अगर कुछ बर्ड्स में वैक्सीन छूट गयी तो यह दूसरी वैक्सीन कवर कर लेगी। प्रश्न है कि अच्छा स्टाफ वैक्सीन लगा रहा है तो छोड़ा कैसे? मान लें कुछ छूटे होंगे तो यह दूसरा वैक्सीन कवर करेगा। जब यह छूटे हुए चिक्स एक्सपोज हो गए हैं तो वैक्सीन कैसे कवर करेगी ?

पहले वैक्सीन लगाने के बाद दूसरी वैक्सीन लगाने के लिए 'गैप' (अंतर) का ध्यान रखा जाता था। अब 'ईस्ट इंडिया' कंपनी ने यह सब ताक पर रखकर वैक्सीन पर वैक्सीन लगाने की नयी पद्धति खड़ी कर दी है। व्यापार के दृष्टिकोण से 'ईस्ट इंडिया' के लिए तो यह बहुत लाभदायक है परन्तु क्या पोल्ट्री के लिए भी लाभदायक है? इसका उत्तर तो हमारे वैज्ञानिक ही दे सकते हैं।

पहली नजर में यह F.I.R. तो सही लगती है। इसका फैसला तो हमारे सक्षम 'सुप्रीम कोर्ट के जस्टिस' (हमारे सक्षम वैज्ञानिक) ही कर सकते हैं। आज स्वर्गीय J.L. वैगड की बहुत याद आ रही है। श्रेष्ठ वैज्ञानिक होने के साथ–साथ निडर और निर्भीक, हर मुद्दे पर साफ–साफ बात करते थे, अपने विचार तथ्यों के साथ रखते थे।

बहर हाल हमारे पास डस्टर श्रीनिवास गौड़ा, डॉक्टर प्रजापति और डॉक्टर पी के शुक्ला हैं। सरकार में, इंस्टीटूशन्स, वैज्ञानिकों में और सबसे बड़ी बात पोल्ट्री इंडस्ट्री में उनकी पकड़ बहुत प्रभावशाली है। यदि वह पोल्ट्री इंडस्ट्री की इस समस्या को जो काफी उलझी हुई है, सुलझा सकें तो इंडस्ट्री के हित में बहुत बड़ा सहयोग होगा। यहाँ मैंने तीन प्रमुख वैज्ञानिकों का नाम लिखा परन्तु और वैज्ञानिकों से भी सम्पर्क कर सकते हैं।

अपने पास चार प्रमुख लेयर के ब्रीडिंग फार्म हैं। सभी के फ्लॉक अच्छा रिजल्ट दे रहे हैं जबकि वैक्सीनेशन प्रोग्राम में जमीन आसमान का फरक है। एक ही वातावरण में यह अंतर क्या दर्शाता है?

IVRI इज्जतनगर में एक पूरा डेवेलप बायोलॉजिकल डिवीजन है जिसका काम ही वैक्सीन की गुणवत्ता, आवश्यकता आदि पर नियंत्रण रखना है। इधर इनके कार्यकलापों की कोई खबर नहीं, जबकि डॉक्टर RISHENDRA VERMA के समय में कुछ शोर शराबा, कुछ हलचल रहती थी। इसमें सभी उच्च कोटि के विशेषज्ञ हैं उनका ध्यान इस और लाना होगा।

एक–दो महीने से देख रहा हूँ, एक नयी 'इन्नोवेटिव कोरायजा वैक्सीन' आ गयी है जिसका जगह–जगह जश्न मनाया जा रहा है, जिसकी रिपोर्टिंग सभी पोल्ट्री मैगजीनें कर रही हैं। भाई भारत में यह कोई नयी बीमारी नहीं। काफी पुरानी है और कभी किसी फार्म पर आ गयी तो इलाज एंटीबायोटिक से हो जाता था। ऐसी बिमारी नहीं थी जो एक लाइन से सभी फार्मों पर हमला कर दे। हमें तो एक और वैक्सीन का लोड बढ़ाना है।

बढ़िया बायोसिक्योरिटी जो बिमारी की रोकथाम के लिए अत्यंत आवश्यक है, इस पर बहुत कम चर्चा होती है। हर फार्म को 100 में से 100 नंबर मिलने चाहिए, परन्तु 95% को शायद 40 को भी ना मिले। इसे हमने सही ढंग से अपना लिया तो शायद इतनी वैक्सीन की जरूरत भी ना पड़े।

हमारे बड़े संस्थानों को जिसमे IVRI , CARI प्रमुख हैं, उन्हें इम्म्यूनोमॉडुलेटर पर काम करना चाहिए। कुछ फील्ड रिपोर्ट चौकाने वाले रिजल्ट दे रहे हैं।

शुक्र है सरकार ने HUMAN VACCINE को इन पोल्ट्री वैक्सीन बनाने वालों के हाथ में नहीं दिया, वरना हम सब साल में कई बार लाइन में खड़े होकर टीका लगवाते रहते। एक छोटे बच्चे को 4–5 साल की उम्र तक कई बिमारियों के अलग–अलग टीके लगते हैं, जो लाइफ लॉन्ग बचाव करते हैं। हम आप इन्फ्लुएंजा का टीका तीन साल के अंतराल से लगवाते रहते हैं। फ्लू का टीका हर साल एक बार लगवाते हैं। पौल्ट्री में ऐसा क्यों नहीं हो सकता? हमारे स्वतंत्र वैज्ञानिक इस ओर ध्यान दें।

यह लेख किसी को आहत करने के लिए नहीं लिखा गया है। एक फील्ड वर्कर होने के नाते, इतनी अधिक वैक्सीन का दबाव एक छोटे से परिंदे पर देख कर अपने वज्ञानिकों की याद आई–कहाँ तक यह मौजूदा प्रोग्राम सही है ओर कहाँ तक गलत? उनके 'सैद्धांतिक' विचारों को नत–मस्तक।

Mr. Shabbir Ahmad Khan

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ARTICLE

Vaccination in Layer Poultry
Principles, Practices, and Impact

Prof. (Dr.) P.K. Shukla and Dr. Amitav Bhattacharyya

Abstract

Vaccination is a cornerstone of preventive health management in commercial layer poultry production. With the intensification of poultry farming, increasing flock sizes, genetic improvement of birds, and heightened disease challenges, vaccination has become indispensable for sustaining productivity, ensuring egg quality, safeguarding animal welfare, and protecting public health. This article provides a comprehensive academic review of vaccination in layer poultry, covering immunological principles, major diseases of layers, vaccine types and technologies, vaccination schedules, routes and methods of administration, factors affecting vaccine efficacy, monitoring of immune responses, economic and biosecurity implications, and emerging trends in vaccine development. The role of vaccination in antimicrobial stewardship and sustainable poultry production is also critically examined.

1. Introduction

The layer poultry sector plays a vital role in global food and nutritional security by providing affordable, high-quality animal protein in the form of eggs. As the industry has transitioned from backyard and smallholder systems to highly intensive commercial operations, the risk of infectious disease outbreaks has increased substantially. High stocking density, rapid bird turnover, multi-age farming, and extensive movement of birds, feed, and personnel contribute to the persistence and spread of pathogens in layer farms.

Vaccination is widely recognized as the most cost-effective and sustainable strategy for controlling infectious diseases in poultry. Unlike therapeutic interventions, vaccination aims to stimulate protective immunity before exposure to pathogens, thereby reducing morbidity, mortality, production losses, and the need for antimicrobial drugs. In layer birds, vaccination assumes added importance because birds are maintained for extended production cycles, often exceeding 70–90 weeks, and must remain healthy throughout the laying period to ensure consistent egg production and quality.

This article reviews the scientific basis and practical application of vaccination in layer poultry, with emphasis on its integration into comprehensive health management and biosecurity programs.

2. Immunological Basis of Vaccination in Poultry

2.1 The Avian Immune System

The avian immune system comprises innate and adaptive components. Innate immunity provides the first line of defense through physical barriers, phagocytic cells, and non-specific responses. Adaptive immunity involves humoral and cell-mediated responses mediated by B and T lymphocytes.

Key lymphoid organs in poultry include:

- **Primary lymphoid organs**: Bursa of Fabricius (B-cell development) and thymus (T-cell development).
- **Secondary lymphoid organs**: Spleen, Harderian gland, cecal tonsils, and mucosa-associated lymphoid tissues.

Effective vaccination relies on stimulating these immune components to recognize and respond rapidly to specific pathogens upon exposure.

2.2 Mechanism of Vaccine-Induced Immunity

Vaccines introduce antigens derived from pathogens into the host without causing disease. These antigens are processed by antigen-presenting cells, leading to activation of lymphocytes and production of antibodies and memory cells. In layer poultry, both systemic immunity (circulating antibodies) and local immunity (respiratory and intestinal mucosa) are critical, depending on the disease targeted.

2.3 Maternal Antibodies and Vaccination

Chicks hatched from vaccinated breeder flocks possess maternal antibodies that provide early protection against several diseases. However, these antibodies can interfere with vaccine take if vaccination is performed too early. Designing appropriate vaccination schedules for layers requires careful consideration of maternal antibody levels.

3. Major Infectious Diseases of Layers Preventable by Vaccination

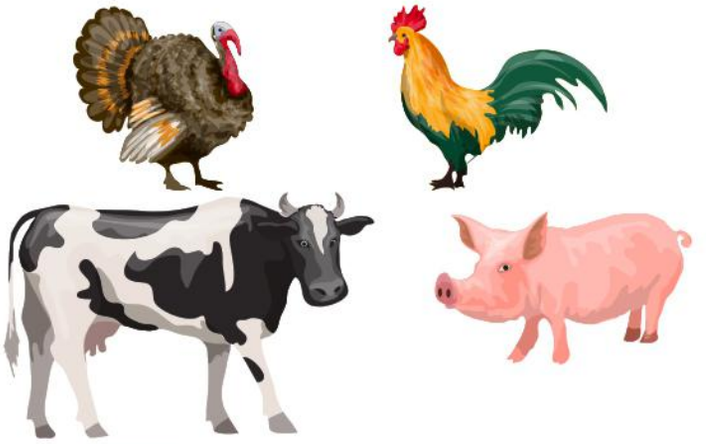
3.1 Viral Diseases

3.1.1 Newcastle Disease (ND)

Newcastle disease is one of the most economically devastating viral diseases of poultry worldwide. In layers, ND causes respiratory distress, nervous signs, sharp drops in egg production, and poor egg quality. Routine vaccination using live and inactivated vaccines is essential for effective control.

3.1.2 Infectious Bronchitis (IB)

Infectious bronchitis affects the respiratory tract, kidneys, and reproductive system. In layers, it leads to reduced egg production, misshapen eggs, and poor shell quality. The existence of multiple serotypes and variants necessitates strategic vaccination programs using homologous or combination vaccines.



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3.1.3 Marek's Disease (MD)

Marek's disease is a lymphoproliferative disease caused by a herpesvirus. It results in tumors, paralysis, immunosuppression, and mortality. Vaccination at hatch, usually with cell-associated or recombinant vaccines, is the primary control measure.

3.1.4 Egg Drop Syndrome (EDS-76)

EDS-76 causes sudden drops in egg production and production of shell-less or soft-shelled eggs. Inactivated vaccines administered before the onset of lay provide effective protection.

3.1.5 Avian Encephalomyelitis (AE)

AE affects young birds, causing neurological signs, while in layers it leads to reduced hatchability and egg production. Vaccination during the rearing phase ensures long-term protection.

3.2 Bacterial Diseases

3.2.1 Salmonellosis

Salmonella infections are of major public health significance due to their zoonotic potential. In layers, vaccination against *Salmonella Enteritidis* and *Salmonella Typhimurium* helps reduce intestinal colonization and egg contamination.

3.2.2 Fowl Cholera

Caused by *Pasteurella multocida*, fowl cholera leads to acute mortality or chronic production losses. Both live and inactivated vaccines are used in endemic areas.

3.2.3 Infectious Coryza

Infectious coryza causes respiratory illness and production losses in layers. Vaccination with bacterins is commonly practiced in regions where the disease is prevalent.

3.3 Parasitic Diseases

3.3.1 Coccidiosis

Although more critical in broilers and growers, coccidiosis can affect pullets during rearing. Live attenuated or non-attenuated coccidial vaccines are used to establish protective immunity.

4. Types of Vaccines Used in Layer Poultry

4.1 Live Attenuated Vaccines

Live vaccines contain weakened pathogens capable of limited replication in the host. They induce strong and long-lasting immunity, including local mucosal responses. However, they require careful handling and may cause mild post-vaccination reactions.

4.2 Inactivated (Killed) Vaccines

Inactivated vaccines contain killed pathogens and are usually administered by injection. They are safer and more stable but often require adjuvants and booster doses to achieve optimal immunity.

4.3 Recombinant Vaccines

Recombinant vaccines use genetic engineering techniques to express specific antigens in a vector organism. They offer high safety and targeted immune responses and are increasingly used against diseases such as Marek's disease and avian influenza.

4.4 Vector and Subunit Vaccines

These vaccines deliver selected antigenic components of pathogens, minimizing the risk of adverse reactions. Their application in layers is expanding with advances in biotechnology.

5. Vaccination Schedules in Layer Poultry

Vaccination programs for layers are designed based on local disease prevalence, maternal antibody status, farm biosecurity, and production objectives. A typical layer vaccination schedule includes:

- **Day-old**: Marek's disease (HVT or recombinant vaccine)
- **1-3 weeks**: Newcastle disease and infectious bronchitis (live)
- **3-6 weeks**: IBD, ND, IB boosters
- **8-12 weeks**: Fowl pox, AE
- **14-18 weeks (pre-lay)**: ND, IB, EDS, Salmonella (inactivated)
- **During lay**: Periodic ND and IB boosters (as per risk assessment)

Customization of schedules is essential to avoid vaccine overload and ensure effective immunity.

6. Routes and Methods of Vaccine Administration

6.1 Hatchery Vaccination

Vaccines such as Marek's disease are commonly administered at the hatchery via subcutaneous injection or in ovo delivery.

6.2 Drinking Water Vaccination

Drinking water vaccination is widely used for live vaccines due to ease of administration. Water quality, sanitation, and bird access must be carefully managed.

6.3 Spray and Aerosol Vaccination

Spray vaccination is effective for respiratory vaccines like ND and IB, stimulating local immunity in the respiratory tract.

6.4 Injectable Vaccination

Inactivated vaccines are administered via intramuscular or subcutaneous injection, usually during the rearing or pre-lay phase.

7. Factors Affecting Vaccine Efficacy in Layers

Several factors influence the success of vaccination programs:

- Vaccine quality and cold chain maintenance
- Correct dosage and administration technique

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- Stress, environmental conditions, and concurrent infections
- Farm biosecurity and hygiene

Failure to address these factors can lead to vaccine failure and disease outbreaks.

8. Monitoring and Evaluation of Vaccination Programs

Serological monitoring using tests such as ELISA and HI is essential to assess immune responses and uniformity of vaccination. Post-vaccination monitoring helps in early detection of gaps in immunity and facilitates timely corrective measures.

9. Economic and Public Health Implications

Vaccination significantly reduces economic losses associated with mortality, reduced egg production, poor egg quality, and treatment costs. Moreover, vaccination against zoonotic pathogens such as *Salmonella* enhances food safety and consumer confidence. By reducing reliance on antibiotics, vaccination contributes to antimicrobial resistance (AMR) mitigation and aligns with global One Health objectives.

10. Emerging Trends and Future Perspectives

Advances in molecular biology and immunology are driving the development of next-generation poultry vaccines, including DNA vaccines, mRNA vaccines, and nanoparticle-based delivery systems. Improved diagnostics, precision vaccination, and integration of vaccination data with digital farm management systems are expected to enhance disease control in layer poultry.

11. Conclusion

Vaccination remains a fundamental pillar of health management in layer poultry production. A scientifically designed and well-implemented vaccination program, integrated with biosecurity, nutrition, and management practices, is essential for sustaining productivity, profitability, and animal welfare. As disease challenges evolve and consumer expectations regarding food safety and sustainability increase, continuous refinement of vaccination strategies will be critical for the long-term resilience of the layer industry.

Prof. (Dr.) P.K. Shukla and Dr. Amitav Bhattacharyya

Department of Poultry Science,

College of Veterinary Science and Animal Husbandry,

Mathura- 281001 (U.P.)

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- SWISS VITAMIN - E
- SWISS VITAMIN - C
- SWISS VITAMIN - K
- SWISS VITAMIN - D2
- SWISS VITAMIN - B2
- SWISS VITAMIN - B9
- SWISS VITAMIN - D3
- SWISS VITAMIN - B5
- SWISS VITAMIN - B1

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Efficacy Of Acidlac™ W Conc. Liquid For Water Sanitation And Acidification In Desi (ASIL) Broiler Breeder Chicks And Growers

Jagadeesh N and Chanthirasekaran R

AcidLAC™ W Conc. Liquid - A Game Changer in Poultry Water Management

India has achieved significant progress in broiler production over the past few decades, recording an impressive annual growth rate of approximately 15%. In contrast, indigenous desi breeds remain largely non-descript and exhibit slow growth for meat production. These breeds are also highly susceptible to bacterial and viral infections, with *Escherichia coli* (*E. coli*) being a major pathogen that acts as both a primary and secondary disease-causing agent. Contaminated drinking water is the primary source of *E. coli* infection in poultry.

Water is the most essential nutrient for poultry health and performance, yet its quality is often overlooked. Clean, safe, and soft water is critical for digestion, nutrient absorption, and maintaining a healthy gut microbiome. Among water quality parameters, pH plays a crucial role in determining nutrient availability and maintaining a balance of microbes within the digestive tract. Therefore, continuous monitoring of water pH and coliform counts is necessary to ensure hygienic water delivery to birds.

To address waterborne disease challenges, acidification of drinking water has emerged as a cost-effective and practical approach. Acidification helps control bacterial contamination and biofilm formation in drinking systems, reducing birds' exposure to harmful organisms and minimizing disease spread. Water disinfection during production is equally important for effective flock management. Thus, water acidification and sanitation form an integral part of a robust water management program, contributing to improved bird health and productivity.

AcidLAC™ W Conc Liquid is a potent antimicrobial acidifier used in poultry as water treatment for total gut health with the following benefits.

a) Reduces microbial load in drinking water.
b) Improves intestinal integrity.
c) Decreases mortality.
d) Improves performance.
e) Removes biofilm and mineral deposits in waterlines.
f) Compatible with antibiotics and no drug residues and withdrawal period.

AcidLAC™ W Liquid will help to improve the digestion, absorption, and utilization of nutrients in the feed by inhibiting microbes and improving growth performance. AcidLAC™ W Conc Liquid is a synergic blend of organic acids that reduces the water pH and hence improves gut acidification. By reducing the gut pH, AcidLAC™ W Conc Liquid promotes the growth of commensals like *Lactobacillus* and reduces the load of pathogenic bacteria in the gut, and it maintains gut eco-balance, which promotes growth of the bird and body weight gain, resulting in better FCR. Apart from aiding in the reduction of microbial count in water, organic acids improve protein digestibility by reducing microbial competition with the host for nutrients and endogenous nitrogen losses.

AcidLAC™ W Conc. Liquid is a synergistic combination of organic acids along with an antimicrobial compound, which helps to reduce the incidence of disease and lower the production costs to the customers. The present study was undertaken to evaluate the efficacy of AcidLAC™ W Conc. Liquid in improving water hygiene and the performance of desi (Asil) breeder chicks and growers, focusing on mortality, body weight, and coliform contamination.

OBJECTIVE

To evaluate the efficacy of AcidLAC™ W Conc. Liquid in improving water hygiene for desi (Asil) breeder chicks and growers under practical farm conditions in Tamil Nadu, India, with respect to mortality, body weight, and coliform contamination.

METHOD

The study was conducted in 2023 at a well-managed desi breeder farm in Tamil Nadu, India. A total of 14,429 desi breeder chicks were allocated to two experimental groups for a 12-week period, housed in open-sided, deep litter sheds under natural conditions. All birds received a breeder mash diet and ad libitum access to water throughout the trial.

Table 1: Dosage and trial details of experimental groups

Group	Description	No. of Birds
Control	Breeder mash diet with NaDCC# tablet as water sanitizer for 12 weeks at 2 tablets/1000L of drinking water	7,229
AcidLac™ W Conc*	Breeder mash diet with AcidLAC™ W Conc Liquid as water sanitizer for 12 weeks at 250 ml per 1000L of drinking water	7,200

Note: *AcidLac™ W Conc. Liquid is a potent antimicrobial acidifier used in poultry to purify the water from microbial contamination and to improve bird performance.

(#NaDCC- Sodium dichloroisocyanurate)

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PARAMETERS MEASURED

- Livability - Assessed in terms of mortality %
- Uniformity - By average body weight
- Water Hygiene - By Coliform test in water

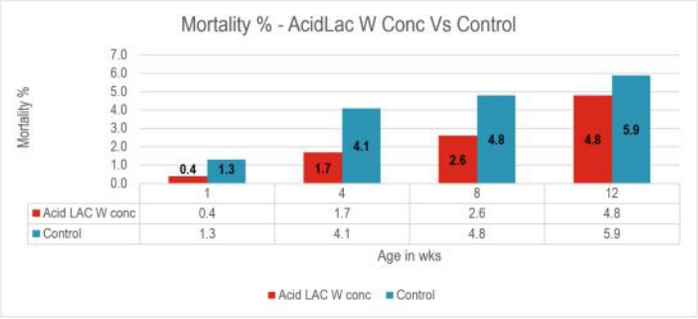
RESULTS

Results demonstrated that supplementation with AcidLAC™ W Conc. Liquid significantly improved mortality rates, body weight uniformity, and water hygiene compared to the control group

Impact on Mortality:

Over the 12-week trial period, the group receiving AcidLAC™ W Conc. Liquid exhibited a 1.1% lower mortality rate compared to the control group. Detailed chick and grower mortality data for both groups are presented in Figure 1.

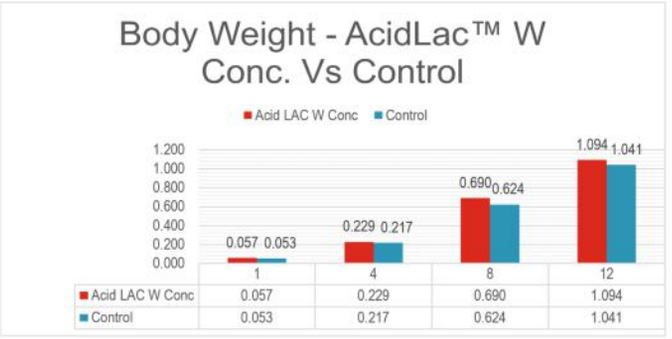
Figure 1: Mortality % of experimental groups during the trial period



Uniformity (Body weight & CV%):

For the total trial period of 12 weeks, the AcidLAC™ W Conc. group had a higher body weight of 53g when compared to the control group. Body weight details of the AcidLAC™ W conc and control group are given as a graphical representation of body weight for both trial and control groups in **Figure 2.**

Figure 2: Body weight of experimental groups during the trial period.



Water analysis and treatment of water samples:

As a preliminary part of the trial, key water parameters like hardness, total dissolved solids (TDS) & pH of source water were analyzed, and the results are as follows:

- Hardness - 340 ppm
- pH - 7.6
- TDS - 460

The pH of the same water becomes acidic (pH 6.6) when treated with AcidLAC™ W Conc Liquid and is used for treatment group birds for drinking purposes. Similarly, the NaDCC tablet was used as a water sanitizer for the control group birds, and the pH of the water after adding the NaDCC tablet was 7.3.

Water samples were collected from different places, like tanks, pipelines, and nipples, and tested for coliform contamination by the qualitative method of analysis. Nipple water samples were collected randomly from different places of the sheds, like the front, middle, and end of the shed. Coliform test results for both AcidLAC™ W Conc and the control group are given in **Table 2.**

Table 2: Water Hygiene - Coliform Contamination Status in AcidLAC™ W Conc. Liquid vs Control

Water Hygiene - Coliform Contamination status in AcidLAC™ W Conc Liquid and Control group						
Age in Wks	AcidLAC W Conc group- Coliform status			Control group - Coliform status		
	Tank	Pipeline	Nipples	Tank	Pipeline	Nipples
1	Negative	Negative	Negative	Negative	Negative	Negative
4	Negative	Negative	1% positive	Negative	2% positive	18% positive
8	Negative	Negative	Negative	Negative	18% Positive	22% Positive
12	Negative	Negative	3% positive	Negative	8% Positive	16% Positive

DISCUSSION

The application of AcidLAC™ W Conc. Liquid in broiler breeder management demonstrated notable improvements in key productivity metrics, including reduced cost of production for growers and lower hatching egg costs, ultimately enhancing overall production performance and chick quality. Water acidification and sanitation with AcidLAC™ W Conc. Liquid resulted in a 1.1% reduction in mortality compared to the control group. Additionally, birds in the treatment group exhibited a 53g higher average body weight. Water analysis revealed that coliform contamination was nearly eliminated in the treatment group, whereas it persisted in the control group. Collectively, these findings indicate that AcidLAC™ W Conc. Liquid delivers superior outcomes across all measured performance parameters.

CONCLUSION

This study demonstrates that supplementation with AcidLAC™ W Conc. Liquid enhances the economic performance of broiler breeder birds by improving body weight gain, livability, and water hygiene. AcidLAC™ W Conc. Liquid serves as an effective antimicrobial acidifier for chicks and growers, supporting optimal pullet uniformity and overall flock health. Its use reduces the proliferation of harmful bacteria in the digestive tract and promotes improved nutrient absorption, thereby contributing to greater productivity

References are available upon request.

Jagadeesh N and Chanthirasekaran R
Kemin Industries South Asia Pvt. Ltd.

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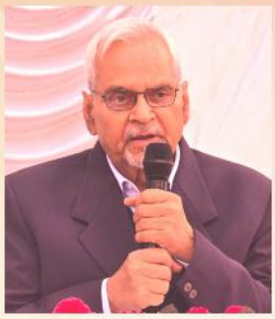
A New Year Gift for Breeders of North India




In a historic development for the poultry sector in North India, the Broiler Breeders Association North (BBA North) has taken a pioneering step by launching a Single Window System office for the sale of commercial parent birds in Panipat, Haryana. This initiative is being widely acknowledged as a transformative move aimed at bringing greater efficiency, transparency, and professionalism to poultry operations across the region.

The inauguration ceremony began with the traditional ribbon-cutting and ceremonial lamp-lighting, symbolising a new beginning for organised poultry services in North India. The occasion was graced by Dr. S. P. Singh, General Manager (North Zone), Venkateshwara Hatcheries (Venky's) India Ltd., who attended as the Chief Guest. The event saw the presence of several prominent leaders and senior representatives from the poultry fraternity, including Mr. Ranpal Dhanda, Mr. S. S. Talwar, Mr. Mohit Malik, President of BBA North, and Mr. Krishna Bhardwaj, along with members of the Association's Executive Committee.

More than 300 breeders, integrators, and industry stakeholders actively participated in the program, reflecting the high level of interest and optimism surrounding this new initiative.

Single Window System: A Progressive Reform for the Poultry Sector

While addressing the gathering, Dr. S. P. Singh described the Single Window System as a forward-looking and much-needed reform for the poultry industry. He highlighted that the new system would significantly simplify administrative procedures, reduce delays, and ensure smoother coordination between breeders and suppliers. According to him, such structured mechanisms are essential to strengthen business operations and enhance trust within the poultry value chain across North India.

Announcement of a Modern Poultry Laboratory

The most noteworthy announcement of the event came from Mr. Mohit Malik, President of BBA North, who revealed that construction of a state-of-the-art poultry laboratory in North India would commence within the next three to four months. This proposed laboratory is expected to play a vital role in improving disease diagnostics, quality control, and scientific research, thereby strengthening the technical foundation of the poultry industry in the region.

Demonstrating his strong personal commitment to this visionary project, Mr. Malik announced a contribution of INR 1 crore and 1 lakh towards the establishment of the laboratory and appealed to fellow breeders and industry partners to extend their wholehearted support.

Adding further momentum to the initiative, Mr. Tejbir Kundu, Managing Director, Kisan Breeding Farm, announced a generous contribution of INR 21 lakh. He underlined the importance of collective responsibility and emphasised that sustainable growth in the poultry sector requires not only commercial success but also strong social and institutional support.





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Strong Backing from Industry Leadership

Mr. Ranpal Dhanda, President of the Poultry Federation of India, hailed the initiative as a major milestone for the poultry industry. He remarked that the long-standing need for a modern and dependable poultry laboratory in North India would finally be fulfilled through this project. Once operational, the facility is expected to benefit farmers, breeders, veterinarians, and allied stakeholders by providing reliable scientific services and technical support. He congratulated the entire BBA North team for their visionary leadership and assured full cooperation from the Poultry Federation of India.

Several other dignitaries and industry leaders present on the occasion also shared their views, applauded the efforts of the Broiler Breeders Association North, and reaffirmed their commitment to support similar progressive initiatives in the future.

Invitation to the Upcoming Annual General Meeting

Towards the conclusion of the program, Mr. Krishan Mann extended a warm invitation to all breeders and association members to participate in the Annual General Meeting (AGM) of BBA North, scheduled to be held on 27-28 February 2026 at Jim Corbett, Ramnagar, Uttarakhand. The AGM is expected to serve as an important platform for discussion, collaboration, and strategic planning for the future of the poultry industry.

Shaping a New Era for Poultry in North India

The program concluded with a strong message of unity, cooperation, and shared responsibility for the progress of the poultry sector. Initiatives such as the Single Window System and the proposed state-of-the-art poultry laboratory mark a decisive step toward building a more organised, transparent, and scientifically advanced poultry industry in North India. These developments are expected to significantly enhance efficiency, strengthen infrastructure, and set new benchmarks for sustainable growth in the years to come.


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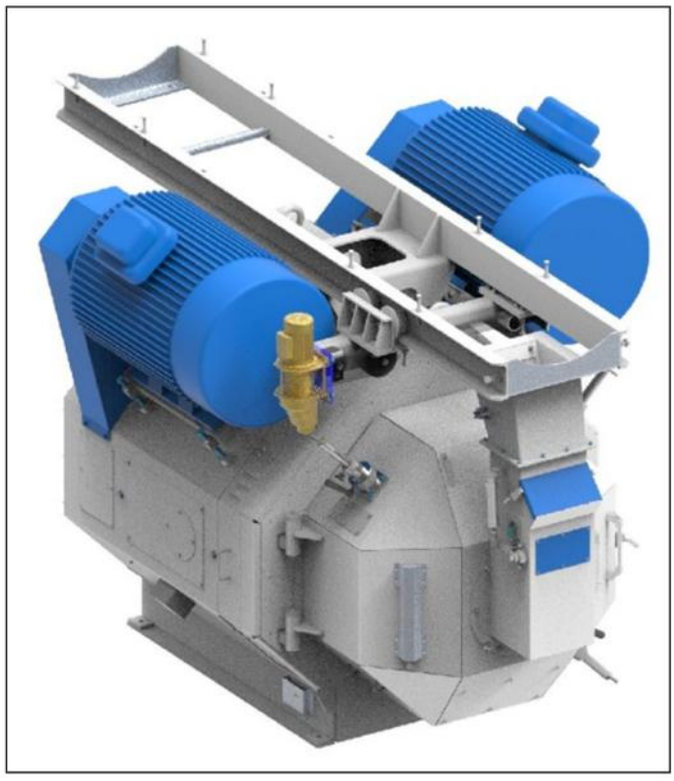
As India cements its position as a global aquaculture powerhouse, with output projected to reach 18 million tonnes by 2026, the demand for high-quality, cost-efficient feed has never been higher. To meet the stringent standards of export-oriented shrimp farming—particularly for species like *P. vannamei* and *P. monodon*—Indian feed manufacturers are increasingly looking toward technological breakthroughs that can optimize Feed Conversion Ratios (FCR) and production throughput. Famsun India is leading this transformation by introducing its innovative "Expansion + Pelleting" technology, a system designed to help local millers achieve a staggering 60% increase in capacity while simultaneously elevating feed quality.

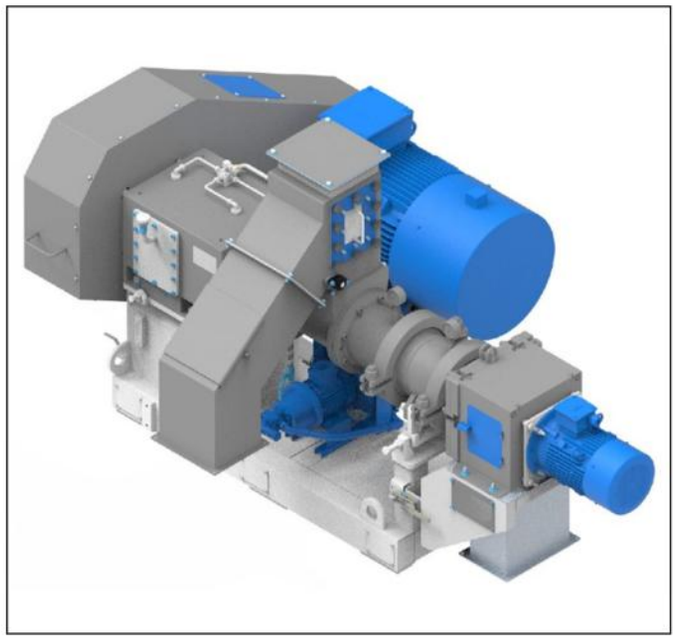


The core of this significant improvement lies in the integration of Famsun expanders into the traditional pelleting line. While conventional processes rely solely on temperature and moisture, Famsun's technology introduces mechanical energy during the conditioning stage. This enables deeper physical and chemical reactions within the feed material, leading to superior starch gelatinization (≥50%) and improved nutrient availability. For an Indian market grappling with rising raw material costs, the high flexibility of this formula-friendly technology allows millers to utilize a wider range of ingredients without compromising the structural integrity of the final pellet.

Leadership Perspective: FAMSUN's Global Vision

Speaking about the achievement, Ms. Rong, Chairperson of FAMSUN Group, expressed pride in the company's contribution to global food security. She said, *"This project reflects FAMSUN's commitment to building smart, safe and sustainable grain infrastructure across the world. Whether in Egypt, Southeast Asia or India, our goal remains the same - to protect every grain and empower food security for generations."* She further emphasized India's strategic importance, adding, *"India is one of our most important markets. With its growing population, expanding ethanol industry and modernization of food supply chains, high-quality storage systems will play a crucial role. FAMSUN is proud to contribute to this journey."*

Production data highlights a transformative leap in efficiency: single-line output that previously operated at 2.8 t/h under traditional conditioning has been boosted to 4.5 t/h—a clear 60% capacity breakthrough. Beyond volume, the quality of the feed is markedly improved. Pellets produced through this dual-process method exhibit exceptional water stability, with stable times exceeding four hours. This is critical for Indian shrimp ponds, where feed stability directly impacts water quality and waste reduction. Furthermore, the powdering rate is reduced by 50%, ensuring that more feed reaches the shrimp rather than being lost as fines.



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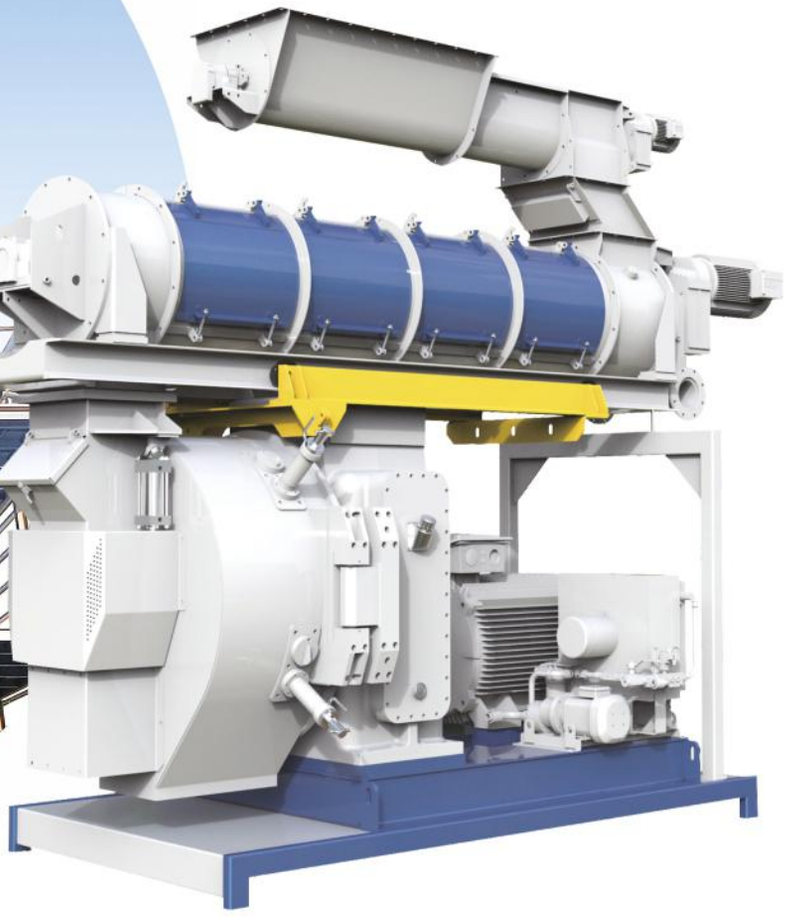

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T: +62-21-30027458; 30027459

CONTACT

Mr. Arun Kumar | +91 9901916554
arunkumar@famsungroup.com

Mr. Ashutosh Mohapatra | +91 93382 16272
ashutosh.mohapatra@famsungroup.com

Mr. Shelby | +91 74167 12555
lxb@famsungroup.com

Table 1: Comparison of Core Parameters - Famsun Expansion + Pelleting vs. Traditional Conditioning + Pelleting

Process Parameters	Traditional Conditioning + Pelleting	Expansion + Pelleting
Core variables	Temperature, moisture	Temperature, moisture, and mechanical energy
Conditioning temperature	90-102℃	Usually higher
Conditioning time	250–300 seconds	Can be properly shortened
Steam pressure	0.15–0.4 MP a after pressure reduction	0.15-0.3MPa after pressure reduction
Key equipment	Conditioner, pellet mill	Expander, pellet mill
Formula flexibility	Relatively low	High flexibility

Efficiency in resource consumption is another area where Famsun India is supporting the "Make in India" initiative's focus on sustainable manufacturing. By optimizing the conditioning process, the technology reduces power consumption per ton by 15-20% and cuts steam consumption by approximately 30%. These operational savings, combined with a total production cost reduction of 8-12%, result in a remarkably short Return on Investment (ROI) period of just 1.5 years. For medium-to-large scale feed mills in regions like Andhra Pradesh and Gujarat, this represents a sustainable path to scaling production in a competitive global market.

Table 2: Comparison of Key Shrimp Feed Quality Indicators - Famsun Expansion + Pelleting vs. Traditional Processes

Quality Indicator	Conditioning + Pelleting	Expansion + Pelleting	Test Method/Condition
Stable time in water	>2 hours	>3 hours	Soaking in normal temperature water
Water stability	May soften and diffuse	No diffusion, cracking<1.5%	Soaking in boiling water for 20mins
Powdering rate	≤0.2%	≤0.1%	Standard powdering rate test
Pellet appearance	Average	Flat cut, smooth appearance	Observe with naked eyes and and a magnifying glass
Degree of starch gelatinization	≤35%	≥50%	Amylase-based test method
Retention rate of heat-sensitive nutrients	Relatively high	Need special protection	Lab analysis

India Focus: Insights from FAMSUN India

Mr. Arun Kumar, Country Head - FAMSUN India, echoed similar sentiments and highlighted the relevance of this project for the Indian market. He stated, *"This global project reinforces what we strongly believe - world-class technology must be accessible to Indian customers as well. From government warehousing to private grain processors, India needs scalable, automated and safe storage solutions."* He further added, *"We are already witnessing strong demand from ethanol plants, large rice millers, feed manufacturers and port-based storage operators. FAMSUN India is fully equipped to deliver similar large-scale silo projects domestically."*

Advantages of Expansion Pre-Treatment Technology

Expansion pre-treatment delivers superior performance compared to conventional conditioning by adding mechanical energy to temperature and moisture control. This creates strong shear forces that drive key changes such as starch gelatinization, protein coagulation, and controlled fat modification, significantly improving feed structure and nutritional value.

The process converts beta-type starch into easily digestible alpha-type starch, enhancing digestibility, viscosity, and water stability while improving Pellet Durability Index (PDI). Fiber bonds are modified to increase soluble dietary fiber, supporting better gut health and nutrient absorption.

Protein binds more effectively with the starch matrix, improving nutrient utilization, while fat oxidation is reduced through enzyme passivation and starch-lipid complex formation. Together, these benefits result in stronger, more stable, and more palatable pellets—making expansion pre-treatment a superior solution for high-performance aquafeed production.

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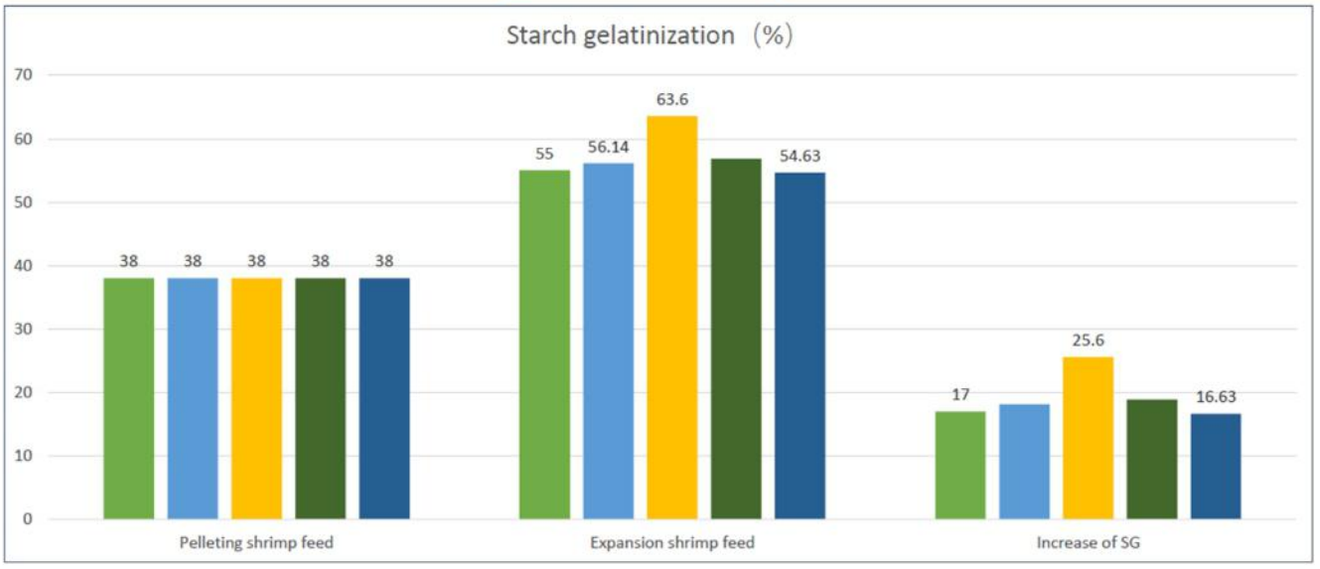

Famsun's commitment to the Indian market is backed by a robust local presence, with a dedicated service and sales office located in Hyderabad to provide neighborhood technical support. As of June 2025, over 40 sets of this expansion + pelleting equipment have been successfully deployed globally for shrimp, fish, and poultry feed, creating a proven model for success that Famsun India is now scaling nationwide. By choosing Famsun, Indian feed producers gain a partner dedicated to "innovating to nourish a better world," ensuring that the future of Indian aquaculture remains safe, nutritious, and globally competitive.

About Author

Ms. Rong, Vice Country Incharge & Design Head, Famsun Group, China, brings extensive experience in feed mill solutions, pet food solutions, and other allied fields along with customer-centric innovation.

Joining FAMSUN in March 2011 as a feed mill designer, she played a pivotal role in shaping advanced feed mill projects in the Chinese market. Her expertise in understanding customer needs and delivering tailored solutions led to her transition to the South Asia department in 2015, where she has been instrumental in driving strategic solutions across the poultry, cattle, aqua feed, grain silos storage, and pet food industries.

With her promotion to South Asia Department Solution Provider Head in 2022 and subsequently as Vice Country Head for India in 2025, Ms. Rong has strengthened FAMSUN's market presence by leveraging her deep knowledge of high-end feed mill design. Having worked on projects with top global customers like New Hope, HAID, CP, and Cargill, she brings a unique perspective to developing efficient, high-performance feed mills.

Her commitment to understanding real customer needs and providing practical solutions continues to shape FAMSUN's growth in India and South Asia.

Mr. Arun Kumar, Managing Director of FAMSUN India, has a distinguished career rooted in mechanical engineering. His extensive experience spans multiple sectors, including pneumatics, geared motors, and their applications in industries such as automobile, cement, paper, steel, power plants, and agriculture. This diverse background has been instrumental in shaping his leadership at FAMSUN India. As Country Head, Mr. Kumar's strategic goals revolve around reinforcing FAMSUN's market leadership by expanding the product portfolio, advancing technological capabilities, and fostering customer-centric solutions. His focus is on investing in R&D, nurturing local talent, and exploring new market opportunities in soy and oilseed processing, as well as pet food, to diversify and strengthen FAMSUN's market position in India and beyond.

FAMSUN Co., Ltd.
Add: No. 1 Huasheng Road, Yangzhou, Jiangsu, China 225127
T: +86-514-87848880 | E-mail: mypublic@famsungroup.com
www.famsungroup.com

India Office
No 401, Dega Towers, Raj Bhavan Road,
Somajiguda, Hyderabad, Telangana - 500082
T: +62-21-30027458; 30027459

CONTACT
Mr. Arun Kumar | +91 9901916554
arunkumar@famsungroup.com

Mr. Ashutosh Mohapatra | +91 93382 16272
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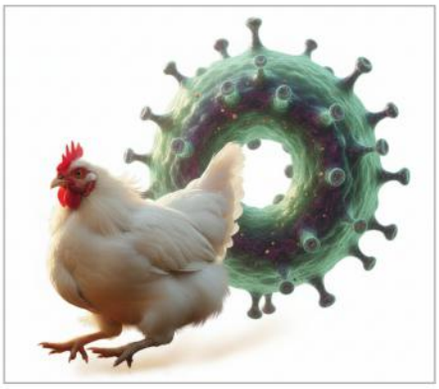
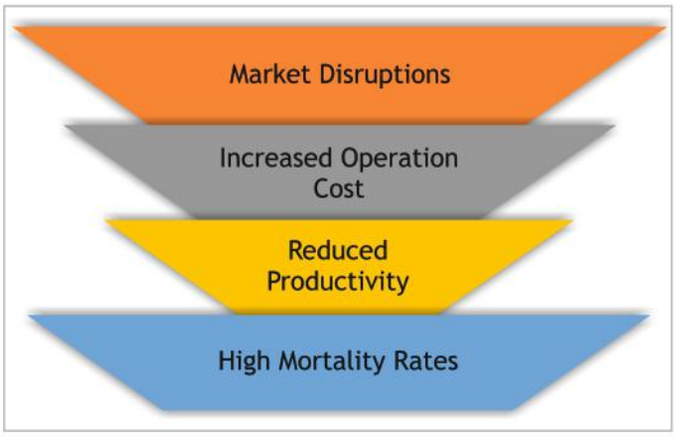
Feed-Based Solution to Enhance Mucosal Defence in Poultry Against Viral Challenges

Dr. Sumon Nag Chowdhury
AGM - Technical & Marketing
Glamac International Pvt. Ltd.

Environmental changes cause immuno-suppression and make the birds more prone to viral infections. These viral challenges namely Newcastle disease (ND), avian influenza (AI), infectious bronchitis (IB), and others—continue to impose a significant threat to the poultry industry worldwide, resulting in substantial economic losses through high mortality rates, reduced productivity, increased operational costs, and market disruptions.

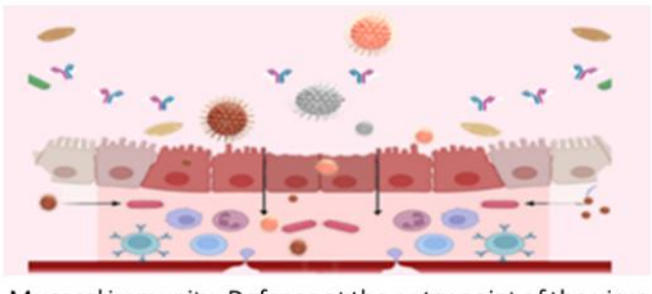


While vaccination remains a cornerstone of prevention programs, the industry increasingly recognizes that vaccines alone cannot guarantee full protection, especially when antigenic drift, immunosuppressive stressors, and variability in field exposure undermine immunization efficacy. Hence, the poultry sector is steadily integrating nutritional strategies that strengthen birds' natural defence systems. Among these, **feed-based solutions aimed at enhancing mucosal defence** have emerged as a powerful, sustainable, and cost-effective approach.



Understanding the Role of Mucosal Immunity

Nearly all kinds of viruses invade the animal's body through the mucous membrane. The mucosal surfaces of poultry—including the gut, respiratory tract, and reproductive system—serve as the **first line of defence** against pathogens. To reinforce the mucous immunity system means to effectively inhibit viral invasion and infection.



Mucosal immunity- Defence at the entry point of the virus

Unlike humoral immunity, which becomes active only after an antigen enters the bird's body through vaccination or when pathogens reach the bloodstream, **mucosal immunity works at the point of entry**. By neutralizing pathogens before they cross epithelial barriers, mucosal immunity significantly reduces both the incidence and severity of infections.

Key components of mucosal immunity include:

- **Mucus layer**: Forms the first protective barrier at mucosal surfaces. Mucin, a structural protein (lubricant) in the mucus layer secreted by goblet cells entraps viral particles and inhibit epithelial adhesion and penetration.
- **Secretory IgA (sIgA)**: The most important antiviral antibody at mucosal sites. sIgA binds to viral antigens, neutralizes them extracellularly and intracellularly, and prevents attachment and entry into epithelial cells.

- **Tight junction proteins**: Tight junction proteins (claudins, occludin, ZO-1) function as selective permeability regulators that prevent paracellular leakage. Viral pathogens frequently disrupt TJ integrity to facilitate epithelial invasion. Enhanced TJ expression strengthens the mucosal barrier, limiting viral penetration and subsequent viremia.

Collectively, these components ensure rapid, localized immune responses, thereby enhancing disease resistance and overall flock resilience.

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For more information please contact:

Glamac International Pvt. Ltd.
413, Orion Business Park, 4th Floor, Kapurbawadi
Ghodbunder Road, Thane (W)- 400610, Mumbai, India.
• www.glamac.com • Email: info@glamac.com, sumon@glamac.com
• Dr. Sumon Nag Chowdhury: +91 9051512590

Importance of Feed-Based Mucosal Defence Approaches

Vaccination remains vital, but it mainly stimulates systemic (humoral) immunity. For pathogens that enter through mucosal sites—such as Newcastle disease virus, avian influenza, IBV, and enteric viruses like rotaviruses, reoviruses —**vaccine response alone may not be enough** to prevent initial infection or viral shedding. Compounding factors such as heat stress, mycotoxins, poor gut health, high stocking density, and poor litter conditions further compromise mucosal barrier function.

Feed-based mucosal defence solutions offer several advantages:

- **Sustained immunological support** throughout the production cycle
- **Modulation of mucosal cytokine expression** and lymphocyte activation
- **Non-invasive** and stress-free administration
- **Synergy with vaccination,** improving both mucosal and systemic responses
- **Reduced viral replication and shedding**, lowering infection pressure in flocks
- **Improved gut health,** supporting nutrient absorption and performance

These attributes justify the integration of functional feed additives in comprehensive disease prevention programs.

VAP™ Premix- The Next-Gen Feed-Based Mucosal Defence Strategy

VAP™ (Versatile Adhesion Polypeptide) is a scientifically designed natural non-toxic functional feed additive that enhances mucosal immunity through multiple pathways:

- Activates B-cells (IgA production) and T-cells (memory & phagocyte response) for early protection, synergizes with M-cells for stronger defense.
- Assists the immune system in targeting environmental viruses, making it less susceptible to viral mutations.
- Activates the immune system early, before the virus replicates extensively within the body, effectively reducing the damage to the bird.

Research Evidence and Field Validation

A recent broiler trial at Agrivet Research & Advisory, Kolkata (ARAPL Trial ID: 290-GLB-1/June-25) revealed that supplementation with VAP™ Premix at 250 mg/kg feed effectively enhanced broiler growth performance with upregulation of local mucosal defence mechanisms (sigA and MUC-2), coupled with maintained or improved vaccine responses, significantly higher livability, and lesser COP per kg live wt.

Several other trials in Taiwan showed VAP™ intake improved T-cell count and reduced intestinal inflammation in Zebrafish and significantly increased IgA response in mice.

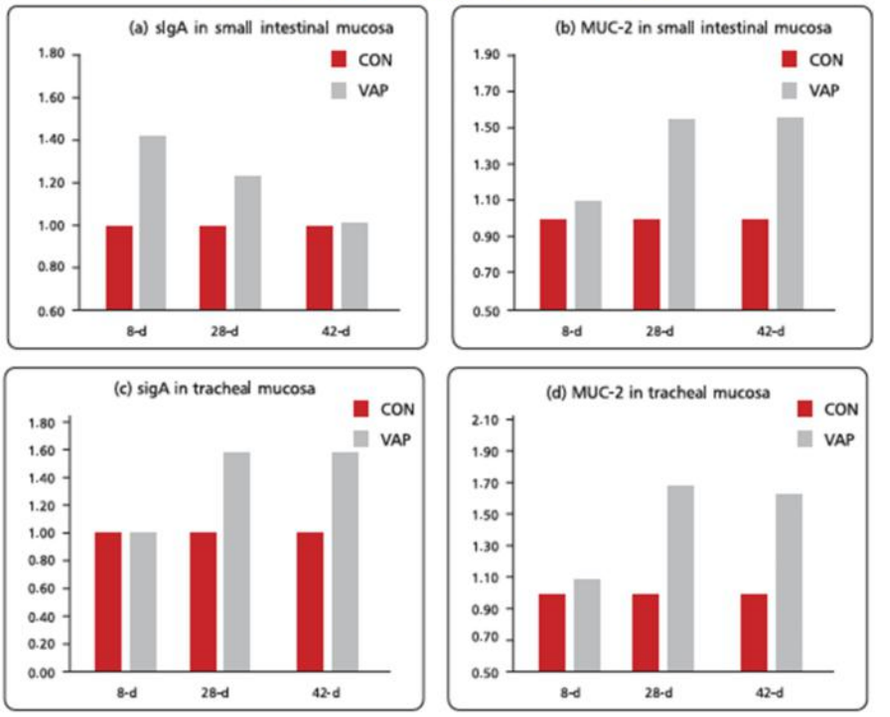
Another very interesting study conducted at National Laboratory Animal Centre, Taiwan showed VAP™ supplemented mice, experimentally challenged with AI viruses (H5N1 and H7N9, a 1:1 virus mixture with a viral load of about 50,000 viruses per ml. of liquid)) did not develop any respiratory symptoms even after 96 hours, indicating strong antiviral mucosal protection.

These collective findings highlight VAP™ Premix as a promising nutritional intervention to work as a shield against virus with strengthened immunity and ensure support health and productivity.

Way forward

In the face of escalating viral challenges and the growing emphasis on welfare-focused poultry production, strengthening mucosal immunity through precision nutrition is no longer optional—it is essential. Feed-based mucosal defence solutions such as VAP™ Premix offer a vital bridge between nutrition and immunology, enabling proactive protection rather than reactive interventions. By reinforcing mucosal immunity—the bird's first line of defence—producers can safeguard flock health, enhance productivity, and build resilience against emerging viral threats. Ultimately, this approach supports a more sustainable, responsible, and profitable poultry production system for the future.

Transcriptomic analysis of mucosal tissues - Pure Science, 100% confirmatory test



Relative mRNA expression (2- Ct) of slagA and MUC-2 genes in the mucosa of broiler chickens

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- ❖ Broiler 1.5% Concentrates

Layer Concentrates:
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- ❖ Layer 10% Concentrates
- ❖ Layer 25% Concentrates
- ❖ Layer 35% Concentrates

Broiler Crumbs/Pellets:
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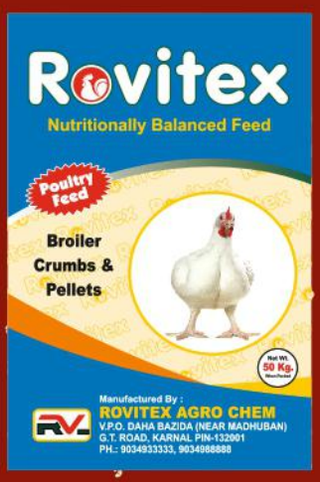
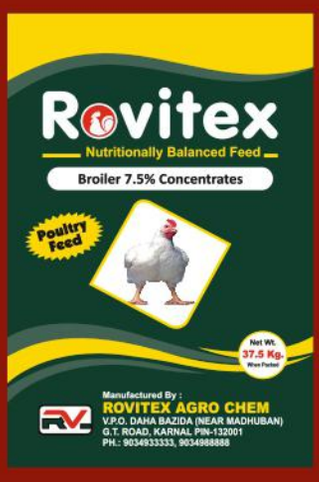
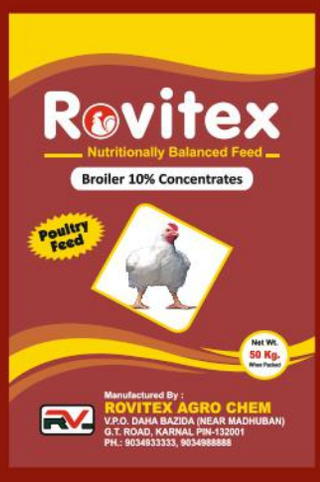
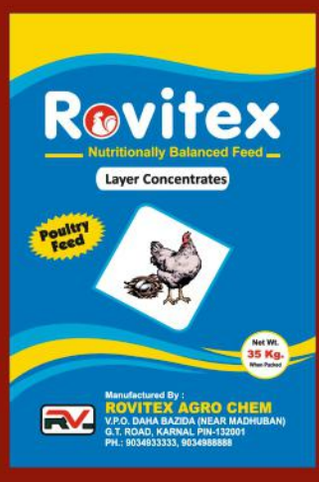
- ❖ Broiler Starter Crumbs
- ❖ Broiler Finisher Pellets









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WORKS: V.P.O. DAHA BAZIDA (NEAR MADHUBAN), G.T. ROAD, KARNAL 132001 (HARYANA)
Ranjeet Singh Lamba: +91-99917-11111, 90349-33333
Samarjeet Singh Lamba: +91-90349-88888, 95410-22000
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ARTICLE

INSIGHT TO IMPACT

Turning Poultry Pest Challenges into a Performance Breakthrough at a 1.2-Lakh Breeder Farm

A veterinarian's data-driven discipline and Envu's precision science restore order in one of Karnataka's leading breeder operations.

When the Night Looked Calm but the Numbers Fell

By midnight, the sheds were still. Fans turned steadily, and the rhythmic sound of feeders filled the air. Yet every morning, the spreadsheets on Dr. Srinivas's desk told another story. Egg counts had dropped again, hatchability had slipped, and several technicians were complaining of sleepless nights.

Bed bugs, red mites, and houseflies—small, persistent, and mostly invisible—were quietly eroding performance at a 1.2 lakh-bird breeder farm near Dodballapur in Bengaluru Rural District. For Dr. Srinivas, a veterinarian who had built his enterprise on measurement and discipline, the losses were more than operational. "Everything looked normal until we saw the data," he said. "The losses came from what we could not see."

He had entered poultry farming in 1994 after a short stint in veterinary sales, determined to apply scientific management to an industry often guided by habit. Over three decades, he created a closed-loop enterprise of brooding, growing, and laying units on raised platforms, supplying hatchable eggs and day-old chicks across southern India and the Northeast. Success for him had always meant predictability: healthy birds, efficient feed conversion, and consistent customer satisfaction.

When Hidden Threats Disrupted a Perfect System

The problems began after a major upgrade. In 2002, the farm shifted from deep-litter to cage systems. The change improved hygiene but also created hidden joints and crevices where ectoparasites could thrive. Within months, the numbers faltered.

Production, which should have remained near 8,400 eggs per 10,000 birds, fell to about 6,000. Hatchableegg selection, once 96-97%, dropped to 78-80%. Feed conversion, normally ≈ 285 g per hatchable egg, worsened by 20-30% even though feed accounts for around 80% of total cost. Mortality rose from 2-3% to 8-11%. Birds became restless, fertility declined, and many workers left after nights of insect bites.

Dr. Srinivas
Veterinarian and Owner of Pragathi Hatcheries at Bengaluru (Karnataka)

Conventional fixes brought little relief. Chemical dosing through drinking water reduced infestation briefly but lowered production by 10-15%. Generic sprays achieved less than 5% control. "I had lost confidence," Dr. Srinivas recalled. "Every product promised results, yet none solved the problem."

Losses spread across every key measure—feed efficiency, hatchable quality, and labour stability. The solution, he realised, required a change in method that would address the source rather than the symptoms.

Precision Control and the Return of Order

Relief arrived through an encounter at an industry exhibition. Envu specialists suggested that instead of internal dosing, the farm needed precision external spraying with verified coverage. They recommended Temprid, a contact adulticide, together with detailed application protocols and post-spray audits.

Dr. Srinivas agreed to a controlled trial. Within 24 hours, nearly 90% of bed bugs were eliminated. After a second spray, the sheds stayed clear for months. Calm returned among birds, and confidence returned among workers. "That first spray was a turning point," he said. "It proved that science, applied correctly, could restore stability."

He then formalised a system that targeted every life stage of the pest. Adult insects were managed with Temprid for immediate and residual control. Larval breeding sites in litter and manure were treated with Bilarv, a larvicide that achieved 100% control within a day. Pre-monsoon preventive rounds and post-treatment inspections became part of routine operations. The results were measurable and sustained.

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Performance Before and After Envu Solutions

Feed efficiency alone reshaped profitability. In breeder production, where feed represents four-fifths of total cost, recovering the FCR margin changed viability within a single cycle. Hatchable quality returned to benchmark levels, mortality normalised, and longevity extended to 70-72 weeks, adding six weeks of profitable lay. Workers returned, and customers reported stronger chick quality and a reliable supply.

Lessons from a Difficult Season

For Dr. Srinivas, the episode confirmed that unseen problems demand close observation. "If the numbers look fine by day but hatchability keeps falling, check again at night," he now tells other farmers. "That is when the real story shows."

He treats ectoparasite control with the same seriousness as feed formulation and vaccination. Each flock is inspected after dark and audited after every treatment. Every adjustment now follows inspection records rather than routine habit.

The experience also changed how he views partnership. "What mattered was the combination of good products and continuous follow-up," he said. "The visits, data checks, and training ensured that each application was correct."

Nearby farms have faced similar fly pressures, and Dr. Srinivas believes that systematic adult and larval control can help them prevent those seasonal surges. He often summarises his learning simply: "Precision means targeting pests, not birds, and applying products only where they are needed."

Vigilance and the Next Frontier

Even after recovery, vigilance remains essential. Red mites continue to challenge the industry. They are smaller, spread faster, and are harder to detect. Dr. Srinivas follows Envu's ongoing research on new molecules and resistance management, convinced that future progress in breeder health will depend on continued innovation in pest science. His team now performs pre-monsoon inspections and keeps digital records of pest sightings to anticipate outbreaks rather than react to them.

Today the sheds are quiet again. Birds feed normally, workers rest through the night, and production remains steady at target levels. The calm reflects discipline, training, and scientific consistency. For Dr. Srinivas, the lesson is clear: knowledge and structure remain the best defence against unseen threats.

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Metric	Before / Under Infestation	After Envu Protocol	Impact That Matters
Egg Production (per 10,000 birds)	≈ 6,000 (vs target 8,400)	≈ 8,400 (80–85%)	Output and revenue restored
Hatchable Selection	78–80% (vs 96–97%)	85–90% consistent	+10–12 points in quality gain
Feed Conversion (FCR)	20–30% worse than standard	285 g per hatchable egg or 330 g per day-old chick	Feed ≈ 80% of cost; profit recovered
Mortality	8–11%	2–3%	Flock health restored
Longevity (Culling Age)	66–68 weeks	70–72 weeks	+6 weeks productive life
Labour Retention	Workers leaving after bites	Stable workforce with comfortable sleep	Operations continued smoothly
Community Impact	Fly complaints in monsoon	Controlled with Bilarv + Temprid	Licence to operate preserved

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ARTICLE

Importance of Lysine in Poultry Breeder Nutrition: Why Lysine Matters

Dr Rajeeb Kumar Roy, Dr Mandeep Maan

Lysine is one of the most important essential amino acids in poultry nutrition. In maize-soybean meal-based diets (common in India and many other countries), lysine is typically the **second limiting amino acid**, after methionine. Because of this, adequate lysine supply is vital. PMC+2OUP Academic+2

Moreover, many nutritionists use the concept of **"ideal protein"** or amino acid balance — expressing the requirements of all essential amino acids (EAAs) as ratios relative to lysine. PMC+2ajhsjournal.ph+2 Thus, establishing an accurate lysine requirement becomes foundational to optimize overall protein and amino-acid nutrition.

Physiologically, lysine plays key roles: it supports **protein synthesis**, which is critical for muscle growth (in broilers) and for the formation of egg proteins, albumen, and other egg components (in layers and breeders). It also supports **immune competence** and digestive tract functioning. PMC+1

Given this, for breeder birds (both broiler-breeders and layer-breeders), having adequate lysine is essential — not only for maintenance and growth, but for **egg production, egg quality, hatchability, reproductive efficiency, and overall flock health.**

Lysine Requirements and Effects in Breeder Birds

Broiler Breeder Hens

- A classic study, **Re-Evaluation of the Protein and Lysine Requirement for Broiler Breeder Hens** reported that 32-week-old broiler breeder hens required a *daily lysine intake* of approximately **845 mg per hen per day** (with diets varying in Lys from ~0.380% to ~0.545%) to achieve maximum egg production, egg mass, and egg content under their experimental conditions. OUP Academic
- In another fundamental work, **Lysine: Amino acid requirements of broiler breeders** (1998) explained that because broiler breeders are typically subjected to controlled (restricted) feed intake, the composition of the feed — especially lysine content — becomes the determinant of amino-acid supply throughout the laying cycle. OUP Academic
- More recently, the global relevance of lysine supply has been reaffirmed by studies like **Effects and interactions of dietary lysine and apparent nitrogen corrected metabolizable energy on yellow-feathered broiler breeder hens**, which reported that for yellow-feathered breeder hens (a type common outside the Western commercial white-feathered strains), the optimal total dietary lysine level was estimated at **0.81% to 0.83%** under certain energy (AMEn) levels for best reproductive performance and egg quality. SpringerLink+1 The study also found that lower (0.71–0.72%) lysine levels provided acceptable "breeding egg" quality, but the higher range produced optimal results. SpringerLink
- Another relevant investigation, **Estimating total lysine requirement for optimised egg production of broiler breeder hens during the early-laying period** (on Ross 308 parent stock) observed that hens offered diets with total lysine at 0.55% had significantly lower egg production, egg mass and egg weight compared to hens fed 0.71%, 0.75% or 0.79% total lysine. PubMed

These studies together indicate that the lysine requirement for broiler-breeder hens depends on factors such as **diet composition, feed intake, energy level (AMEn), and genetic/strain differences.** Importantly, for many breeder flocks, lysine levels in the diet may need to be as high as ~0.80–0.83% (total Lys) under some contexts to support optimal egg production and reproductive performance.

Layer / Egg-Type Breeders (and Laying Hens) — Relevance for India / Tropics

While most classic lysine requirement research is on commercial broiler breeders or white-feathered layers under temperate climate, there is valuable research from India and similar tropical environments:

- A recent Indian study, **Effect of Supplemental Lysine to Low Protein Diet on Production Performance, Egg Quality and Serum Biochemical Parameters of Gramapriya Laying Hens**, evaluated layers fed a basal diet (14% CP, 0.60% lysine) — low in protein and lysine — and then supplemented with synthetic lysine to raise total lysine to 0.65, 0.70, and 0.75%. They observed that increasing lysine from 0.60 to 0.65% significantly improved egg production, egg mass, and feed conversion ratio; but beyond that (0.70 or 0.75%) no further improvement in those parameters. Interestingly, albumen content of eggs increased with higher lysine, while yolk content decreased. Serum protein concentration also improved with higher lysine levels. The authors concluded that ~0.70% lysine (with 14% CP) was adequate for these hens under their conditions. Indian Agricultural Research Journals

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- Another Indian experiment on WLH layers (BV-300) from 25–44 weeks age by **Effect of feeding different levels of lysine and protein on the performance of WLH layers** found that increasing dietary digestible lysine (with two levels of crude protein, 13.36% and 15.78%) improved egg weight and egg mass; better feed efficiency was also observed with higher lysine concentration. Based on this, they estimated an optimal lysine requirement around **0.65% lysine when CP was 13.36%**, or **0.63% lysine when CP was 15.78%** (i.e. equivalent to ~570–599 mg Lys/day per bird). Arc Articles
- A comprehensive review of amino-acid requirements in laying hens (which includes principles applicable to breeder layers) notes that adequate lysine supports **egg production, egg mass, feed conversion efficiency**, as well as **immune competence and gut health**. PMC+1

These findings from Indian conditions show that lysine is critical even for low-input or low-protein diets often used in backyard or smallholder systems, and that modest supplementation can significantly enhance production and egg quality under tropical climates.

Why Lysine Is Especially Important for Breeder Bird Nutrition in India / Tropical Conditions

1. **Feed Ingredients & Limiting Amino Acids**
   - In India, poultry diets often rely on maize, soybean meal, and locally available ingredients (rice bran, deoiled rice bran, etc.) — which may be deficient (or marginal) in essential amino acids, especially lysine. Under such conditions, lysine is likely to be the second limiting amino acid, making supplementation or careful formulation essential. PMC+1
   - Using the "ideal protein" approach, once lysine requirement is defined, other EAAs can be balanced relative to lysine — fostering cost-effective and nutritionally balanced diets suitable for local ingredients. ajhsjournal.ph+1
2. **Reproductive Performance and Egg Quality**
   - For breeder birds, egg production rate, egg mass, egg quality (albumen content, yolk ratio), hatchability — all may respond to lysine supply. The Indian study on Gramapriya hens demonstrated improved egg production, egg mass, better feed conversion, and improved albumen proportion with increased lysine. Indian Agricultural Research Journals
   - Given that breeders are often managed for long-term reproduction (not just for meat), ensuring consistent lysine supply supports sustained reproductive output.
3. **Flexibility with Low-Protein Diets**
   - For small-scale or backyard poultry, high-protein feeds may be expensive. Supplementing synthetic lysine allows the possibility of reducing crude-protein content (hence cost) while still meeting essential amino-acid needs. This is particularly relevant under Indian smallholder conditions. The Gramapriya study used a low-protein (14% CP) diet with lysine supplementation. Indian Agricultural Research Journals
   - This strategy can reduce feed cost, nitrogen excretion (good environment), and still maintain production — as indicated in broader literature on amino acid supplementation under reduced protein diets. ScienceDirect+1
4. **Adaptation to Genetic / Strain & Energy Differences**
   - Modern breeder strains or native/tropical genotypes may have different amino-acid needs. The yellow-feathered breeder hens study found optimal lysine levels higher than those traditionally recommended for white-feathered hens — 0.81–0.83% total lysine under certain energy (AMEn) levels. SpringerLink
   - Energy levels (AMEn) in the diet interact with lysine requirement: the same lysine level may not suffice under a high-energy or low-energy diet. SpringerLink+1
   - Thus, for Indian conditions (variable energy ingredients, seasonal feed ingredient shifts), breed- and diet-specific lysine evaluation may be needed.

Challenges, Risks & Considerations

While lysine supplementation and balancing are beneficial, certain caveats are warranted:

- **Over-supplementation may disturb amino-acid balance**: Excess lysine (especially without adjusting other amino acids such as arginine) may lead to antagonism, reducing performance or causing metabolic imbalance. This has been observed in broiler growth-phase studies. ScienceDirect+1
- **Maintenance of proper amino-acid ratios**: Since most amino acids needs are expressed relative to lysine under the ideal protein concept, accurate formulation is required — not just dumping lysine. Other EAAs (methionine, threonine, etc.) must be adjusted in proportion. PMC+1
- **Feed intake control in breeders**: In broiler breeders, feed intake is often restricted to avoid excessive body weight, which can affect amino-acid intake. As noted in classic lysine-requirement studies, when feed intake is controlled, dietary composition (including lysine) becomes even more critical. OUP Academic+1

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- **Variation due to strain, age, production stage, energy levels, environment**: Lysine requirement is not static; it varies with bird strain (white vs yellow feathers, commercial vs native), age, laying cycle stage, dietary energy, environmental conditions (heat stress, tropical climate) and feed ingredients. This argues for **local validation** of lysine requirements rather than relying solely on Western commercial guidelines. SpringerLink+2Arc Articles+2

Recommendations for Breeder Bird Nutrition in India (and Tropics)

Based on the above review, the following recommendations emerge:

1. Use lysine as the **reference (anchor) amino acid** when formulating breeder diets, and adjust other EAAs according to ideal-protein ratios.
2. For broiler-breeder hens under Indian/tropical conditions (or non-white commercial strains), consider **total dietary lysine around 0.80-0.83%** (subject to energy level, feed intake, bird strain) — but validate with local trials.
3. For low-protein diets (to reduce cost), especially in backyard or smallholder systems, supplement synthetic lysine — a diet with ~14% CP + ~0.70% Lys has been shown (in Gramapriya hens) to support reasonable egg production and quality.
4. Monitor not only egg production, but egg quality (albumen ratio, shell quality), reproductive traits, bird health, and overall amino-acid balance to avoid negative effects from imbalance or over-supplementation.
5. Periodically re-evaluate amino-acid requirements (including lysine) especially when you change **bird strain, diet ingredients, energy density, or management practices** — because requirements vary with these factors.

Conclusion

Lysine is a cornerstone amino acid in poultry nutrition — particularly for breeder birds (both broiler breeders and layer breeders). Given its role as second limiting amino acid in common maize-soy diets, and as the anchor for "ideal protein" balancing, ensuring adequate lysine supply is critical for optimal egg production, egg quality, reproductive performance, and bird health.

For India and tropical regions — where feed ingredients, energy density, bird genotypes, and management conditions vary — it is especially important to formulate diets thoughtfully, possibly supplementing lysine when necessary, and to validate requirements under local conditions. Reliable breeder performance and economic sustainability of poultry operations depend significantly on such precision in amino-acid nutrition.

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The sound produced by new-born chicks is an important bio-signal to receive information about their welfare. When chicks are comfortable in their environment, they sit quietly and relaxed, often sleeping for extended periods, which aids in their recovery from the intense hatching process. However, if they are not completely comfortable, they are active and constantly vocal. Hence, monitoring chick conditions based on vocalizations is an essential element of welfare-friendly poultry production. Until now, research had not established a direct application to monitor vocalizations in the hatchery. That gap prompted Petersime to further examine the use of sound data and led the company to develop NestSound™, a unique chick sound monitoring technology that automatically alerts hatchery managers when chicks require attention during storage.

"Of the five senses, hearing is the universal alerting sense. For experienced hatchery managers, hearing the sound produced by new-born chicks is an important source of information about their well-being. However, this crucial bio-signal is only picked up when they pass by the chick holding room," explains Rudy Verhelst, Business Development Manager at Petersime. *"This is where our new NestSound™ technology comes into play. By measuring the vocalizations new-born chicks make, NestSound™ automatically and continuously monitors the comfort level of the chicks stored inside the X-Streamer™ Chick-Store. This enables hatchery managers to promptly intervene whenever the chicks require attention."*

The X-Streamer™ Chick-Store is Petersime's dedicated chick storage machine that automatically delivers the perfect storage conditions in any climate. With NestSound™, the machine now comes with an extra and very powerful tool to monitor chick welfare. The NestSound™ technology continuously measures the sound emitted by the chicks. Based on the NestSound™ call detection algorithm, the Chick-Store controller's on-screen information dynamically displays the chicks' comfort levels, making it easy to monitor their well-being. The information is also remotely accessible via smartphone, tablet or pc. The advantage is clear: The technology gives real-time information - even remotely - compared to a situation where the hatchery managers rely on their own occasional observations of chicks stored inside a traditional holding room.

The new NestSound™ technology also offers opportunities for market differentiation: End-customers are becoming increasingly aware of animal welfare. Thanks to the handy history reporting function, NestSound™ makes it very visible how the new-born chicks have enjoyed high comfort levels during their storage time at the hatchery.

NestSound™ is part of Petersime's Embryo-Response Incubation™ series and will be officially unveiled to a global audience at the Petersime booth (Hall 17 Stand C20) during EuroTier 2024 in Hanover, Germany.

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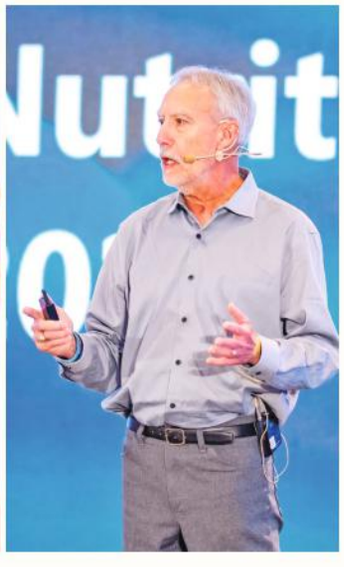
Alltech South Asia hosts Poultry Nutrition Summit 2025

Alltech, a global leader in animal health and nutrition, successfully hosted the South Asia Poultry Nutrition Summit 2025 from 16-18 December at Cinnamon Life, Colombo, Sri Lanka. Centred on the theme of "Smart Nutrition for Profitable and Sustainable Poultry Production," the three-day summit brought together more than 85 senior industry delegates from across South Asia, including poultry nutrition experts, feed millers, integrators and industry leaders.

Poultry nutrition has evolved beyond production efficiency to embrace a more holistic approach encompassing biological performance, economic viability, sustainability, biosecurity, food safety and bird welfare. As the industry faces increasing pressure from volatile raw material prices, supply chain disruptions and rising production costs, the need for smart, science-backed nutritional strategies is becoming more critical than ever.

The South Asia Poultry Nutrition Summit 2025 addressed these challenges by providing a knowledge-sharing platform focused on practical and innovative solutions that can help maintain economic balance without compromising bird performance. The summit agenda was curated to cover key industry themes such as future poultry trends, feed-mill-to-farm efficiency, gut health, precision feeding, feed formulation, meat yield optimization and sustainability-driven nutrition strategies.



The event featured a distinguished panel of global and regional experts, including Dr. Rick Kleyn, renowned poultry nutritionist and global consultant, who shared insights on advancing nutrition strategies aligned with current industry realities; Dr. Roy Brister, strategic poultry advisor at Alltech, who highlighted the importance of data-driven decision-making and precision nutrition in improving poultry performance and profitability; and Mr. Dilsahn Weviwa, managing director of Pussalla Meat Producers Pvt. Ltd., who provided the audience with a comprehensive outlook on the Sri Lankan poultry industry, highlighting key opportunities and prevailing challenges.

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Dr. Richard Murphy, Alltech Director of Research, delivered an insightful session on gut health management, while Dr. Lokesh Gupta, Alltech Technical Director - South Asia, highlighted Alltech's innovative, science-backed solutions tailored to address the evolving needs of the industry. Further strengthening the knowledge exchange, the summit contributed through expert-led technical sessions, panel discussions and innovation briefings, enabling participants to gain actionable insights applicable to real-world poultry operations.

"The South Asia Poultry Nutrition Summit 2025 was designed to empower poultry professionals with practical knowledge and strategic insights needed to improve efficiency, resilience and sustainability," said Dr. Aman Sayed, Alltech managing director for India and regional director for South Asia. "Collaboration and continuous learning are essential as the industry navigates an increasingly complex market environment ", he added.

The Alltech South Asia Poultry Nutrition Summit 2025 provided a valuable platform for poultry professionals to connect, learn and explore the latest nutritional innovations shaping the future of poultry production.

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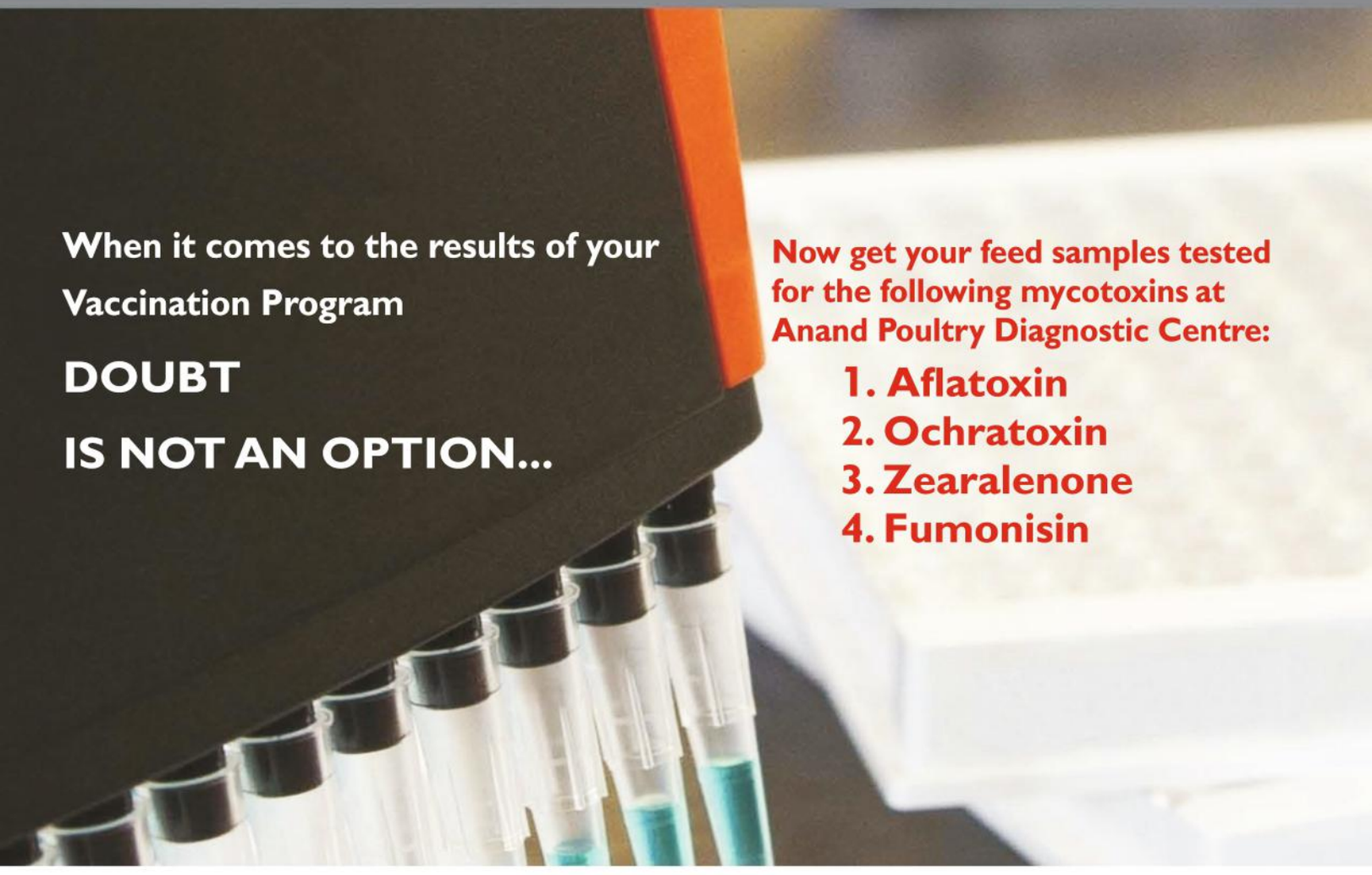

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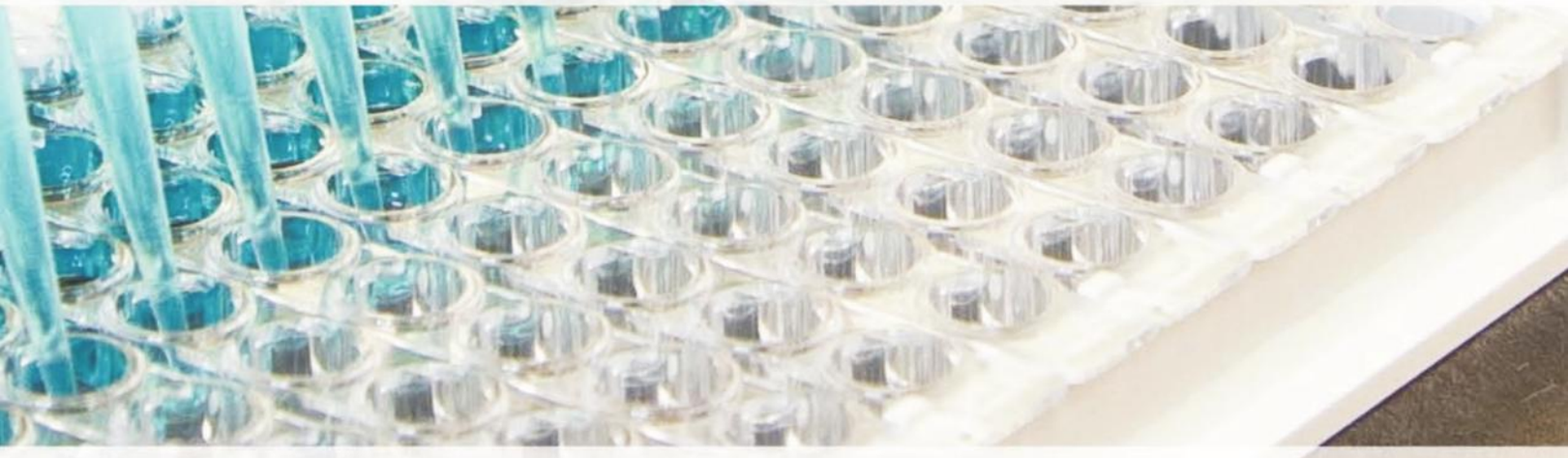

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Bhuvana Nutribio Sciences, India & Andres Pintaluba S.A. (APSA) Spain, Successfully Hosts 2nd Technical Seminar under Bhuvana – Pintaluba Tech Series in Raipur

Bhuvana Nutribio Sciences, India & Andres Pintaluba S.A. (APSA) Spain, successfully organized its 2nd **Technical Seminar under the Bhuvana - Pintaluba Tech Series on 15th December 2025 at Hotel Sayaji.** The event marked an important milestone in Bhuvana - Pintaluba's ongoing efforts to promote science-led, practical solutions for the poultry industry.

The seminar commenced with a **Ganesh Vandana**, followed by a welcome address by **Dr. Nikhil Adagale, General Manager, Bhuvana.** In his address, he emphasized the company's strong commitment to advancing poultry health through innovation, research, and technical excellence.

The keynote session was delivered by **Dr. Rais Rajpura,** Assistant Professor at the Department of Animal Science, Anand Agricultural University, Anand, Gujarat and an internationally experienced Technical Advisor. His presentation on "**Integrated Approach to Gut and Respiratory Health in Poultry**" offered valuable scientific insights and practical strategies aimed at improving flock performance and overall farm profitability.

Following the keynote address, **Dr. Jyoti Kumar Mainali, Area Manager-Asia of Andres Pintaluba S.A. (APSA),** presented an overview of the company's corporate profile. She highlighted its **European-origin Tiamulin 10%** (APSAMIX TIAMULIN 10%), and other research-driven products like APSAVIT OVOSMART, APSA MIOCHEM 20, and APSA AMINOVIT, developed through robust R&D capabilities.

Further, Dr. Nikhil Adagale shared insights into the Bhuvana journey, outlining the organization's core strengths in gut health management and showcasing **innovative tablet-based solutions** designed to address critical poultry health challenges. (**GutPROP WS**)

The seminar witnessed active participation from **key poultry stakeholders and protein producers from Chhattisgarh and Odisha.** The interactive technical discussions were highly appreciated for their depth, practical relevance, and industry-focused approach.

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Key protein producers in attendance included:

Mr. S. S. Brahmankar, Mr. Achin Banarjee, Mr. Dhanraj Banarjee, Mr. Mukesh Brahmankar, Mr. Govind Chandrakar, Mr. Virendra Chahal, Mr. Sachidanand Meher, Mr. Nalin Meher, Mr. Binaya Meher, Mr. H. Suryakumar, Mr. Yashwant Chandrakar, Mr. Rajesh Chahal, Mr. Muhamad, Dr. Manoj Shukla, Dr. Amit Yeskal, Dr. Bijendra Sahu, Dr. Shlok Sahu, Mr. Gopal Ugra, Mr. Suman Mishra, Mr. V. Ramna, Mr. Shivdev Singh Kalkat, along with other esteemed protein producers.

The event served as a strong *branding and engagement* platform for Bhuvana Nutribio Sciences India & Andres Pintaluba S.A. (APSA) Spain, while opening new business opportunities across the eastern and central regions of India. **Bhuvana - Pintaluba expressed its sincere gratitude to all participating protein producers for their active involvement and continued encouragement toward its mission of delivering science-backed poultry solutions.**

Team Bhuvana - Pintaluba!

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Economic Impact of Subclinical Infections in Poultry Production

Prof. (Dr) R.N. Sreenivas Gowda*

Introduction

A subclinical infection is when a person or animal has a pathogen (like a virus or bacteria) in their body, but experiences few or no noticeable symptoms, existing between being completely healthy and having a full-blown illness. These infections are often detected only through lab tests, and the infected individual can still unknowingly spread the pathogen as an asymptomatic carrier.

What are clinical and subclinical infections?

Clinical infections produce observable symptoms and signs of illness in the host, and substantial mortality and morbidity. while **subclinical infections** (also known as asymptomatic or inapparent infections) with minimal or no visible signs or symptoms, are present in the body but cause poor growth. lingering mortality and poor performance in terms of egg or meat production.

Clinical = obvious symptoms; **Subclinica**l = no or mild symptoms.

The subclinical infections in poultry

Subclinical infections in poultry are infections caused by pathogens (viruses, bacteria, parasites) that cause **minimal or no obvious outward sickness** (like sneezing, lethargy, or high mortality) but still impact bird health and farm economics, leading to poor growth, reduced feed efficiency, lower egg production, or increased susceptibility to other diseases, often detected only through lab tests. These "hidden" infections allow birds to act as **asymptomatic carriers**, spreading diseases like Avian Influenza or Chicken Infectious Anemia Virus (CIAV) unknowingly within flocks.

Fig: 1. Analogous to the largest, hidden portion of an iceberg, the major proportion of cases of coccidiosis are sub-clinical and unnoticed.

The Subclinical poultry infections are widespread in India and are a major cause of economic loss due to reduced performance, immunosuppression, and increased susceptibility to secondary infectious diseases.

- The sub clinical infections are like a hidden iceberg, Most of the infection appears as clinical 20% but, they rest deep without showing any apparent infection about 80% sub clinically .(fig,1,). **No obvious signs:** The infection doesn't cause visible signs or symptoms of disease, or they are so mild they go unnoticed.

The common subclinical infections identified in India include:

- **Infectious Bursal Disease (IBD) / Gumboro Disease**: This viral infection is highly prevalent in India, often in a subclinical form that causes immunosuppression without high mortality. This immunosuppression leads to poor response to other vaccines (like Newcastle disease vaccine) and makes birds more susceptible to secondary bacterial infections, resulting in significant production losses.
- **Chicken Infectious Anemia (CIA)**: The Chicken Anemia Virus (CAV) circulates widely in Indian poultry flocks, often without overt clinical signs in older birds. Subclinical CIA causes immunosuppression and poor growth performance, and can lead to secondary infections such as gangrenous dermatitis when co-infected with *Clostridium perfringens* or *Staphylococcus aureus*.
- **Coccidiosis**: Caused by *Eimeria* species parasites, coccidiosis is one of the most common and economically important diseases in poultry worldwide, including India. While severe cases cause bloody diarrhea and death, subclinical forms are very common and result in chronic damage to the intestinal mucosa, leading to malabsorption of nutrients, poor weight gain, and increased feed conversion ratios.
- **Necrotic Enteritis**: This bacterial disease, caused by *Clostridium perfringens*, is often subclinical. The subclinical form causes chronic damage to the intestinal lining, which impairs nutrient absorption and drastically reduces growth rate and feed efficiency, resulting in substantial economic losses.
- **Salmonellosis**: Many paratyphoid *Salmonella* infections are subclinical in most poultry, with adult birds often acting as asymptomatic carriers. These can pose a public health risk as they are a major cause of foodborne illness in humans.

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- **Mycoplasmosis**: *Mycoplasma gallisepticum* (MG) infections often develop slowly and can be subclinical or result in mild respiratory signs and a drop in egg production in adult birds. The pathogenicity of MG is often enhanced when other infections or environmental stressors are present.
- **Marek's Disease**: While it can cause tumors and paralysis, Marek's disease virus infection can also be subclinical, with infected birds becoming lifelong carriers and shedding the virus through dander and dust.
- These subclinical infections are problematic because infected, apparently healthy birds continue to spread the pathogens, making disease control and eradication challenging. Good biosecurity, sanitation practices, and effective vaccination programs are crucial for management.

Economic impact of subclinical infections

Subclinical infections in poultry production have a significant economic impact, primarily through **reduced performance** (weight gain, feed efficiency, egg production), **increased production costs** (veterinary bills, antibiotic use), and **indirect losses** (carcass condemnation, secondary infections). These "hidden costs" often represent the vast majority of the financial burden of disease, significantly eroding profit margins.

Economic Impact

The economic losses from subclinical infections manifest in several ways:

- **Reduced Body Weight Gain:** Sub clinically infected birds often exhibit impaired growth rates and lower average market weights compared to healthy flocks. For example, studies on subclinical necrotic enteritis (SNE) estimated a 12% reduction in body weight in affected birds.
- **Poor Feed Conversion Ratio (FCR):** An increased FCR means more feed is required to produce a kilogram of meat or a dozen eggs, directly increasing production costs. SNE has been associated with a 10.9% increase in FCR.
- **Increased Mortality Rates:** While subclinical infections may not cause mass die-offs, they can lead to slightly higher baseline mortality rates and make birds more susceptible to other fatal diseases.
- **Immunosuppression and Secondary Infections:** Many subclinical infections, such as Infectious Bursal Disease (IBD) or Chicken Anemia Virus (CAV), cause immunosuppression. This compromises the bird's immune system, leading to a higher incidence of secondary infections (e.g., *E. coli* or *Mycoplasma*) and reduced efficacy of vaccination programs, leading to further losses.
- **Carcass Condemnation:** Diseases can lead to lesions or other conditions that result in the condemnation of carcasses at processing plants, representing a total loss for those individual birds.
- **Increased Veterinary and Treatment Costs:** The need for increased medication, including antibiotics, to manage secondary infections or the subclinical condition itself, adds substantially to operating expenses.
- **Reduced Egg Production:** In layer and breeder flocks, subclinical infections can lead to a drop in egg production and quality.

Quantifiable Losses

Specific examples from research highlight the magnitude of these impacts:

- **Infectious Bursal Disease (IBD):** Flocks with chronic IBD infection showed a **14% decrease in financial return** per 1,000 birds compared to unaffected flocks.
- **Coccidiosis:** The global cost of coccidiosis in chickens was estimated at around **$13 billion USD** annually, considering production losses and treatment costs. Losses are maximum due to reduced body weight gain and increased FCR.
- **Subclinical Necrotic Enteritis (SNE):** An analysis estimated losses ranging from approximately **$878 to $1,481 USD per 20,000-bird flock** due to reduced body weight and FCR.

Management Implications

Management of subclinical infections in poultry focuses on **prevention and control strategies** that minimize pathogen presence and strengthen bird immunity, as infected birds often show no obvious symptoms but suffer production losses and can act as disease reservoirs. Antibiotics were historically used but have been restricted due to concerns about antimicrobial resistance.

Key management strategies include:

1. Biosecurity and Husbandry

Strict biosecurity is crucial for preventing the introduction and spread of pathogens within and between flocks.

- **"All-in, all-out" management:** Cleaning and disinfecting houses thoroughly after depopulation and before new stock arrives.
- **Hygiene:** Maintaining clean, dry litter conditions, proper ventilation, and appropriate brooding temperatures to reduce parasite loads and microbial growth.
- **Access Control:** Limiting access to the farm, using dedicated clothing and footwear, and implementing handwashing and disinfection procedures for all workers and visitors.

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- **Water and Feed Quality:** Ensuring constant access to clean, fresh water (e.g., using nipple drinkers) and high-quality feed.

2. Vaccination Programs

Vaccination is a primary method for controlling several subclinical infections, particularly viral diseases and coccidiosis.

- **Coccidiosis:** Live oocyst vaccines are administered to chicks to induce natural immunity, which is crucial for preventing the intestinal damage that often precedes secondary bacterial infections like necrotic enteritis.
- **Viral Infections:** Vaccines for diseases like Marek's disease, Avian Encephalomyelitis, and some strains of Avian Influenza are used to prevent clinical signs, reduce viral shedding, and provide maternal antibodies to young chicks.
- **Bacterial Infections:** Inactivated or live attenuated vaccines are used against pathogens like *Salmonella* to reduce colonization and shedding.

3. Nutritional and Dietary Interventions

Dietary management can significantly influence gut health and disease resistance.

- **Probiotics and Prebiotics:** Supplementation with beneficial live microorganisms (e.g., *Bacillus* spp., *Lactobacillus* spp., yeasts) and non-digestible feed ingredients helps balance intestinal microflora, enhance immunity, and exclude pathogens through competitive exclusion.
- **Butyrate:** This short-chain fatty acid serves as a primary energy source for intestinal cells, helping to reinforce the gut barrier function and reduce inflammation.
- **Phytochemicals/Herbal Medicines:** Plant extracts (e.g., from garlic, oregano) containing compounds with antimicrobial or immunomodulatory properties are explored as alternatives to conventional drugs.
- **Enzymes and Amino Acids:** Using highly digestible protein sources and supplementing specific amino acids like threonine and methionine can improve nutrient absorption and support gut integrity, reducing the available substrate for pathogens like *Clostridium perfringens*.

4. Monitoring and Diagnostics

Regular monitoring is vital for detecting subclinical infections.

- **Fecal Examinations:** Routine examination of droppings helps identify parasitic oocysts or abnormal bacterial presence.
- **Serological and PCR Testing:** Blood tests (ELISA) and molecular diagnostics (PCR) are used to screen for exposure to specific pathogens and confirm infection status in breeder flocks.
- **Consulting a Veterinarian:** Proper diagnosis requires professional input. A veterinarian can help develop an effective control program and ensure compliance with regulations on the use of medications in food-producing animals.

By combining these strategies, producers can manage the risk associated with subclinical infections, improve animal welfare, and maintain flock productivity without relying heavily on therapeutic antimicrobials.

Conclusion

Subclinical infections in poultry, often from pathogens like coccidiosis or *Clostridium perfringens* (necrotic enteritis), Mycoplasmal infections and some viral diseases such as IBD,CIA, and MD significantly harm health and production by causing hidden damage to the gut, leading to reduced weight gain, poor feed conversion (FCR), and lower nutrient absorption, resulting in substantial economic losses for producers, even without obvious outward sickness. These infections weaken the immune system, making birds more vulnerable to other diseases and increasing stress, impacting overall flock performance and profitability

Prof. (Dr) R.N. Sreenivas Gowda*

(*Former and Founder VC, KVAFSU, Bidar, Former Director IAH&VB ,Bangalore, Former Prof & HOD .Dept. of Pathology. Veterinary College UAS, Bangalore.)

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ARTICLE

Avian Influenza Outbreaks & Biosecurity Challenges in Poultry Industry

Dr. Pawar Rutik Namdev[1], Dr. Shipra Tiwari[1]
Dr. Mahendra Kumar Patel[1]
[1]College of Veterinary Science and Animal Husbandry, DUVASU Mathura

Abstract

Poultry farming is one of India's fastest-growing industries, giving people across the country an affordable source of protein and providing jobs to millions. But the sector often runs into trouble whenever avian influenza, better known as bird flu, strikes. In recent years, the H5N1 strain has repeatedly hit Indian states, causing panic, heavy losses for farmers, and big disruptions in the poultry trade. The latest cases in Uttar Pradesh in August 2025 remind us that this problem is far from over. This article explains the current bird flu situation in India, the financial damage it causes, the weaknesses in farm-level biosecurity, and what steps are needed to protect both farmers and consumers.

Introduction

India's poultry sector has grown into a powerhouse — worth over ₹1.5 lakh crore today. Eggs and chicken are not only an affordable source of protein but also a daily income for millions of small and large farmers. However, with this rapid growth comes a big challenge: disease outbreaks. Bird flu has been the most worrying among these. First detected in India in 2006, it has returned almost every year in different states. The recent detection in Prayagraj, Uttar Pradesh, shows how quickly the disease can reappear, forcing culling of birds, lowering consumer confidence, and creating fear in the market.

The Current Situation in India

- **Where outbreaks occur:** Bird flu is no stranger to states like Kerala, Maharashtra, Haryana, Punjab, Madhya Pradesh, and Uttar Pradesh. Kerala often reports frequent cases because it lies on migratory bird routes.
- **Fresh outbreak:** In August 2025, bird flu was confirmed in Prayagraj (UP). The state government immediately sent Rapid Response Teams (RRTs) to cull birds and disinfect affected farms.
- **Wild birds play a role:** Since India lies along the Central Asian Flyway, migratory birds often carry the virus. Past incidents in Himachal Pradesh, where wild geese died in large numbers, show how nature itself contributes to the cycle.

Economic Impact on Indian Poultry Sector

The impact of bird flu goes far beyond sick birds:

1. **Direct farm losses -** Whenever bird flu hits, thousands of birds are culled to stop the spread, wiping out a farmer's income.
2. **Crash in demand -** Fear spreads faster than the virus. In many cases, even healthy chicken and eggs remain unsold because consumers panic. In 2021, prices in some markets dropped by 50-60% overnight.
3. **Disrupted trade -** Some states restrict the transport of birds and eggs during outbreaks, creating shortages in one region and oversupply in another.
4. **Hit to allied sectors -** Maize and soybean farmers, who supply poultry feed, also feel the shock.

In short, the outbreak leaves a chain reaction of losses — from small backyard farmers to large integrated poultry companies.

Biosecurity Gaps in India

Despite knowing the risks, India still struggles with gaps in biosecurity — the protective steps needed to keep farms safe.

- **Backyard flocks:** Nearly one-third of India's poultry is reared in backyards, often without proper housing or fences, making them vulnerable to infection from wild birds.
- **Limited awareness:** Many farmers can't easily identify bird flu symptoms or don't know how and where to report them.
- **Weak farm practices:** Measures like foot baths, vehicle disinfection, or controlled farm entry are often ignored.
- **Testing delays:** Though ICAR-NIHSAD in Bhopal is the main lab, transporting samples from far-off regions slows down confirmation.
- **Compensation issues:** Farmers whose flocks are culled often complain about delayed or inadequate payments, discouraging early reporting.

Government Response & Policy Measures

India does have a National Action Plan on Avian Influenza (2021 update) under the Department of Animal Husbandry and Dairying (DAHD). The key steps include:

- Culling birds within a 1-km radius of the outbreak.
- Compensating farmers for birds that are killed.
- Restricting the movement of poultry products from affected zones.
- Running awareness drives to assure consumers that properly cooked poultry remains safe to eat.

However, the effectiveness of these measures depends a lot on the state. Kerala and Maharashtra act fast, but in many states, response is patchy and slow.

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Future Strategies for India

India stands at a critical juncture in addressing antimicrobial resistance (AMR), especially in livestock and poultry farming. While progress has been made in surveillance, awareness, and regulation, the journey ahead requires coordinated and innovative actions. The following strategies can strengthen India's fight against AMR:

1. Strengthening One Health Approach

India must adopt the One Health framework more robustly, linking human health, animal health, and the environment. Establishing dedicated One Health centers at state and district levels can ensure integrated monitoring of antibiotic use and resistance patterns. This will also encourage collaborative policymaking between veterinary, medical, and environmental authorities.

2. Expanding Nationwide Surveillance Networks

Although initiatives like ICMR and ICAR surveillance programs exist, they need to be scaled up to cover rural, semi-urban, and backyard farms. Building farmer-friendly reporting systems using mobile apps or SMS-based tools will allow real-time tracking of antibiotic use and emerging resistance hotspots.

3. Incentivizing Farmers for Prudent Antibiotic Use

Farmers often resort to antibiotics as a low-cost solution to disease management. Providing financial incentives, insurance schemes, and subsidies for vaccines and probiotics can reduce this dependence. Certification programs such as "Antibiotic-Responsible Farms" can also encourage compliance while improving consumer trust in Indian poultry and dairy products.

4. Promoting Alternatives to Antibiotics

Future strategies should prioritize the research and adoption of non-antibiotic interventions such as probiotics, prebiotics, herbal extracts, bacteriophages, and advanced vaccines. India's traditional knowledge of Ayurveda and ethnoveterinary practices could be integrated with modern science to develop cost-effective solutions for livestock health.

5. Education, Training and Behavioral Change

Farmers, paravets, and veterinary pharmacists need continuous capacity-building programs on biosecurity, hygiene, and judicious use of antimicrobials. Community-based awareness campaigns through radio, TV, and local cooperatives will be vital to changing farmer attitudes towards antibiotics.

6. Regulatory Reforms and Market-Based Approaches

Enforcement of bans on critical antibiotics for growth promotion must be strictly implemented. At the same time, India can introduce market-driven incentives, such as higher prices for antibiotic-free milk, meat, and eggs. Encouraging organized retail chains to label and promote antibiotic-free products will create demand-led change.

7. Investment in Infrastructure and Research

India should increase investments in veterinary diagnostics and rapid testing kits to enable early disease detection, reducing unnecessary antibiotic use. Public-private partnerships with pharmaceutical and biotech companies can accelerate the development of safer drugs and diagnostic tools tailored for Indian livestock conditions.

8. International Collaboration and Export Readiness

As India seeks to expand its export share in poultry, dairy, and meat, aligning with global AMR standards (OIE, WHO, Codex Alimentarius) will be crucial. Strengthening traceability systems through blockchain and digital platforms will ensure compliance with international markets, improving both trade and biosecurity.

Conclusion

Bird flu is not new to India, but its impact remains serious. The 2025 outbreak in Uttar Pradesh shows that the virus will keep returning unless farms, governments, and consumers all work together. Stronger farm biosecurity, faster detection, fair farmer compensation, and public trust are the keys to keeping India's poultry sector safe. With poultry playing such a big role in nutrition and livelihoods, managing avian influenza is more than an animal health issue — it's about food security, farmer survival, and public confidence.

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SEC India Leaders Join Forces at MENASA CrushCon 2025

It was a moment of pride and recognition for SEC India as four of its fourteen esteemed Regional Advisory Council (RAC) members participated in MENASA CrushCon 2025, held in Dubai. Their presence underscored SEC India's growing influence and active engagement in global platforms that shape the future of the protein and oilseed sectors. As the Soy Excellence Center (SEC) India continues to make steady, meaningful, and impactful progress in strengthening talent and leadership across the Indian Protein Value Chain, the U.S. Soy industry and the U.S. Soybean Export Council (USSEC) have expressed their sincere appreciation to all SEC RAC members for their consistent guidance, strategic insights, and valuable contributions.

The SEC India RAC members attending the event included Divya Kumar Gulati, Chairman of CLFMA of India; Ricky Thaper, Joint Secretary of the Poultry Federation of India; Sumit Agarwal, Managing Director of Bio Nutrients; and Naveen Pasuparthy, Managing Director of The Nanda Group. Also seen in the picture were Kevin Roepke, Executive Director MENASA, USSEC, and Vijay Anand, Center Lead - SEC India, USSEC, highlighting the strong collaboration between industry leadership and the U.S. Soy ecosystem.

USSEC's flagship MENASA CrushCon 2025, conducted on December 3-4, brought together more than 200 participants, including crushers, refiners, protein value chain professionals, and U.S. soybean farmers. Organized under the theme “Connect. Collaborate. Catalyse.”, the event served as a powerful platform for dialogue, networking, and knowledge exchange across the global soy and protein industries.

The conference addressed the rapidly evolving soy trade environment, with in-depth discussions on global market dynamics, emerging innovations, and the increasing importance of building sustainable, resilient, and future-ready supply chains. Conversations throughout the event reinforced the proven quality, consistency, sustainability, and strong nutritional profile of U.S. Soy, along with its critical role in supporting regional food security and meeting the growing protein demands across both feed and food sectors.

Interested applicants wishing to register for the upcoming courses can email to **mshankar@ct.ussec.org** and CC **VAnand@ct.ussec.org**

MENASA CrushCon 2025 further strengthened the positioning of U.S. Soy as a trusted and reliable partner in advancing a protein-secure world. The MENASA region encompassing the Middle East, North Africa, and South Asia represents a vast and diverse geography, and the event stood as a magnificent representation of its strategic importance for U.S. Soy and the global protein value chain.

What SEC Members Have to Say

Vishal Sachdeva
Technical Manager, Intracare SEA Pvt. Ltd.

I work closely with poultry, hatchery, and feed industry stakeholders on hygiene, biosecurity, and process optimization across operations.

Before enrolling in the India SEC Poultry Production & Management Course (Cohort #8), my primary objective was to strengthen my understanding of poultry processing fundamentals and align them more closely with practical, on-ground challenges faced by the industry. The course provided a well-structured blend of scientific principles and real-world applications, helping bridge this gap effectively.

Several sessions stood out for me, particularly those covering processing fundamentals, Quality parameters, Farm management practices including biosecurity & hygiene in poultry operations. The expert-led discussions and case-based explanations added strong practical relevance and helped reinforce concepts that are directly applicable in my professional role.

Overall, the course has had a meaningful impact on my personal and professional development. It has enhanced my technical clarity, improved my ability to engage in solution-oriented discussions with industry professionals, and strengthened my confidence in applying best practices across poultry processing systems.

Thank you to the entire SEC team for delivering such a valuable learning experience.

Dr. Eshwar Nayak
Production Manager at Venkateshwara Hatcheries Pvt. Ltd

I joined the **India SEC Poultry Production & Management Course** to strengthen my practical and technical knowledge of modern poultry management and nutrition. The course offered clear and learning with real field experiences, which helped me a lot in my day-to-day work.
The interactive sessions, expert faculty, and especially the question-and-answer sessions were good and very helpful. Overall, this course has improved my confidence, technical clarity, and decision-making skills.
Thank you SEC India Team.

From INR to USD:
Reimagining India's Poultry Industry through Export

Dr. Chandan
Owner, LIORAA

Two months ago, I was shopping for groceries in a supermarket in Singapore when I couldn't help whispering, "So costly," while staring at the price of eggs. A pack of 10 eggs cost SGD 3.7—roughly ₹252. That's ₹25 per egg, enough to buy four eggs back home in India. A week later, I was in Namakkal, Tamil Nadu, sitting with Ramanna, a layer farmer, during a meeting. He was visibly worried. The lifting rate had dipped again, thanks to oversupply. Soaring input costs added pressure from the other side. "We raise good birds," he sighed, "but we sell them like they're invisible."

His frustration echoes across India's poultry belt. Farmers and integrators produce millions of tons of chicken and eggs, yet struggle to break free from the fluctuating price barriers of the domestic market. Their produce is commoditized, their margins squeezed. But when premium markets like Singapore, UAE, and Saudi Arabia surround us, why aren't we tapping into them?

The truth is sobering: India is not yet producing world-class poultry. Nor does it enjoy a cost advantage or internationally recognized disease-free zones. But that doesn't mean it can't. We've been myopic—focused only on domestic demand. What if, instead of chasing prices in local mandis, India's poultry sector aimed for supermarket shelves in Singapore and breakfast tables in Dubai? The challenge isn't just production—it's transformation. It's time to stop thinking in kilos and cartons, and start thinking in destinations, differentiation, and dollars.

Why Export Is a Strategic Imperative

India's poultry industry has grown rapidly over the past two decades, driven by improved genetics, feed efficiency, and vertical integration. Yet its export footprint remains negligible. Friends often say, "We can't compete with the US or Brazil." I always counter: "If Thailand can, if Vietnam and the Philippines can, why can't we?"

Global demand for processed, frozen, and ready-to-cook poultry is surging—especially in ASEAN, Gulf countries, and parts of Africa. These markets are hungry for affordable, safe, and culturally adaptable protein. India has the scale, but not yet the systems to serve them. To compete globally, we must first acknowledge the gap. We need to build the infrastructure, protocols, and branding required to meet international standards. That means creating disease-free zones, enforcing biosecurity, and adopting world-class farming and processing practices—not just for export, but as a blueprint for domestic transformation.

Poultry SEZs: Building Export-Grade Ecosystems

One bold solution is the creation of **Animal Husbandry Special Economic Zones (SEZs)**—with **Poultry SEZs** as a priority. These zones, strategically located in coastal states like Tamil Nadu, Andhra Pradesh, Gujarat, and Odisha, would be dedicated to producing poultry exclusively for international markets. Within these SEZs, only world-class practices would be permitted—from hatchery hygiene and feed protocols to slaughter standards and cold chain logistics. Farms and processors would operate under export-grade compliance, with strict traceability and veterinary oversight.

These SEZs must be supported by robust shipping infrastructure. Ports near these zones should be equipped with fast-loading docks, quality inspection labs, and veterinary certification facilities. Time-sensitive exports like frozen chicken and processed eggs require seamless logistics. A delay of hours can mean the loss of entire consignments. These SEZs must be built with speed, safety, and scale in mind.

To attract investment and signal national priority, the government should also consider **sector-specific taxation** for produce originating from these SEZs. Preferential GST rates, income tax rebates for SEZ-based processors, and customs duty waivers on imported equipment could incentivize participation and innovation. More importantly, such targeted taxation would drag focused government attention toward poultry as a strategic export sector—creating a fiscal identity that distinguishes it from general agriculture.

These SEZs wouldn't just serve global demand—they would act as **incubators for best practices**, influencing the broader domestic industry over time. What begins as an export hub could evolve into a national benchmark for quality, compliance, and profitability.

Processed Poultry: The Format That Wins

The future of poultry exports lies in value-added formats. Raw carcasses have limited appeal and low margins. But ready-to-cook and ready-to-eat products—marinated fillets, spiced wings, grilled strips—are in high demand across international markets. These formats offer better shelf life, higher consumer appeal, and stronger brand potential.

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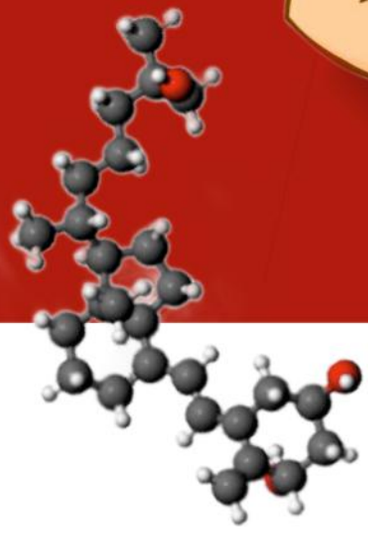

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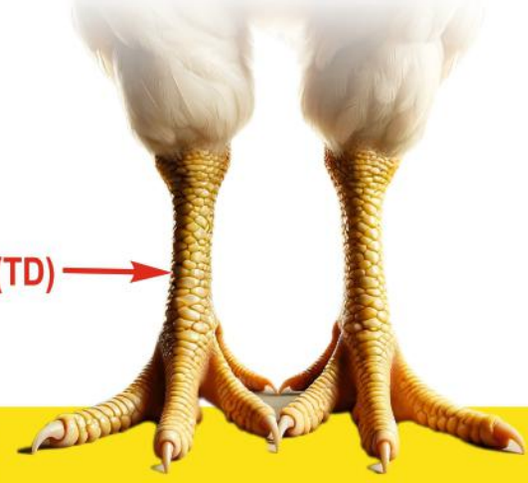

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Processed poultry also enables byproduct monetization—bones, skin, and offal can be converted into pet food, gelatin, and other value-added products. This expands the revenue base and strengthens the economics of the entire poultry chain.

India can tap into this by developing regional brands that reflect its culinary heritage. Imagine "Tandoori Chicken Strips" in Southeast Asia or "Masala Wings" in Gulf supermarkets—products that carry both flavor and identity. But branding must be backed by quality. Without export-grade processing and packaging, even the best recipes won't travel far.

Eggs: Small Format, Big Opportunity

Eggs are among the most efficient sources of animal protein, and their global demand is rising—especially in processed formats. India, with its vast layer population, can become a reliable supplier of egg powders, liquid eggs, and boiled formats.

Currently, low domestic prices often compel farmers to compromise on quality. When an egg sells for ₹6-7 in India but fetches ₹20-25 in Singapore, the opportunity gap is glaring. Can we afford to ignore it?

Egg powders serve baking and food manufacturing industries, while liquid eggs cater to hotels, airlines, and catering services. Boiled and peeled eggs are ideal for ready-to-eat segments. With proper grading, packaging, and cold chain support, eggs can become a high-volume, high-frequency export item—quietly powerful, globally relevant.

Export as a Roadmap for Domestic Reform

Export orientation isn't just about foreign exchange—it's about raising the bar. By building SEZs, enforcing global standards, and incentivizing excellence, India can create a roadmap that transforms its entire poultry ecosystem. What starts as an export hub can evolve into a domestic benchmark.

Farmers and integrators outside SEZs will begin to adopt best practices to qualify for future inclusion. Processors will upgrade facilities to meet export norms. Cold chain operators, logistics providers, and even hatchery suppliers will align with the new expectations. In time, the SEZ model will ripple outward—lifting the entire sector.

The Road Ahead

India's poultry entrepreneurs, integrators, and policymakers must now embrace a new narrative—one that sees export not as an afterthought, but as a strategic engine. Whether it's a broiler processor in Tamil Nadu, an egg cooperative in Andhra Pradesh, or a cold chain startup in Maharashtra, the message is clear: think global, act strategic, build bold.

India's poultry industry is not yet world-class. But with vision, investment, and policy alignment, it can be. The world is waiting—and it's hungry.

Dr. Chandan
Owner, LIORAA
(Strategic Advisor for Animals Nutrition and Health Organiztions)

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Soya DOC: A Critical Nutrient for Poultry Productivity

Q1. You have conducted numerous workshops on the quality of Soya DOC and its importance for Poultry. "What motivated you to do this?"

Answer : (Dr. Sunil Nadgauda) : Honestly, what made me start doing these workshops was seeing how much impact the quality of Soya DOC has on overall poultry performance — and how often it's overlooked. Many people in the feed industry focus mainly on price, but not everyone understands how variations in Soya DOC quality — things like protein levels, amino acid balance, or proper heat treatment — can directly affect animal growth and health.

I wanted to bridge that gap. Through these workshops, my aim has been to create awareness about what defines good-quality Soya DOC, how to evaluate it, and why it's worth investing in. When nutritionists and feed millers understand the science behind it, they make better decisions, which ultimately leads to better productivity and profitability for farmers.

So, in short, it's about education and impact — helping the industry move from just "cost-based buying" to "quality-based nutrition."

Q2. How long has Venky's been in the soya business?

Answer : (Mr.N.K. Toshniwal) When we established our poultry genetics research and breeding facilities — including pure line and grandparent stock — in India, **Padmashree Late Dr. B. V. Rao** realized that the quality of Soya DOC plays a crucial role in unlocking the highest genetic potential of our breeds. With that vision, he initiated the idea in **1989**, and by **1992**, we had set up our **first soya plant in Solapur**.

We were actually the **first poultry company to venture into the soya business**, which at that time was primarily considered an oil business. Naturally, we faced many challenges in the initial years. In fact, one of the financial institutions even remarked that *"oil is a slippery business — will Venkys be able to manage it?"*

For the first two to three years, being new to this segment, we encountered several hurdles. However, under the strong leadership of our Chairperson Mrs. Anuradha J.Desai, we decided to make this unit a core strength supporting our breeding program. She stressed that this unit should not only support the breeding program but should itself become one of the key unit.

We take pride in the fact that we had **prepaid all our loans to financial institutions ahead of schedule**, even with prepaid-penalties for the first plant and their after we decided to expand this business only with our internal accruals.

As we progressed, we realized the importance of being part of the **edible oil business** as well. So, in **2001**, we set up an **oil refinery**, ensuring complete value addition for all our by-products. This step made the unit much more **competitive and sustainable**. In fact, we were probably the first company to produce **lecithin** in Maharashtra.

In **2004**, we established our **second plant in Solapur**, followed by a **third plant in Nanded** (in 2015) and a **fourth in Srirampur** (in 2021). All strategically located to cater effectively to the industry.

Q3. After setting up your own Soya Plant, how has the feed been benefited?

Answer : (Dr.KP Kale) : Setting up our own Soya Plant truly transformed the way we look at feed nutrition and quality. By bringing soya processing in-house, we were able to streamline the entire supply chain — now, fresh Soya DOC reaches our feed mill within just 1-2 days of processing. That freshness made a world of difference in feed palatability, and we soon began seeing visible improvements across all productivity parameters — from our SPF, Pure Line, and GP breeders (around 33 years Journey) to commercial broiler flocks.

Having complete control over processing has been a huge advantage. We can precisely manage parameters like temperature during toasting, ensuring that trypsin inhibitors are fully inactivated while amino acids remain intact. This balance is critical — it improves protein digestibility and nutrient availability, allowing the birds to convert feed more efficiently.

In fact, we developed our in-house technology and designed, developed, and manufactured the required equipment for the process.

With consistent quality Soya DOC, we also started fine-tuning the protein and amino acid profiles in our feed formulations. This helped us reduce excess crude protein, cut down on nitrogen excretion, and improve overall gut health — making our feed both cost-effective and environmentally sustainable.

Over time, we've realized that properly processed soya meal isn't just another ingredient; it's the nutritional backbone of our feed. Our own Soya DOC provides a pure, digestible protein source that has truly boosted bird performance, liveability, and overall productivity.

Q4. How are you managing the Soya DOC cost in spite of maintaining product quality and purity ?

Answer: (Mr.N.K. Toshniwal) : As we know, the soya industry is highly working-capital intensive, and interest costs form a significant part of overall expenses. To manage this, we made a conscious decision to operate completely debt-free—without taking any loans for setting up or running our plants.

We also realized that soya plants are largely locally fabricated, and their technical design often depends on the experience of the fabricator. Hence, we decided to build strong in-house technical expertise within our group. We take pride in the fact that our Nanded and Srirampur plants—including their buildings and equipment—have been designed, manufactured, and installed entirely by our in-house expertise team. This approach helped us reduce project costs by over 40%, which in turn keeps our production costs low.

Over the years, we have developed efficient sourcing of raw soybeans, ensuring availability throughout the year. We have optimized plant operations and implemented continuous process monitoring to minimize wastage and improve yield. Focus is on achieving operational efficiency.

Ultimately, our integrated approach—right from setting up the unit to procurement and processing—allows us to maintain high standards of quality and purity while keeping overall production costs competitive.

Q5. What are the common types of adulterations noticed if the Soya DOC source is not authentic and reliable?

Answer: (Dr. Sunil Nadgauda) When the Soya DOC source is not authentic or reliable, several types of adulterations can be observed — both intentional and due to poor processing practices. The most common issues include:

- **Mixing with fillers** such as rice bran, de-oiled cake from other oilseeds (like cottonseed or sunflower), or even sand and silica to increase bulk weight.
- **High fibre content** due to the inclusion of hulls, which reduces protein percentage and digestibility.
- **Presence of residual oil** or **improperly toasted material**, leading to higher trypsin inhibitor levels that can adversely affect bird performance.
- **Excessive moisture** added deliberately to increase weight, which also reduces shelf life and promotes fungal growth.
- **Mycotoxin contamination** resulting from poor storage or substandard raw material.
- In some cases, **urea or melamine** adulteration has been reported to artificially enhance crude protein readings.
- **Salt Adulteration-** Common Salt is **cheap and dense**, so even small additions can make a large difference in weight

Such adulterations directly impact feed quality, bird health, and overall productivity. That's why we always emphasize on sourcing Soya DOC from trusted and verified suppliers. *We believe that birds, through their performance, convey quality much better than lab reports.*

Q6. Is protein percentage the right way to judge soybean DOC?

Answer : (Dr.KP Kale) Protein percentage is **an important indicator**, but it is **not sufficient on its own** to judge soybean meal quality for broilers. While crude protein gives a basic idea of nutritional value, several other factors significantly influence broiler performance and feed efficiency.

Limitations of relying solely on protein percentage include:

1. **Amino acid balance** - Protein percentage doesn't reflect levels of essential amino acids like lysine, methionine, and threonine, which are crucial for growth and muscle development.
2. **Anti-nutritional factors** - Compounds like trypsin inhibitors can reduce digestibility and nutrient absorption if not properly inactivated during processing.
3. **Protein solubility and digestibility** - High protein content alone doesn't guarantee that protein is effectively digestible.
4. **Processing quality** - Over/ under-cooking, along with factors like color and odor, can indicate poor processing that affects nutrient availability.

A **comprehensive assessment** of soybean meal should combine protein percentage with these additional indicators to ensure optimal growth, efficient feed conversion, and overall broiler health.

In an interview with Feedinfo on 13 September 2024, Tom D'Alfonso, Director for Animal and Aquaculture at the US Soybean Export Council (USSEC), outlined key findings comparing US Soy with soy from other origins. The main points include:

1. ***Their studies highlight significant differences in nutrient content, consistency, and sustainability because of increased heat damage.***
2. ***The higher digestibility of essential amino acids found in SBM can add an estimated value*** of ***$3-$5/MT.***
3. ***Additionally, greater availability of digestible energy (ME) for poultry contributes an additional $9-$10/MT.***
4. ***Better nutrient composition and digestibility translate to lower feed cost per kg of animal protein and improved animal performance.***
5. ***Feed conversion trials show a 5-point FCR improvement (1.65 → 1.59) with US SBM due to higher metabolisable energy and amino acid digestibility.***
6. ***For a broiler operation processing 50M birds/year, using 100% US soy can unlock ~$3 million in annual profits through reduced feed use and/or higher output.***

Tom D'Alfonso's findings strongly align with and reaffirm our experience of many years.

Conclusion Remark:

"High-quality Soya meal is the backbone of poultry nutrition, directly influencing growth, productivity, and profitability. By ensuring proper processing, amino acid balance, and strict quality control, we not only optimize feed efficiency but also safeguard bird health and performance. Investing in Soya quality is, therefore, a strategic step toward sustainable and profitable poultry production."

VH group's approach is to always focus on quality at an economical cost, and our division follows the same corporate policy.

Ultimately, investing in high-quality Soya DOC is not just about nutrition—it's a strategic lever for sustainable poultry production, improved profitability, and long-term operational efficiency."

We are well aware that Venky's alone cannot cater to the industry's demand, so we are communicating this message to all our poultry stakeholders to emphasize its importance.

*Interview conducted by Dr.Datta Kulkarni,
VENKATESHWARA BV BIOCORP PVT LTD, PUNE

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100g of HERBAL C can be used in place of 100g synthetic Vitamin C with higher stability and better activity. 100-200g per ton of feed is recommended as depending upon severity of stress.

WATER INCLUSION RATE

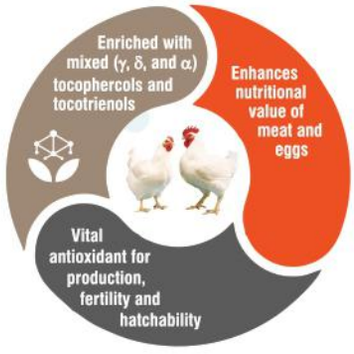
10ml per 100 birds or as advised by the poultry consultant. To be given orally, mixed with drinking water, once daily. Double quantity is recommended for breeders.

PRESENTATION

1 Kg, 10 Kg & 25 Kg
1 Ltr and 5 Ltr

E Sel POWER

Natural vitamin E and organic selenium complex



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USAGE

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- Improves broiler and layer performance
- Optimizes antioxidant defense against reactive cytotoxic free radicals
- Overcome stress and reduces load of heavy metals from the body
- Prevents exudative diathesis, muscular dystrophy, crazy chick disease

FEED INCLUSION RATE

100 gm per ton of feed or as advised by the poultry consultant

WATER INCLUSION RATE

E Sel POWER Liquid (per 1000 birds)

Broilers	Layers	Qty
0-2 weeks	0 - 8 wks	10 ml
3-4 weeks	9 -20 wks	20 ml
5th week & onwards	21-72 wks	40 ml

To be given orally, mixed with drinking water, once daily.
Double quantity is recommended for breeders.

PRESENTATION

1 Kg, 10 Kg & 25 Kg
500 ml & 1 Ltr

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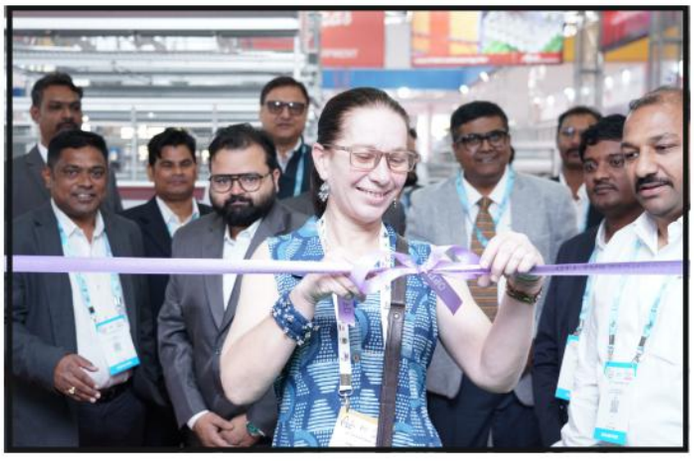
POULTRY INDIA 2025 WITNESSES OPTIMA LIFE SCIENCES AT ITS INNOVATIVE BEST



Optima Life Sciences marked a powerful presence at **Poultry India Expo 2025**, reinforcing its commitment to innovation, quality, and customer trust. The stall was formally inaugurated by **one of our esteemed European distributors**, symbolizing our expanding global footprint and strengthening international collaborations.

This year, Optima Life Sciences presented a **unique manufacturing-facility-themed stall**, designed to give visitors a closer look at our production excellence, stringent quality standards, and the scientific rigour behind every product. This setup was crafted to build deeper trust among customers by showcasing how our products are made with precision, consistency, and global-quality benchmarks.

OPTIMA

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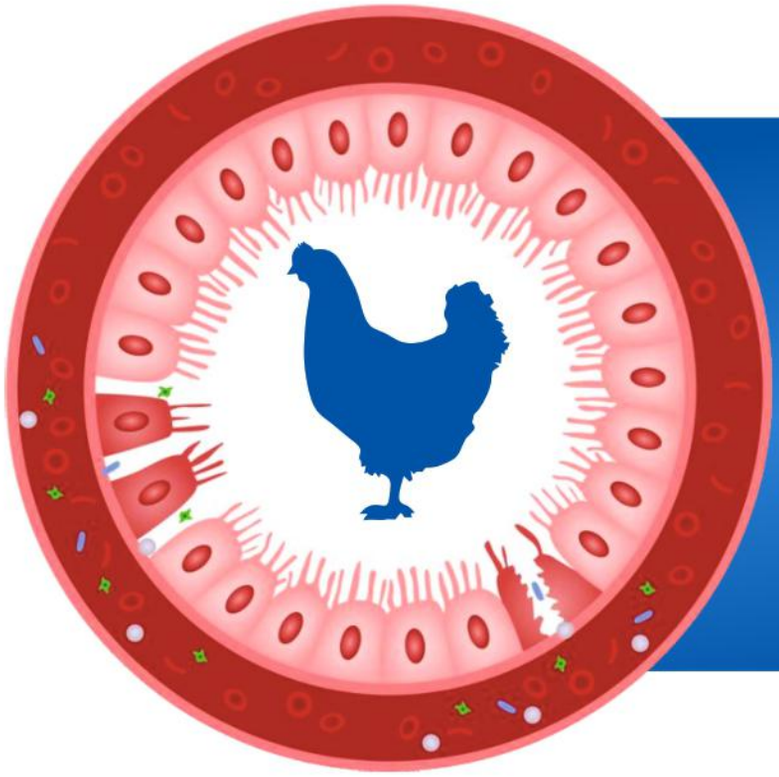
STRENGTHENING THE GUT ACROSS EVERY AXIS



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WITH PROPRIETARY STRAIN

Bacillus velezensis, BV-OLS1101™

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Follow Us On

A key highlight of the event was the **special launch of our proprietary probiotic strain – *Bacillus velezensis* OLS-1101**. The unveiling was done by the distinguished inventors:

Dr. Sudipto Haldar, Director, Agrivet; PhD, Animal Nutrition
Dr. Amit Pal, Scientist G, Division of Pathophysiology, NICED Kolkata

The expert discussion held during the launch was attended by **leading veterinarians, consultants, and key customers** from the poultry industry. The session provided scientific insights into the strain's development, its unique mode of action, and its potential to transform poultry gut health management.

To further elevate the visitor experience, Optima Life Sciences curated a **premium Golf Play Zone**, offering a business-class networking activity widely appreciated within the industry. The booth also featured a **fine-dine experience**, creating an engaging environment that led to candid moments and pure networking for our guests.

Optima Life Sciences' participation this year was a testament to our continuous pursuit of excellence, innovation, and customer-centric solutions. We remain committed to advancing poultry health with science-backed products and strengthening our partnerships across India and beyond.

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ROSS 308 AP BEST ACHIEVERS DECEMBER-2025

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Northern Region

COMPANY: Sampoorna Feeds
FARMER NAME: Mr. Nirmal Singh

DECEMBER-2025	Top #1
Farm Type	Open House
State	PUNJAB
Chicks Placed	3260
Mean Age	32.0
Avg Body Wt	2386
FCR	1.370
cFCR	1.284
Livability%	96.1
Daily Gain	74.6
EPEF	523.0

Eastern Region

COMPANY: IB Group
FARMER NAME: Ms. Nilima Roy

DECEMBER-2025	Top #1
Farm Type	Open House
State	BENGAL
Chicks Placed	1288
Mean Age	41.0
Avg Body Wt	3084
FCR	1.433
cFCR	1.192
Livability%	95.7
Daily Gain	75.2
EPEF	502.5

Central Region

COMPANY: Japfa
FARMER NAME: Mr. Ankush Baban Jagadale

DECEMBER-2025	Top #1
Farm Type	EC House
State	MAHARASHTRA
Chicks Placed	6788
Mean Age	33.6
Avg Body Wt	2494
FCR	1.386
cFCR	1.276
Livability%	96.3
Daily Gain	74.1
EPEF	515.0

South Region

COMPANY: SKM
FARMER NAME: Ms. Dhivya Ayilam

DECEMBER-2025	Top #1
Farm Type	EC House
State	TAMILNADU
Chicks Placed	22490
Mean Age	32.2
Avg Body Wt	2210.0
FCR	1.340
cFCR	1.293
Livability%	97.1
Daily Gain	68.6
EPEF	497.3

DECEMBER-Top PERFORMANCE BY AREA

Area	Chicks Placed	Mean Age	BW	FCR	cFCR(2Kg)	Livability%	Daygain	EPEF
North EC House	5082	40.0	3147	1.590	1.335	95.8	78.7	474.0
North Open House	3260	32.0	2386	1.370	1.284	96.1	74.6	523.0
East EC House	10991	36.0	2658	1.503	1.357	95.6	73.8	469.8
East Open House	1288	41.0	3084	1.433	1.192	95.7	75.2	502.5
Central EC House	6788	33.6	2494	1.386	1.276	96.3	74.1	515.0
Central Open House	6228	33.1	2418	1.407	1.314	96.5	73.0	501.1
South EC House	22490	32.2	2210	1.340	1.293	97.1	68.6	497.3
South Open House	1860	33.5	2390	1.420	1.333	96.9	71.4	487.3

DECEMBER-Top 10 FIELD PERFORMANCE

Flock	Farm Type	State	Chicks Placed	Mean Age	BW	FCR	cFCR	Livability%	Day Gain	EPEF
Flock 1	OPEN HOUSE	PUNJAB	3260	32.0	2386	1.370	1.284	96.1	74.6	523.0
Flock 2	OPEN HOUSE	PUNJAB	4960	31.6	2334	1.380	1.306	97.0	73.9	519.4
Flock 3	OPEN HOUSE	HIMACHAL PRADESH	8929	36.6	2854	1.440	1.250	96.0	77.9	519.4
Flock 4	EC HOUSE	MAHARASHTRA	6788	33.6	2494	1.386	1.276	96.3	74.1	515.0
Flock 5	EC HOUSE	MAHARASHTRA	9979	32.3	2348	1.369	1.292	97.1	72.6	514.9
Flock 6	OPEN HOUSE	PUNJAB	8168	35.2	2667	1.430	1.282	96.1	75.7	508.5
Flock 7	EC HOUSE	MAHARASHTRA	13820	33.4	2428	1.400	1.305	97.2	72.8	505.3
Flock 8	OPEN HOUSE	PUNJAB	3506	31.2	2302	1.390	1.323	95.0	73.8	504.0
Flock 9	EC HOUSE	MAHARASHTRA	8695	32.4	2246	1.347	1.292	97.7	69.4	503.2
Flock 10	OPENHOUSE	PUNJAB	9694	36.1	2673	1.430	1.280	97.1	74.1	503.0

Navigating Bio-Security Volatility through Visionary Influence and Employee Psychological Capital in the Indian Poultry Healthcare Sector

Jyoti Prakash Mishra[1], Dr. Saamta Jain[2]

Abstract

This study examines the challenge of bio-security faced by the Indian poultry healthcare sector due to animal-borne threats and changing rules. It looks at how visionary leadership and employee psychological capital (PsyCap) can help organizations survive. Through examining industry data, the research finds that when leaders offer a clear vision, it helps protect their employees from the psychological stress caused by industry problems. The results suggest that when healthcare workers have higher levels of hope, self-belief, resilience, and optimism, they are more likely to follow bio-security rules. This paper adds to the research on organizational behavior by showing that PsyCap is a key factor in turning leadership ideas into real- world stability. This indicates the need for leadership programs that focus on the specific challenges within the Indian agri-business environment.

1. Introduction

In India, poultry healthcare is very important for food and jobs in the countryside. But the sector faces problems like bird flu and antibiotic resistance. Technical fixes aren't enough; people are the main defense.

Transformative leadership, with its focus on vision and intellect, is key to handling these issues (Bass & amp; Riggio, 2006). Leaders who paint a clear picture of the future help build their team's Psychological Capital (PsyCap). PsyCap, which includes hope, confidence, toughness, and a positive attitude, helps staff handle the stress of disease outbreaks without getting burned out (Luthans et al., 2007). Even though it matters, there isn't much research connecting these ideas in Indian poultry healthcare. This study looks at

how visionary leadership affects the PsyCap of healthcare workers and how this teamwork boosts strength in the organization. It gives stakeholders a guide to build a stronger human bio-shield through better leadership strategies.

2. Review of Literature

Transformational leadership is important for encouraging innovation and dedication when organizations face crises (Avolio & Yammarino, 2013). In farming and animal care, leaders must often balance business goals with public health needs. Because of this strain, Visionary Influence is needed to align the different goals of those involved (Nuthall, 2021).

Biosecurity volatility refers to unpredictable changes in how common diseases are, and the resulting regulatory or economic disturbances (Umali-Deininger et al., 2023). Research shows that this instability often causes compliance fatigue among workers. Here, strict hygiene practices become less important than speed.

Employee Psychological Capital (PsyCap) is a helpful predictor of job performance and mental well-being (Luthans & Youssef-Morgan, 2017). Recent research in India has revealed that PsyCap can affect the connection between supportive leadership and proactive behavior in employees (Srivastava et al., 2022). Still, we don't know how leaders activate these psychological resources when facing biological and high- risk situations. Current models usually don't consider the special pressures of the poultry healthcare industry. Things like mass slaughter or fast zoonotic spread call for a special type of toughness (Rani & Gupta, 2021). This study addresses this gap by looking at how these factors interact within India's socio- economic structure.

3. Study Methodology

This study adopts a **mixed-methods research design** to capture both the depth of leadership experiences and the breadth of psychological impact.

- **Quantitative Phase:** A structured survey was administered to 240 professionals across 15 poultry healthcare firms in India, including veterinarians, laboratory technicians, and field consultants. The survey utilized the PCQ-24 scale for PsyCap and the MLQ-5X for transformational leadership.
- **Qualitative Phase:** Semi-structured interviews were conducted with 12 senior executives to understand leadership strategies during recent bio-security crises.
- **Sampling:** A purposive sampling technique ensured representation from various geographic clusters (e.g., Andhra Pradesh, Maharashtra, and Haryana).
- **Ethical Considerations:** All participants provided informed consent, and data anonymization was strictly maintained to protect organizational reputations.

4. Findings

The data analysis reveals a **strong positive correlation** ($r = 0.68, p < 0.01$) between a leader's

visionary influence and the overall PsyCap of the employees.

Key Findings Include:

1. **Resilience as a Core Factor:** Among the four dimensions of PsyCap, "Resilience" showed the highest variance explanation during periods of active bio-security alerts
2. **Vision vs. Anxiety:** Employees who perceived their leaders as "highly visionary" reported 40% lower levels of task-related anxiety compared to those under transactional management.
3. **Bio-Security Compliance:** Firms with high aggregate PsyCap scores showed 25% fewer protocol deviations in bio-security audits.
4. **Cultural Nuance:** In the Indian context, "Individualized Consideration" from leaders was found to be a prerequisite for "Visionary Influence" to take effect, suggesting a paternalistic element in successful leadership.

Variables	Mean	SD	1	2	3
1. Visionary Influence	4.12	0.65	(0.88)		
2. Psychological Capital (PsyCap)	3.85	0.72	0.54**	(0.91)	
3. Bio-security Compliance	4.25	0.58	0.42**	0.61**	(0.85)
*(Note: Alpha coefficients are in parentheses; *$p < 0.01$)					

The analysis confirms that while Visionary Influence has a direct impact on Bio-security Compliance (β = 0.32), the introduction of PsyCap as a mediator significantly strengthens the model. The indirect effect is statistically significant, suggesting that leaders do not just "force" compliance; they build the "inner resources" of employees (Hope and Efficacy), which naturally leads to more disciplined bio-security behaviors in the poultry sheds.

5. Result and Discussion

The results show that transformational leadership serves as a catalyst for psychological strength. In the poultry healthcare field, where the work is naturally unstable, a leader's skill at presenting bio-security as a mission, instead of just a rule, greatly improves employee efficacy.

When comparing these results with Luthans et al. (2007), it is clear that while psychological capital is usually stable, leadership intervention can easily develop it. This opposes the common idea in agri- management that technical training is the only method for improving bio-security compliance. Our results suggest that a worker's belief in their ability to handle a crisis is just as vital as the personal protective equipment they wear. The blend of leadership vision and employee optimism creates a strong environment that can withstand the shocks of sudden market closures or disease outbreaks.

6. Conclusion

This study finds that visionary leadership is key to the psychological capital of employees in India's poultry healthcare sector. Clear direction from leaders during bio-security changes helps workers maintain performance when stressed.

Recommendations:

- **Leadership Training:** Companies should change their training to include communication skills for managers, not just technical skills.
- **PsyCap Monitoring:** HR should regularly check employee psychological health as part of their audits.
- **Future Research:** Later studies could examine how digital leadership impacts the field as remote monitoring and tele-veterinary services become more common.

Jyoti Prakash Mishra[1], Dr. Saamta Jain[2]

[1]Research Scholar, School of Commerce and Management, ISBM University Chhattisgarh

Email: jpmishra.isbm@atomicmail.io

[2]Assistant Professor, School of Commerce and Management, ISBM University Chhattisgar

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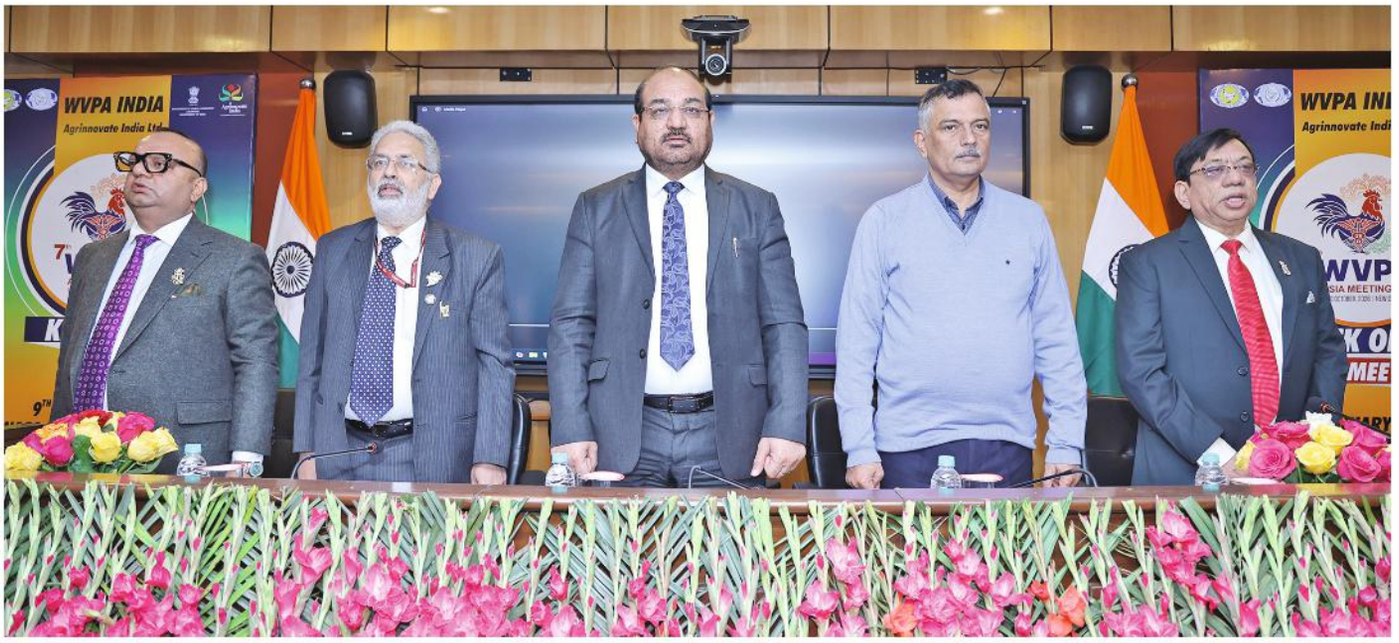
Kick-Off Meeting for WVPA Asia Meeting 2026 Held in New Delhi

"Innovations in Poultry Disease Management for a Safer/ Healthier World."

पशुपालन और डेयरी विभाग
DEPARTMENT OF ANIMAL HUSBANDRY AND DAIRYING



The World Veterinary Poultry Association (WVPA), in association with WVPA India and with Agrinnovate India Limited and Department of Animal Husbandry and Dairying (DAHD) Ministry of Animal Husbandry, as Knowledge Partners, successfully organized the Kick–Off Meeting for the 7th WVPA Asia Meeting on 9 January 2026 at NASC Complex, New Delhi. The meeting held under the chairmanship of Dr. M. L. Jat, Director General, ICAR. The Guest of Honor was Dr Inderjeet Singh, Hon VC BASU and Special Guest Dr Praveen Malik, AHC set the strategic course for the international conference to be hosted in New Delhi on 9-10th October 2026.

The kick–off meeting brought together leaders and stakeholders from government, academia, industry, research organisations and professional bodies to deliberate on priorities, partnerships and the roadmap for the Asia Meeting. deliberations focused on strengthening disease preparedness, biosecurity, accelerating digital transformation, addressing antimicrobial resistance (AMR), improving nutritional efficiency, and advancing sustainable and profitable poultry production across Asia.

Key highlights:

- **Dr. Ajit S. Ranade** delivered the opening remarks and provided an overview of the meeting agenda and objectives and was moderator for the panel discussion.

- **Dr. Shirish Nigam** (Secretary, WVPA India) addressed the strategic role of WVPA India in strengthening Asia's poultry knowledge network, underlining that Asia accounts for approximately **50% of the world's egg and chicken production** and that coordinated regional cooperation is essential for future growth.

- **Dr. Jeetendra Varma** (President, WVPA India) outlined WVPA India's action plan and roadmap leading up to the 7th WVPA Asia Meeting (9-10 October 2026), and briefed attendees on the proposed programme structure and preparatory milestones.

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Mr. Suresh Chitturi, Managing Director, Srinivasa Group (Keynote Address), highlighted India's rapid growth trajectory in poultry production. He noted that India currently produces approximately 149 billion eggs annually, with a per capita egg consumption of 106 eggs per person per year, and projected that egg production could reach 200 billion in future years. On poultry meat, Mr. Chitturi observed that India is the world's fifth-largest producer, with per capita chicken consumption around 7.5 kg per person per year, and an expected sectoral annual growth of 8-10%.

Dr. Praveen Malik Animal Husbandry Commissioner (AHC) DAHD, Government of India; CEO, Agrinnovate India Limited) urged industry stakeholders to bring forward practical issues and suggestions to strengthen the poultry sector and reaffirmed the Animal Husbandry Department's support for collaborative initiatives.

The programme included a special online address by **Prof. Dr. Sjaak**, WVPA Global President, who highlighted WVPA's international activities and the association's role in fostering global exchange among poultry health professionals.

Dr. Inderjeet Singh Hon Vice-Chancellor, Bihar Animal Science University, Guest of Honour emphasised industry-led research and stronger industry-academia partnerships, and called for initiatives that support rural and backyard poultry systems.

High-level participation and active contributions from ICAR leadership included **Dr. M. L. Jat** (DG, ICAR), **Dr. Divakar Hemadri** (ADG Health) **and Dr. A. K. Samanta** (ADG, Nutrition) all of whom pledged support and provided guidance for the Asia Meeting.

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Leadership Panel Discussion

The meeting concluded with a Leadership Panel discussion on **"What Asia Expects from India's Poultry Leadership"**, comprising representatives from poultry industry organisations and associations, major integrators, animal health and feed companies, and academic and research experts. Mr. Ranpal Dhandha, President, PFI, Dr Yash Goyal, MD MSD, Mr Vijay Teng, President, INTAS, Mr Uday Singh Bayas President, Poultry India, Dr Arun Atrey, CEO Zenex AH, Dr Sanjay Gavkare GM, Venkys, Dr CB Pathak VP VIP, Dr Ali Asgar, MD Saife VetMed, Dr Leena Bora Vamso, Dr NK Mahajan, Mr Mohit Malik, Mr SK Malhotra, Dr Divakar Hemadri ADG ICAR, Dr AK Samanta ADG ICAR, Maj Gen ML Sharma Gen Secy NAVS were among the panelist. The panel explored regional expectations, potential avenues for public–private collaboration, student engagement and capacity building, technology transfer, and pathways to strengthen preparedness against transboundary diseases and AMR.

Notable commitments announced during the session included support from industry associations to promote attendance and sponsorship for veterinary students and emerging professionals.







Closing

The Kick–Off Meeting reaffirmed India's readiness to host an inclusive and high–impact international forum that will advance science, policy and industry practice in poultry health and production across Asia. The organisers expressed their appreciation to all participants, speakers and partner organisations for their active contributions. The meeting closed with a formal word of thanks by Dr. B. Barman.

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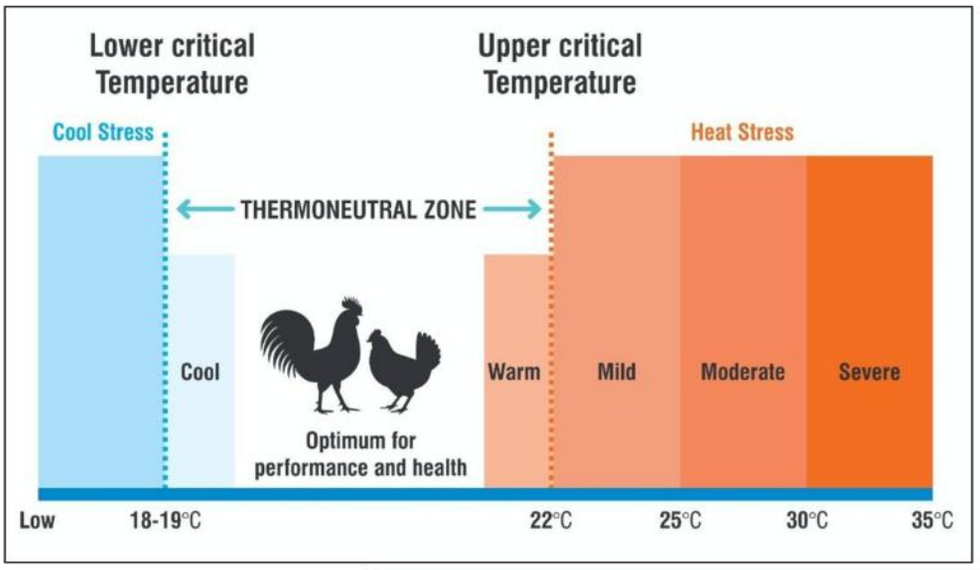
Managing Heat Stress in Poultry A Comprehensive Guide

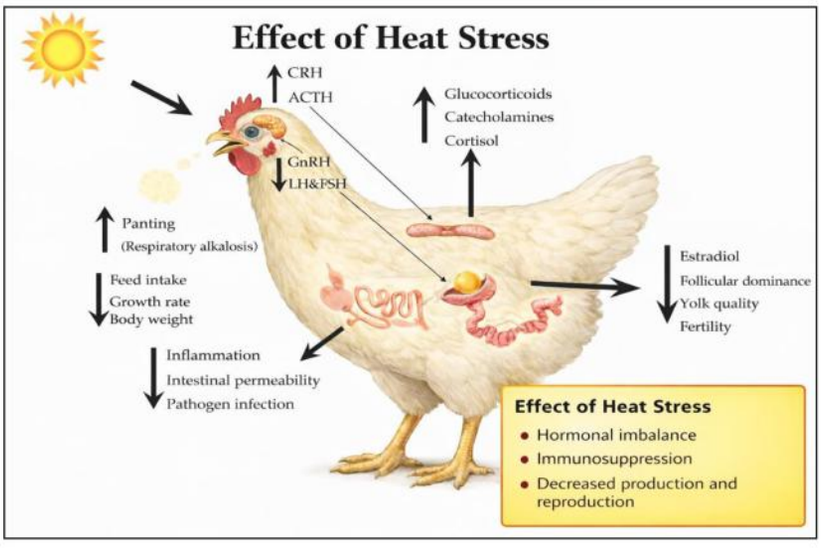
Dr. Gopal Potdar and Dr. Hardik Patel

Rising global temperatures present significant challenges for poultry producers worldwide. When birds experience prolonged exposure to elevated temperatures, their health and productivity suffer considerably. This condition becomes particularly concerning when temperatures climb beyond 25-30°C, especially in humid conditions. Birds struggle to regulate their internal body temperature, leading to decreased performance and increased mortality. Effective management requires a multifaceted approach combining proper housing, nutrition, and supportive supplements.



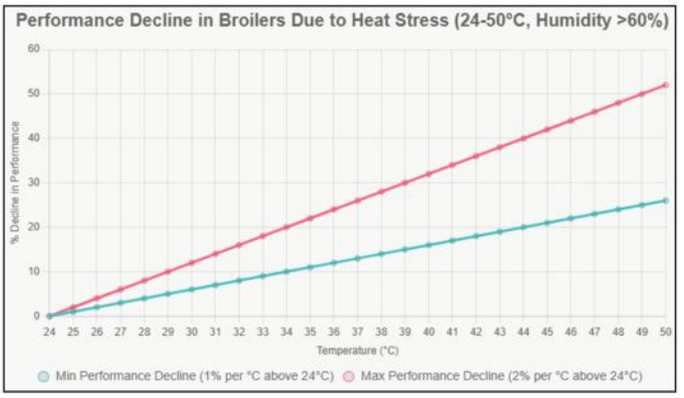
The Physiology of Heat Stress

Birds maintain constant body temperatures through various cooling mechanisms. Unlike mammals, poultry lack sweat glands and rely primarily on respiratory evaporation and behavioural adaptations to dissipate heat. When environmental temperatures exceed their cooling capacity, birds experience thermal distress. Observable signs include accelerated respiration, reduced activity, drooping wings, and changes in comb coloration. Without intervention, these symptoms progress can severe dehydration, metabolic imbalances, and potentially fatal outcomes, with mortality reaching 10-20% in extreme cases.



Impact on Meat Birds

Broiler chickens face heightened vulnerability due to their rapid growth rates and dense plumage. Thermal stress can diminish feed consumption by 20-30%, directly compromising weight gain and feed conversion efficiency (FCR). Birds redirect metabolic energy from muscle development to temperature regulation, resulting in inferior carcass quality characterized by reduced breast meat yield and increased moisture loss. Research indicates that each degree rise above 24°C correlates with 1-2% decline in performance.



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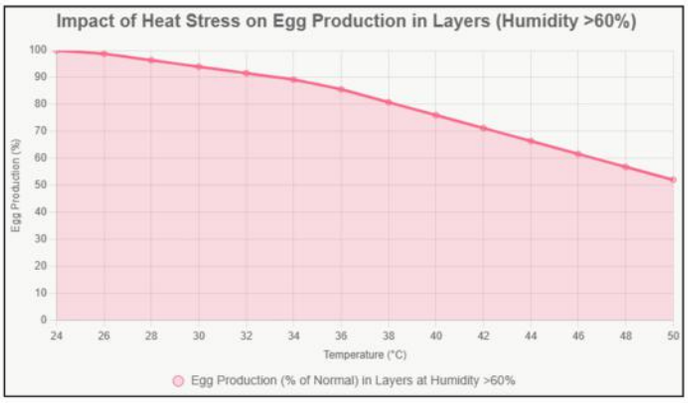
Effective management includes reducing bird density to 8-10 per square meter (depending upon the age), maintaining continuous air circulation, and implementing evaporative coolingsystems. Adjusting feeding schedules to cooler periods and supplementing with electrolyte solutions, Vit. C, Betaine & Chromium helps to maintain adequate nutrient intake.

Effects on Egg-Laying Birds

Layer hens experience heat-related challenges through disrupted reproductive physiology. Elevated temperatures interfere with hormone production, reducing follicle maturation and causing 15-25% drops in egg production. Shell quality deteriorates as calcium metabolism becomes impaired, producing thinner, more porous shells prone to breakage and bacterial penetration. Additionally, immune function weakens, increasing disease susceptibility and shortening productive life.

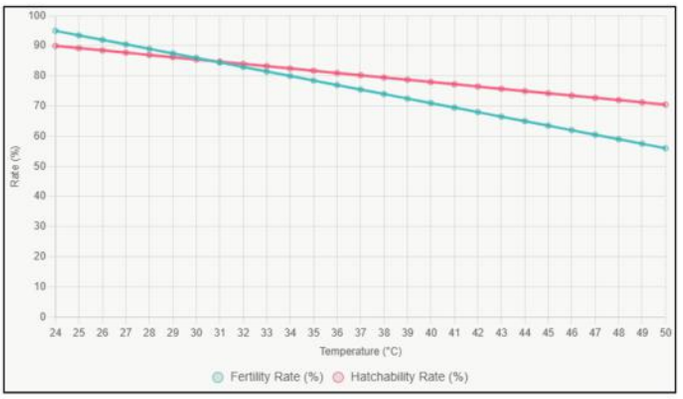


Recommended interventions include adequate shade provision, humidity control through misting (maintaining levels below 70%), and constant access to cool water (18-20°C). Dietary modifications such as moderate protein reduction (16-18%) minimize metabolic heat production, while antioxidant vitamins and other supplements support cellular defense mechanisms.

Challenges for Breeding Flocks

Breeder birds face compounded difficulties as they supply future generations. Heat exposure compromises male sperm production and female egg development, reducing fertility rates by 10-20% and hatchability by 5-15%. Semen quality declines while embryonic mortality increases due to inadequate egg protein formation. These birds, typically older and heavier, generate additional metabolic heat, intensifying their vulnerability.

Specialized management includes corrective diet with multi-supplement, dedicated cooling areas for males, modified lighting programs to extend feeding opportunities during cooler hours, and selection of heat-resistant genetic lines. Careful monitoring of body condition and incubation parameters ensures continued breeding success.



Comprehensive Management Framework

Successful heat stress mitigation requires integrated strategies:

Environmental Control

- Install efficient ventilation systems and evaporative cooling
- Apply reflective roofing materials
- Prevent overcrowding

Results: 5-10°C temperature reduction and improved air quality

Water Management

- Provide 2-3 times normal water availability
- Use efficient drinking systems
- Maintain optimal water pH

Results: Prevents dehydration and enhances nutrient uptake

Nutritional Adjustments

- Offer easily digestible feed forms
- Include osmolytes, electrolytes and supplements

Results: Reduces heat production and supports electrolyte equilibrium

Monitoring Protocols

- Implement thermal imaging technology
- Track behavioural indicators
- Maintain preventive health programs

Results: Early problem detection and loss prevention

Combined implementation can recover 70-80% of heat-related performance losses.

Nutritional Support Solutions

While environmental modifications provide an essential foundation, targeted nutritional interventions address the underlying physiological disruptions caused by heat stress. Advanced anti-stress formulation such as **THERMOGARD** is specifically designed to protect birds during high-temperature challenges.

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1 Data on file, Study Report No. B815R-US-18-A46, Zoetis Inc.

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Key benefits of THERMOGARD include:

Fluid and Mineral Balance:

Replenishes critical electrolytes lost through panting and respiratory cooling, preventing dehydration and digestive upset—particularly important for fast-growing broiler birds.

Appetite and Immune Support:

Helps restore feed intake and strengthens immune response, crucial for sustaining egg production, shell quality, and reproductive efficiency.

Metabolic pH Regulation:

Corrects respiration-induced alkalosis, stabilizing acid-base balance for optimal nutrient utilization across broiler, layer, and breeder flocks.

Recommended application rates for THERMOGARD:

Liquid form: Preventive use at **1 ml per 2 L of water**; during heat stress **1 ml per 1 L of water** Powder form: **100-250 g per metric ton** for broilers and layers; **250-500 g per metric ton** for breeders

Available in multiple pack sizes, **THERMOGARD** integrates seamlessly into daily farm management. Poultry producers report **10-15% improvement in performance parameters** during peak summer stress when using **THERMOGARD** as part of a comprehensive heat management strategy.

Conclusion

Managing heat stress in poultry demands a proactive, integrated approach that addresses environmental, nutritional, and physiological challenges. By implementing effective ventilation, water management, and dietary adjustments—such as reducing protein levels and incorporating electrolytes producers can mitigate the adverse effects on broilers, layers, and breeders, including reduced feed intake, egg production declines, and fertility issues. Supplements play a vital role in restoring electrolyte balance, boosting immunity, and countering oxidative stress, potentially recovering up to 80% of performance losses. As global temperatures continue to rise, prioritizing these strategies not only enhances flock welfareand productivity but also ensures the long-term viability of poultry operations in an increasingly unpredictable climate.

Dr. Gopal Potdar and Dr. Hardik Patel

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In our journey we visited many faces with our poultry Sector legends, and one among them is

S. Mukhtiar Singh Sandhu

Founder: Sandhu Feeds | Sandhu Poultry Farm
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1. Are you originally from Assandh?

Yes, I was born and raised in Assandh. I come from a modest background and have always aspired to do something exceptional that would provide new opportunities and financial security for the next generation and my extended family.

2. What is the best aspect of your journey?

The most rewarding aspect of my journey in poultry farming is that it is a field meant for passionate and hardworking individuals. The level of success achieved is directly related to the effort and dedication one puts in.

3. What motivates you most in this journey?

The greatest motivation in this journey is staying so involved with my work that there is little room for distractions or negative thoughts. This focus keeps me active and purposeful each day.

4. Why did you choose the poultry or livestock profession?

I chose this path because it offered a promising future with a relatively low initial investment, and it is closely linked to agriculture. With careful management and commitment, the rewards in this field can be substantial.

5. How does your organization differ from other major players in the industry?

Our organization differentiates itself by never compromising on process control and product quality. Each decision regarding expansion is made thoughtfully, and we prioritize moving forward methodically, always with an emphasis on quality and efficiency. I firmly believe that slow and steady wins the race.

6. Please tell us about your family.

Three out of my five brothers' families are actively engaged in poultry farming. Today, my nephew, Ravinder Singh Sandhu, and my son, Shahtaj Singh Sandhu, lead the organisation. I am truly satisfied to see them carrying forward the vision I set for our organization.

7. What do you believe will help your organization become a leader in the livestock industry?

Focusing on the quality of chicks, feed, and farm management, along with gradual expansion and the integration of automation and advanced technology, will enable our organization to achieve a leadership position in the livestock industry.

8. What is your dream for the next generation entering this business?

My dream is for the next generation to achieve even greater heights of success, building on the progress we have made through dedication to this business.

9. What is your favourite food?

Until the age of 60, I enjoyed chicken, fish, and goat meat, and occasionally shared a drink with friends in the evenings. However, after turning 60, my preferences changed. Now, I mostly eat home-grown organic vegetables, salads, fruits, and pulses, and have completely given up alcohol.

10. What are your hobbies?

I prioritize maintaining good health, waking up early, going to bed early, exercising regularly, reading and listening to Gurbani, meditating, spending time with loved ones, and enjoying a peaceful life.

11. Is there anything you would like to add?

If you wish to earn the goodwill and blessings of small farmers, always ensure the highest quality in chicks, feed, and other farm inputs. Quality must never be compromised.

Host by:
Dr. Ramesh Sikka
Founder Member
Anand Sikka Veterinarians Foundation (India)
+91 98909-63144 sikkaramesh44@gmail.com

Understanding the Gastro Intestinal Tract of the Chicken (Barrier functions and Structure's)

Dr. S.K. Maini

Gut health heavily depends on the maintenance of a delicate balance between the host, the intestinal microbiota, the intestinal environment, various stress, dietary nutrients and composition, presence of mycotoxins, anti nutrients and other antagonistic compounds. If this balance is disturbed, the birds suffer, their growth, health and performance are all compromised.

The gastro-intestinal tract of a bird is a highly specialised tube, that starts at the beak and ends in the cloaca. The primary function of the gastro-intestinal tract of the chicken is to digest and absorb the nutrients contained in the feed being fed, to meet the metabolic demands for maintenance, growth, development, production and reproduction, and forms a barrier to prevent the entry of pathogens (Bacteria, Virus's, Fungus, Protozoa etc), biotoxins (mycotoxins, tannins, anti-nutrients, incompatiable chemicals, medicines and drugs etc.), due to its barrier function, a state of desirable homeostasis exists, that is essential for the birds growth, immunity, health and performance .

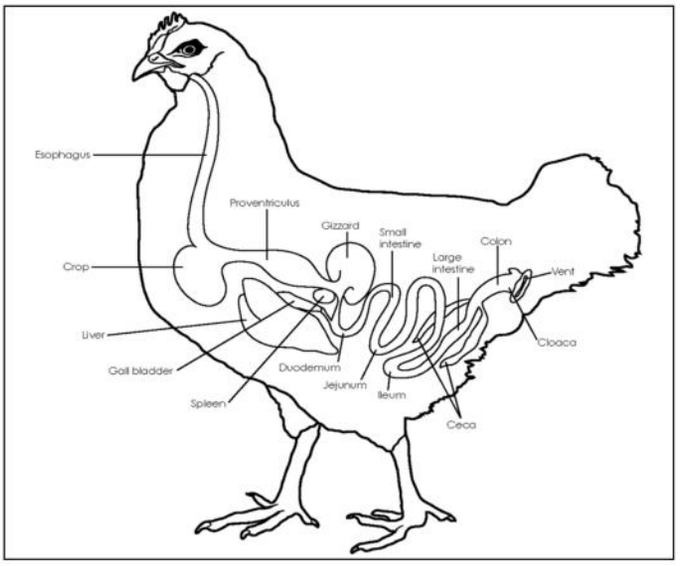
How the barrier function works:

Selective Permeability: Allows essential nutrients, water, and electrolytes to pass while restricting or stopping the harmful substances.

Physical & Chemical Defense: The mucus layer and antimicrobial peptides provide protection from harmfull micro-organisms.

Immune Surveillance: Local immune cells monitor and respond to various types of microbial threats, entering through the contaminated drinking water or feed.

The Gastro-intestinal tract of the chicken like other animals, normally harbours and maintains a variety of



microbiota consisting of bacteria, virus's, protozoa, fungi etc., which keep changing with the environment, season, weather conditions, various stresses, type of feed, its composition and the birds age, helping the digestion, absorption of nutrients and the immune functions of the birds and disease resistance, to ensure good overall performance.

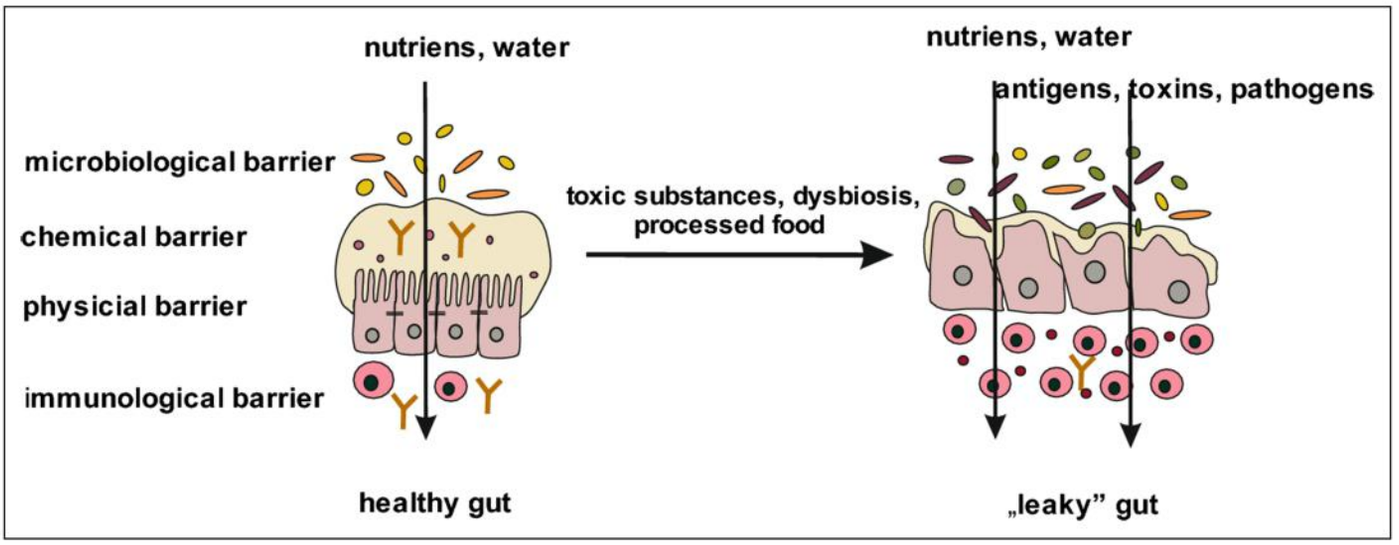
Factors Affecting/Damaging the Barrier Function:

Stress: Can activate the HPA axis, leading to barrier dysfunction.

Diet: Amino acids (like arginine, glutamine, threonine) and supplements (like Chlorella vulgaris) can support barrier integrity, while poor nutrition weakens it.

Infectious Agents: Pathogens (e.g., Salmonella) and toxins directly damage the barrier.

Microbiota Imbalance: Dysbiosis increases susceptibility to disease.



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This barrier function needs to be maintained in good working conditions at all the times, to ensure, there is no inflammation, physical damage, and the gut integrity is adequately maintained to ensure proper absorption of nutrients, their utilisation and metabolism for the birds requirements, to ensure performance as per its genetic potential.

The intestinal barrier consists of 4 layers: microbiological, chemical, physical and immunological. Under the influence of exogenous or endogenous factors, the intestinal barrier is damaged, leading to a phenomenon called "leaky gut".

The barrier function in the chicken intestine is a crucial defence system, acting as a selective filter using a single cell layer (epithelium) with tight junctions, mucus, and immune cells to absorb nutrients while blocking pathogens, toxins, and antigens from entering the bloodstream, with its integrity essential for health and performance, maintained by specialized cells and influenced by diet and microbiota.

Epithelial Cells: A single layer of cells forms the primary physical barrier, connected by junctions. Intercellular Junctions: Tight junctions (TJs), adherens junctions, and desmosomes seal the spaces between cells, controlling paracellular (between cells) transport of the required nutrients and preventing leakage of unwanted materials into the blood stream out of the intestinal lumen.

Mucus Layer: Secreted by goblet cells, this thick layer separates microbes from the epithelium, housing antimicrobial peptides and maintaining microbial balance.

Microbiota: A balanced gut flora contributes to barrier integrity and competes with pathogens.

Immune Cells: Located in the lamina propria, these cells provide immune defense against invaders.

Specialized Cells: Goblet cells (mucus), Paneth cells (antimicrobial), tuft cells, and enteroendocrine cells support barrier function and nutrient absorption.

A clear understanding of the Gastro Intestinal Tract of the chicken, the barrier system and its maintenance is vital for optimum bird health, growth, feed consumption, digestibility, efficiency etc., is a must, barrier system dysfunction leads to disease (like necrotic enteritis, coccidiosis), loss of production and poor over all performance..

Dr. S. K. Maini,

Consultant, Vesper Group, Bengaluru.

EVENT CALENDER

FEBRUARY 2026

10–13 FEBRUARY – 12TH KOLKATA INTERNATIONAL POULTRY FAIR

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MARCH 2026

10-12 MARCH – VICTAM ASIA

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APRIL 2026

VIV SELECT INDIA
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Web : www.india.viv.net

JUNE 2026

28-30 JUNE – MIDDLE EAST POULTRY EXPO

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JULY 2026

13-17 JULY – WORLD'S POULTRY CONGRESS

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AUGUST 2026

4-6 AUGUST – SIAVS

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हरित पैकेजिंग का नवयुग: पोल्ट्री उद्योग में पर्यावरण–अनुकूल क्रांति

डॉ. पवार ऋतिक नामदेव, डॉ. शिप्रा तिवारी[1], डॉ. महेन्द्र पटेल

1. परिचय

आज दुनिया जिस तेजी से आगे बढ़ रही है, उसी गति से पर्यावरण प्रदूषण और प्लास्टिक कचरा भी बढ़ रहा है। खाने–पीने की चीजों की पैकेजिंग में इस्तेमाल होने वाला प्लास्टिक न केवल पर्यावरण के लिए हानिकारक है, बल्कि हमारे स्वास्थ्य के लिए भी खतरा बन गया है। ऐसे में पोल्ट्री उद्योग, जो प्रोटीन उत्पादन और ग्रामीण विकास का एक बड़ा स्तंभ है, अब टिकाऊ (Sustainable) और पर्यावरण–अनुकूल (Eco & Friendly) पैकेजिंग की ओर कदम बढ़ा रहा है। यह बदलाव केवल उत्पाद की पैकिंग तक सीमित नहीं है, बल्कि यह "हरित सोच" (Green Mindset) की एक नई दिशा है।

2. पारंपरिक पैकेजिंग के खतरे

कई दशकों से पोल्ट्री उत्पादों की पैकेजिंग में पॉलीथीन (PE), पॉलीप्रोपाइलीन (PP), पॉलिस्टाइरीन (PS) जैसी प्लास्टिक का उपयोग होता आया है। ये सामग्री टिकाऊ तो हैं, परंतु प्रकृति में नष्ट नहीं होतीं। सैकड़ों वर्षों तक ये मिट्टी और समुद्र में बनी रहती हैं, जिससे माइक्रोप्लास्टिक जैसे विषैले कण बनते हैं जो पशुओं, पक्षियों और अंततः मानव शरीर तक पहुँच जाते हैं। इन प्लास्टिकों का निर्माण भी जीवाश्म ईंधनों से होता है, जिससे कार्बन उत्सर्जन और जलवायु परिवर्तन की समस्या बढ़ती है। अब दुनिया को चाहिए ऐसे पैकेजिंग समाधान जो प्रकृति के साथ तालमेल बैठाएँ, न कि उसे नुकसान पहुँचाएँ।

3. टिकाऊ और पर्यावरण–अनुकूल पैकेजिंग के नवीन विकल्प

1. जैव–अपघटनीय (Biodegradable) फिल्में

आज ऐसे कई पदार्थ विकसित किए जा चुके हैं जो उपयोग के बाद प्राकृतिक रूप से मिट्टी में मिल जाते हैं।

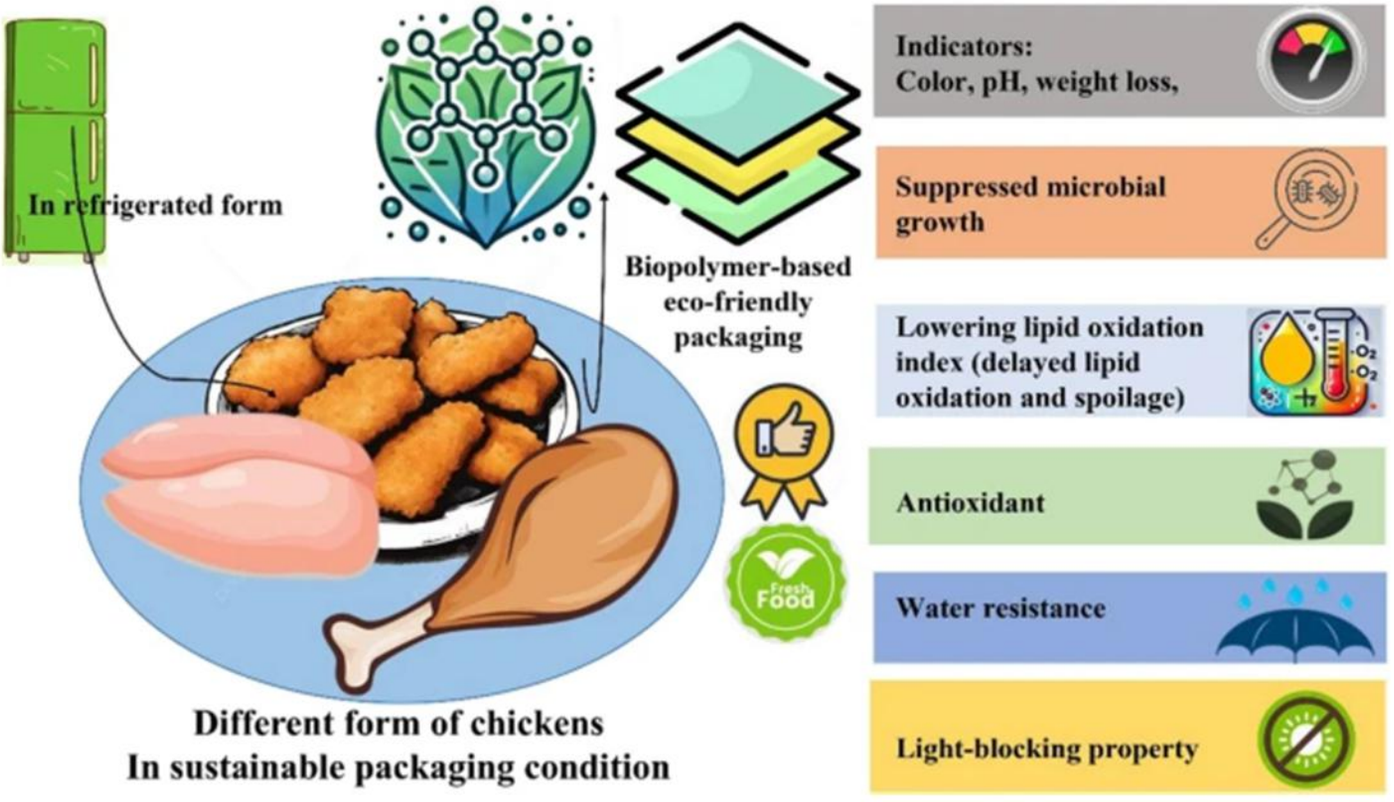
PLA (पॉलीलैक्टिक एसिड) और PHA (पॉलीहाइड्रॉक्सी अल्कानोएट) जैसी बायोप्लास्टिक मक्का, गन्ना या कसावा जैसी फसलों से बनाई जाती हैं। ये पूरी तरह कम्पोस्टेबल (Compostable) होती हैं और वातावरण को नुकसान नहीं पहुँचातीं। काइटोसैन (Chitosan) आधारित फिल्में तो खुद में एंटीबैक्टीरियल गुणों से भरपूर होती हैं, जो पोल्ट्री उत्पादों की ताजगी लंबे समय तक बनाए रखती हैं।

2. पेपर और पेपरबोर्ड पैकेजिंग

कागज आधारित पैकेजिंग फिर से लोकप्रिय हो रही है। आज की आधुनिक तकनीक से इसे नमी और तेल प्रतिरोधी बनाया जा सकता है।

ऐसे पैकेज न केवल रीसायकल होने योग्य हैं, बल्कि देखने में भी आकर्षक लगते हैं।

कई पोल्ट्री कंपनियाँ FSC प्रमाणित कागज का प्रयोग कर रही हैं, जो "सस्टेनेबल फॉरेस्ट मैनेजमेंट" का प्रतीक है।



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Dwipen Bhagawati
dwipen.b@anthembio.com
+91-8197298530

Bishwapriya Mukherjee
bishwapriya.m@anthembio.com
+91-9108648326

Satish Sharma
satish.s@anthembio.com

Visit Our Website
www.anthembio.com
+91- 8066724000

Anthem Biosciences Limited
#49, F1 & F2 Canara Bank Road, Bommasandra Industrial Area Phase-I, Hosur Road, Bangalore-560099, Karnataka, INDIA

3. पौधों से बने बायो–कॉम्पोजिट

धान की भूसी, गन्ने की बगास, गेहूँ का भूसा या जूट जैसे कृषि अपशिष्ट से बने बायो–कॉम्पोजिट आज नया विकल्प बन रहे हैं।

ये हल्के, टिकाऊ और पर्यावरण में घुलनशील होते हैं। इनसे बने ट्रे, बॉक्स या कार्टन पोल्ट्री उत्पादों के लिए बेहद उपयुक्त हैं।

इससे किसानों को अतिरिक्त आय और उद्योग को हरित विकल्प दोनों मिलते हैं।

4. खाने योग्य (म्कपइसम) पैकेजिंग

कल्पना कीजिए ऐसी पैकेजिंग जो प्रकृति में मिल जाए या खाई भी जा सके!

प्रोटीन, स्टार्च, जिलेटिन या एल्गिनेट से बनी खाने योग्य फिल्में यही कर रही हैं।

इनमें यदि नीम, लौंग या हल्दी जैसे प्राकृतिक तत्व मिलाए जाएँ, तो ये पैकिंग बैक्टीरिया से सुरक्षा देती हैं और शेल्फ लाइफ बढ़ाती हैं।

5. स्मार्ट और एक्टिव पैकेजिंग

आधुनिक पोल्ट्री पैकेजिंग अब तकनीकी रूप से भी स्मार्ट हो चुकी है।

- एक्टिव पैकेजिंग में प्राकृतिक तत्व शामिल किए जाते हैं जो खराबी को रोकते हैं।
- इंटेलिजेंट पैकेजिंग में फ्रेशनेस सेंसर या क्यूआर कोड होते हैं, जिनसे उपभोक्ता पैक खोलने से पहले ही जान सकते हैं कि उत्पाद कितना ताजा है।

ऐसी तकनीकें न केवल खाद्य सुरक्षा बढ़ाती हैं बल्कि खाद्य अपव्यय (Food Waste) भी कम करती हैं।

टिकाऊ पैकेजिंग के फायदे

- **पर्यावरण संरक्षणः** कम कार्बन उत्सर्जन और कम प्लास्टिक कचरा।
- **उपभोक्ता भरोसाः** लोग "ग्रीन लेबल" वाले उत्पादों को ज्यादा पसंद करते हैं।
- **बेहतर ब्रांड छविः** हरित सोच अब आधुनिक ब्रांड की पहचान है।
- **उत्पाद की ताजगीः** प्राकृतिक कोटिंग्स से मांस लंबे समय तक सुरक्षित रहता है।
- **पुनः प्रयोग और पुनर्चक्रणः** कचरे में भारी कमी आती है।

चुनौतियाँ और सीमाएँ

हालांकि यह दिशा सही है, लेकिन कुछ कठिनाइयाँ बनी हुई हैं –

- बायोप्लास्टिक की लागत पारंपरिक प्लास्टिक से अधिक है।
- कम्पोस्टिंग और रीसायकल की सुविधा अभी हर जगह उपलब्ध नहीं है।
- कुछ जैव–आधारित फिल्में नमी से जल्दी प्रभावित होती हैं।
- उपभोक्ताओं को अभी भी सही अपशिष्ट प्रबंधन की जानकारी नहीं है।

इन सबका समाधान सरकार, उद्योग और उपभोक्ता कृ तीनों की साझेदारी से ही संभव है।

दुनिया से प्रेरणा

- यूरोप में *Huhtamaki* और *Amcor* जैसी कंपनियाँ बायोपैकिंग को बड़े स्तर पर लागू कर रही हैं।
- भारत में स्टार्टअप्स गन्ने की बगास और मक्के के स्टार्च से बने ट्रे बना रहे हैं जो पूरी तरह कम्पोस्टेबल हैं।
- अमेरिका की *Tyson Foods* कंपनी ने 2030 तक 100% रीसायकल पैकेजिंग का लक्ष्य रखा है।
- जापान में समुद्री शैवाल से बायोप्लास्टिक बनाने पर अनुसंधान चल रहा है।

यह साफ है कि अब "हरित पैकेजिंग" केवल विकल्प नहीं बल्कि भविष्य की आवश्यकता बन चुकी है।

निष्कर्ष

हरित पैकेजिंग सिर्फ एक तकनीकी बदलाव नहीं, बल्कि एक सोच का परिवर्तन है।

जब पोल्ट्री उद्योग जैव–अपघटनीय, पुनर्चक्रण योग्य और स्मार्ट पैकेजिंग अपनाता है, तो वह न केवल अपने उत्पाद की गुणवत्ता बढ़ाता है, बल्कि आने वाली पीढ़ियों के लिए स्वच्छ और सुरक्षित पृथ्वी की नींव भी रखता है।यह बदलाव साबित करता है कि आर्थिक विकास और पर्यावरण संरक्षण एक साथ संभव हैं।

हर नई "ग्रीन पैक" के साथ पोल्ट्री उद्योग न सिर्फ बाजार में, बल्कि धरती के दिल में भी अपनी जगह बना रहा है।

आगे की राहः हरित भविष्य की उड़ान

भविष्य में पैकेजिंग केवल "एक बार इस्तेमाल" की चीज नहीं रहेगी।

नई तकनीकें कृ नैनो टेक्नोलॉजी, बायोपॉलिमर इंजीनियरिंग और एआई आधारित डिजाइन कृ ऐसी स्मार्ट पैकेजिंग लाएँगी जो खुद पर्यावरण का हिस्सा बन जाए।सरकारें यदि "ग्रीन सर्टिफिकेशन" और "टैक्स इंसेंटिव" जैसी नीतियाँ अपनाएँ, और उपभोक्ता भी पर्यावरण–अनुकूल विकल्प चुनें, तो आने वाला समय शून्य–कचरा (Zero Waste) पोल्ट्री उद्योग का होगा। आखिरकार –

"स्वच्छ पैकेजिंग, सुरक्षित भोजन और सतत भविष्य" यही है उस हरित क्रांति की असली पहचान जो पोल्ट्री उद्योग में नई उड़ान भर रही है।

डॉ. पवार ऋतिक नामदेव
(एम.वी.एस.सी. स्कॉलर),

डॉ. शिप्रा तिवारी[1]
(एम.वी.एस.सी. स्कॉलर),

डॉ. महेन्द्र पटेल
(पीएच.डी. स्कॉलर),
पशु उत्पाद प्रौद्योगिकी विभाग, पशु चिकित्सा विज्ञान एवं पशुपालन महाविद्यालय, दुवासु, मथुरा – 281001, भारत
rutikpawar2827@gmail-com

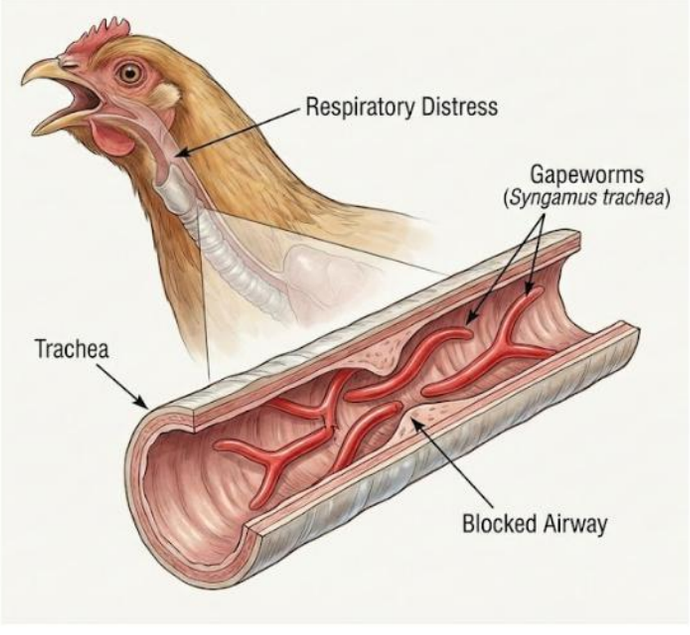
ARTICLE

Gapeworm infection in poultry their prevention and control

Alok Kumar Singh[1#], Deepali Tiwari[2]
Pradeep Kumar[3] and N. D. Hirani[4]

Gapeworms i.e. *Syngamus trachea* are classified within nematodes that affects the 'respiratory system' of birds as the adult worms reside in the trachea (or windpipe) and due to its lodgement, it often produces a gurgling sound or 'tracheal rattle' that may be confused with respiratory problems. Gapeworm is commonly found in poultry birds common in pheasants, but it also affects chickens, guinea fowl, and turkeys. The presence of gapeworms can result in considerable losses in pheasants and turkeys. The most notable sign of gapeworm infection is gasping in birds for air, often referred to as 'gaping'. Furthermore, head shaking and neck stretching are commonly observed for proper air passage. When birds are held, a gurgling sound can frequently be heard, which indicates a 'tracheal rattle'. The gasping for air associated with gapeworms is often misdiagnosed as another respiratory issue. In severe cases of infestation, suffocation may lead to death as gaseous exchange insufficiency occurs.

Gapeworm infestation can occur directly when birds consume eggs that have been either ingested or expelled by infected birds, or by consuming infected feed and water also indirectly through intermediate hosts such as earthworms or snails. Young birds, particularly those under 8 weeks of age, are particularly more susceptible to gapeworm. Gapeworms generally inhabit the trachea (windpipe) but may also be found in the bronchi and lungs. Typically, eggs are gathered from the ground or from intermediate hosts like earthworms or snails. The eggs hatch, allowing the larvae to penetrate the intestinal walls and migrate to the lungs and bronchi of young birds. It is at this point that they undergo a larval moult before moving up to the trachea. Once they arrive at this site, male and female gapeworms attach to one another these are y shape in together where male worm anchors female worm . This entire process takes about 7 days. When fully matured, they display a 'Y' shape and measure between 1 to 2 cm in length. Gapeworms release eggs that are either coughed up onto the ground or swallowed and later excreted in the faeces. The gapeworm, scientifically referred to as Syngamus trachea, is a parasitic nematode that resides in the trachea of both domestic and wild birds worldwide.



Life Cycle:

Chickens become infected with S. trachea by inadvertently consuming larvae that have contaminated the surrounding environment, feed, or water by faeces from an infected bird. Numerous wild bird species can harbour S. trachea, shedding the larvae in their droppings. Chickens may also become infected indirectly by ingesting earthworms, snails, or slugs that carry the infection. Regardless of the method of infection, once chickens ingest the larvae, these will migrate through the gastrointestinal tract until they reach the trachea, where they reproduce, lay eggs, feed on blood, and reside. The eggs may either be coughed up or swallowed by the chicken. If swallowed, they will be excreted with the faeces, further contaminating the environment with additional eggs for other flock members or even for the same bird to ingest, leading to an accumulation of more worms or the infection of others. The prepatent period lasts between 17 to 20 days.

Clinical Signs:

Affected chickens are frequently seen stretching their necks, opening their mouths, and gasping or gaping for air. This gaping occurs due to the presence of multiple worms in the trachea, resulting in a partial to complete obstruction of airflow. Without treatment, heavily infested birds often succumb to suffocation. Smaller chicken breeds, such as bantams and younger chickens, are more severely impacted by gapeworms. This is associated with the size of the chicken's trachea; when there is a larger space available for the worms to attach, they are less likely to cause a blockage that prevents the chicken from breathing and death. The signs are yawning, gurgling or respiratory distress, loss of appetite, and ultimately coughing and choking, along with head shaking, decreased feed intake, and an unthrifty appearance also observed. Affected areas include the trachea (windpipe), bronchi, and lungs.

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Transmission:

- It occurs through intermediate hosts such as earthworms or snails, as well as directly by birds that consume eggs that have been coughed up or excreted in faeces. Intermediate host present in environment ingest infected eggs and during feeding by birds it gets entered into GI tract of susceptible host causing infection.

Other names:

- Gapes, red worms, forked worms, Y worms, or gape Worm.

Diagnosis includes:

- History - it includes queries of general health of birds and presence of intermediate host and environmental analysis of sustainability of worm, feeding and watering pattern in farm and precautionary measure adapted for prevention.
- Clinical signs - gasping is common sign in birds which indicate respiratory distress, gurgling sound, respiratory rattle, head stretching etc is commonly observed.
- Physical examination - presence of worms and common sign of respiratory stress.
- Faecal flotation method (to detect eggs in faeces) of infected birds
- Identification of worms in the trachea during postmortem examination.

Treatment:

- Albendazole is administered orally to each bird, with a repeat dosage after 2 weeks.
- Safeguard 10% Liquid Dewormer, such as Fenbendazole, is used off-label in poultry. It should be introduced into the flock's drinking water at a dosage of 3 mL per gallon for a period of 3 days, with a repeat every 3 weeks.
- 1% Ivermectin Injectable is also applied off-label in poultry. This medication can be given orally to each chicken or mixed into the flock's water supply. For oral administration, the dosage is 0.25 mL for large chickens and 0.1 mL for bantams. If mixed in water, the dosage is 4 mL per gallon. Fresh preparation is required daily for 2 days.
- Pour-on Ivermectin (5 mg/mL) is utilized off-label in poultry. It is intended solely for external use and should not be administered internally to the birds. Apply it topically to each chicken using an eye dropper on the skin at the back of the neck. Bantams should receive 3 drops, standard-sized birds 4-5 drops, and large breeds 6 drops. This should be repeated in 2 weeks.
- Levamisole Soluble Drench Powder is also used off-label in poultry. It is added to the flock's water supply. It is crucial to note that severely weakened chickens should not receive this medication, as it may impair their ability to fight infections. Administer at a rate of 10 mL per gallon of water for only 1 day, with a repeat in 7 days, and again 7 days thereafter.

Prevention and control:

- Tilling the soil in the pens at the conclusion of the growing season aids in diminishing residual infections.
- Treating the soil to eradicate earthworms, snails, and slugs.
- Rotating the areas designated for poultry confinement.
- Implementing an effective worming strategy, rotating grazing areas, and avoiding contact with ground frequented by wild pheasants.
- The bird should be separated from turkeys who play a symptomless carrier for infection.
- Rearing under moist ground should be avoiding, regular removal of faeces and sanitation is essential.
- Isolation and segregation of newly introduced bird in the flock.
- Sick bird should be treated with suitable drugs and kept in another shed.
- Young birds should be separated from adult birds such as turkey to prevent cross contamination.
- Practice bio security measure by keeping poultry yard and farm clean, dry, prevent entry of wild birds and intermediate host to break lifecycle transmission.
- Avoid overcrowding in birds as respiratory transmission can cause large birds' mortality.
- Proper monitoring, bio security measure, sanitation and effective treatment is sufficient to control gapeworm infection in birds and minimal economic loss in farm.

Alok Kumar Singh[1#], Deepali Tiwari[2]
Pradeep Kumar[3]and N. D. Hirani[4]

[1]Department of Veterinary Parasitology, College of Veterinary Science & A.H., Rewa

[2]B.V. Sc & A.H., Student, College of Veterinary Science & A.H., Rewa

[3]Department of Veterinary Parasitology, DUVASU, Mathura

[4]Department of Veterinary Parasitology, COVSc &A. H., Kamdhenu University, Junagadh

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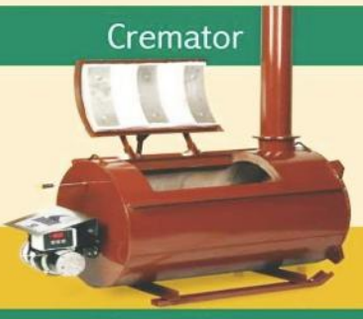

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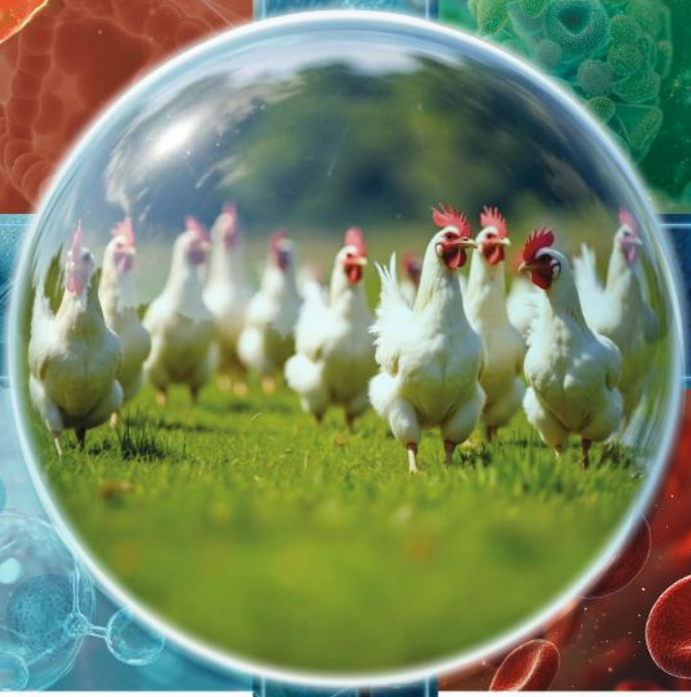

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ARTICLE

Novel Technologies in Poultry Health and Productivity

Prof. Dr. R.N.S. Gowda*

Introduction

In 2025, India's poultry industry is characterized by strong growth projections and a stable outlook, driven by rising income, urbanization, and a preference for protein-rich foods. The market is expected to see revenue growth of 8-10% in FY2025, supported by investments in value-added products and backward integration. Challenges remain, including managing feed prices and disease outbreaks, but the industry is poised for resilience and growth through technological advancements, sustainable practices, and potential export opportunities. The chicken business has a significant impact on the in supplying the quality animal protein at a cheaper rate. Chicken eggs and chicken meat are both helped along by the industry's commitment to quality control. The industry's players are worried about the health care of the birds because of the rising food safety concerns. The poultry sector is able to keep better tabs on the well-being of its chickens, thanks to recent technology breakthroughs. With the use of Internet of Things (IoT)-based wearable sensing devices like accelerometers and gyro devices, avian diseases and chicken health may now be diagnosed via video surveillance, voice observations, and feces inspections.

Novel technologies for treating diseases in poultry include advanced genetics, microbiome manipulation, new-generation vaccines, and innovative diagnostic tools. These approaches are moving the industry beyond traditional antibiotics to address pressing issues like antimicrobial resistance, emerging pathogens, and improved animal welfare.

Genetic editing for disease resistance

Gene-editing technologies like CRISPR/Cas9 allow for the development of genetically resistant poultry, a permanent and highly effective solution for preventing viral infections.

- **Avian Influenza resistance:** Scientists have used CRISPR to alter the ANP32A protein in chickens, a crucial host factor for the avian influenza virus (AIV). Edited chickens show significant resistance to infection and limited viral spread.
- **Avian Leukosis Virus (ALV) resistance:** The NHE1 gene, which serves as a receptor for ALV subgroup J, can be precisely edited using CRISPR to make chickens resistant to the virus.
- **New vaccine development:** CRISPR is also used to engineer multivalent recombinant vaccines, which can protect against several different diseases at once.

Technological Advancements:

The industry is adopting advanced breeding techniques, automated feeding systems, and climate control in environmentally controlled (EC) sheds to improve efficiency and reduce mortality.

Latest poultry technologies focus on Artificial Intelligence (AI) for monitoring and prediction, automation and robotics for tasks like feeding and waste removal, Internet of Things (IoT) sensors for real-time data on environment and health, and blockchain for supply chain transparency and safety. Other advancements include gene editing to eliminate male chick culling, precision feeding systems, advanced waste management, and sustainable energy solutions to reduce environmental impact. Biosensors and wearable sensors are emerging as essential tools for detecting poultry diseases like avian influenza, Newcastle disease (ND), and infectious bronchitis.

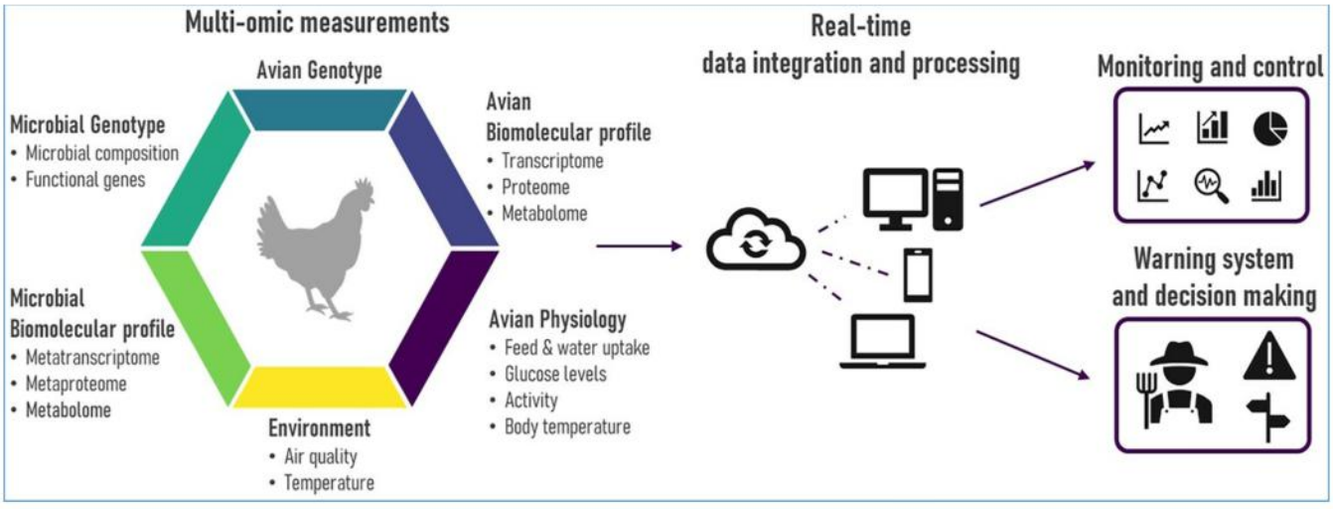

Fig:1. Overview of future integration of multi-omics measurements in precision livestock farming (PLF) technologies. (Source: Goossens, E., Dehau, T., Ducatelle, R., & Van Immerseel, F. (2022). Omics technologies in poultry health and productivity - part 2: future applications in the poultry industry. Avian Pathology, 51(5), 418-423. https://doi.org/10.1080/03079457.2022.2085545)

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Omics technologies, including genomics, **transcriptomics, proteomics, and metabolomics**, offer comprehensive molecular insights into poultry health and disease by studying entire sets of DNA, RNA, proteins, and metabolites (fig.1).

1. **Microbiome manipulation**: Targeting the gut microbiome is a key strategy for enhancing immunity and preventing infections, particularly as an alternative to antibiotics. Microbiome manipulations are a promising approach for poultry disease diagnosis by using the microbiota's response to disease as an indicator of infection and to predict outbreaks. By analyzing changes in the microbiome, researchers can identify a"dysbiotic state" (a perturbed microbial community) associated with specific diseases. Novel diagnostic tools are being developed to map the microbiome, enabling rapid and comprehensive data acquisition to assess health risks, sanitation, and the efficacy of treatments.

- **Probiotics and prebiotics:** The administration of beneficial microorganisms (probiotics) and their food sources (prebiotics) can improve the competitive exclusion of pathogens like *Salmonella* and *Clostridium perfringens*. This promotes a healthier gut, better nutrient absorption, and stronger immune response.
- **Synbiotics and postbiotics:** Research is also exploring synbiotics (combinations of probiotics and prebiotics) and postbiotics (non-viable microbial cells or their components), which offer similar health benefits without the viability challenges of live cultures.
- **Phage therapy:** Phages, which are viruses that kill bacteria, offer a targeted and natural alternative to antibiotics for treating bacterial infections.
- **Targeted approach:** Because phages are highly specific to their bacterial hosts, they can eliminate pathogens like *Salmonella*, *Campylobacter*, and *E. coli* while preserving the bird's beneficial gut flora.
- **Combinatorial treatments:** Phage therapy can be delivered as a "cocktail" of different phages to prevent bacteria from developing resistance. It can be administered orally, through sprays, or as a feed additive.
- **Improved food safety:** Phages can also be used as a biocontrol agent on farms and in processing plants to reduce contamination of poultry products.

New-generation vaccines

Advances in vaccine technology offer more potent, stable, and convenient solutions for controlling infectious diseases.

- **Vector vaccines:** These "Trojan horse" vaccines use a harmless virus (the vector) to deliver protective genes from a pathogen, stimulating a strong and safe immune response. Examples include trivalent vaccines that protect against Marek's, infectious bursal, and Newcastle diseases in a single shot.
- **DNA and mRNA vaccines:** These nucleic acid-based vaccines instruct the bird's cells to produce specific antigens, triggering an immune response. They are quicker to produce than conventional vaccines, and mRNA versions are particularly high-potency.
- **Nanostructures in vaccines:** Nanoparticles are being explored as delivery systems to ensure the controlled release of antigens and enhance the immune response, offering improved efficacy and longer-lasting protection.

Precision poultry farming

Precision farming technologies enable real-time health monitoring and early disease detection, allowing for rapid intervention.

- **Biosensors and wearable sensors:** Biosensors provide accurate diagnostic information about specific pathogens, while wearable sensors can track physiological and behavioral changes—such as body temperature and movement—to alert farmers to potential infections like avian influenza.
- **Vocalization analysis:** Artificial intelligence (AI) can analyze flock vocalizations to detect subtle changes indicating respiratory infections like Newcastle disease or infectious bronchitis.

Conclusion

Novel technologies for poultry disease treatment include targeted therapies like bacteriophage therapy for bacterial infections, advanced **vaccine technologies** using recombinant DNA for broader protection, and **biosensor systems** for rapid diagnostic and early disease detection. Artificial intelligence and IoT sensors offer real-time monitoring for early detection, while **natural compounds** such as botanicals and essential oils are being explored as alternatives to synthetic drugs. Nanoparticles and microencapsulation are also used to improve the stability and delivery of these therapeutic agents.

Prof. Dr. R.N.S. Gowda*

(Author Acknowledges the Google support) *Former and Founder VC, KVAFSU, Bidar, Former Director IAH^VB, Bangalore, Former Prof &HOD. Dept. of Pathology. Veterinary College UAS, Bangalore.

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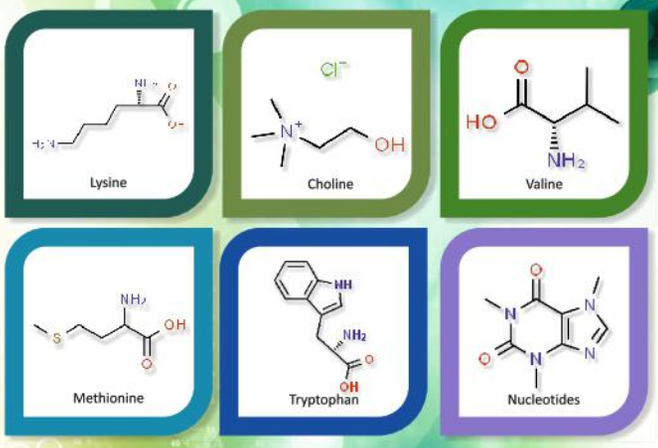

To achieve high efficiency poultry farming, a finely balanced feed formula with high bioavailability of feed nutritional fractions especially of critical ingredients including limiting amino acids, trace minerals etc., are required. To attain this balance, supplementation becomes extremely crucial to attain maximum bird performance and productivity.

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ARTICLE

Farming Challenges and their required Corrections

Dr. S.K.Maini
Consultant, Vesper Group, Bengaluru

Chicks always arrive stressed on the farms, as a result of unchangeable post hatch handling procedures and practices, variable weather conditions, transportation from hatchery to the farms, and in adequate brooding conditions on arrival at the farms.

All the above mentioned significantly affect the chicks growth, development, immunity, health, survival and overall performance.

What prevails in the poultry industry is the poor knowledge, understanding, wrong beliefs, in adequate facilities available, faulty practices and procedures being followed since decades and mis-information related to the correlations of every aspect or condition involved with the brooding of the chicks and growing them to adulthood for optimum levels of production and overall performance.

Some of the practices and procedures that need improvements or change are listed below:

Pre-Brooding Preparation's and Arrangements:

Shed Preparation: Mostly done 5 to 10 days before the chicks arrive, it should be done immediately after the previous batch is removed, most farmers keep un cleaned shed for several days, cleaned shed after litter removal, and application of proper hygiene and sanitation procedures, should be kept vacant till the next batch of chicks arrival date is confirmed.

After spreading the new Litter Material (Paddy Husk /Saw Wood/Wood Shavings/ Ground Nut Hulls/Coconut Coir Powder or any material used depending upon local availability) should be sprayed at least two times before the chicks arrive. One Spray should be an insecticide to take care of the Pests, the other be Formalin to take care of the bacteria, fungus and Virus's.

Avoid using Lime Powder as it contributes to the dustiness, harmful for the respiratory tract health. However white washing the walls and floor is not a bad idea. Lime powder can be used under the leaking drinkers and on wet patches only. Avoiding spillage and wet patches is the best situation, Wet litter due to birds health and nutrition needs to be promptly looked into and corrected.

Ventilation and Curtains: Fresh air is very essential, but maintaining the temperature is equally important. Fix the curtains, to both the side of the shed, during winters and very cold weather, for heat conservation, have a curtain cloth/tarpaulin sheet/plastic sheet or some insulation material below the shed roof. The side curtains should be lift able from below, as fresh air is required just 4 to 10 inches above the litter where the birds breath, this is the area where the Ammonia, Co2 and other gases produced by the wet litter accumulate and cause damage to the Chicks respiratory system leading to stressful conditions, that usually gets complicated with E. coli and other bacteria leading to Respiratory Infections.

Temperature for brooding: the chicks require 90° F during their first week of life, this temperature is reduced by 5° F every week, till the feathers grow and chicks can handle the lower temperatures. Farmers normally maintain the day temperatures very well, the problem is during night time, when outside temperature falls, less labourer's are available to work, and the labourer's take care of themselves more than the chicks.

Feed: Pre Starter Crumble's for the broilers and the Chick Starter Crumble's for the layer chicks are used, first on the brooder floor , then in the feeders. It is essential to provide the required quantity of feed and record the daily feed consumed of the birds, to analyse weight gain related problems later.

Fresh clean sanitised water: Clean cool and sanitised water be provided at all the times, use of bleaching powder, tablets or liquid chlorine, hydrogen peroxide, iodophores or commercial water sanitizers may be used to keep the bacterial loads low and the chicks free from infections.

It has become a normal practice in the poultry industry, farmers use antibiotics in drinking water, during the first week of the chicks life, even without the Veterinarians/Poultry Advisor's recommending it, assuming it to be used for the prevention, control and spread of bacterial infections. Chicks are hatched (99%) disease free, they need products containing Probiotic Bacteria to colonize their gut for its better development, fitness and health, and to keep the population of the pathogenic bacteria under check.

Over Crowding: Should be avoided at all cost, as it increases competition for floor space, feeding and watering space and give rise to several vices, difficult to control later, it has direct effect on the growth, weight gain, immunity development and survivability of the chicks.

Bird weighing and Recording of their body weights: Body weights must be taken and recorded every 2 weeks, from day old till peak production. Mark the birds or the cages, same birds have to be weighed every time for accuracy, weigh at least 25 to 30 birds, take the average, compare it with the standard body weight chart provided by the chicks supplier, and take appropriate corrective action at the earliest.

Vaccines and the vaccination programs: Several types and varieties of poultry vaccines (live and killed, single and in combination) are available in the market from both international and indigenous vaccine manufacturer's. No vaccine can give the desirable results, if the immune system of the birds is compromised, as a result of inadequate nutrition, immune-suppression due to presence of mycotoxins and endotoxins, faulty management, and poor hygiene and sanitation.

Equally important is the proper use of the vaccines as per the manufacturer's recommendations or the Veterinarians advise. The birds should have standard body weights, active, fit and fine immune system, be free from any sub clinical or clinical diseases, and the vaccination program be adjusted as per the existing disease known to exist in the area.

Guess Work and Blame Game is very common: Without improving their knowledge and understanding of the practices and procedures, or learning from their past experience, batch after batch, farmers, their supervisor's and workers make the same of similar mistakes, keep losing money on medicines, loosing birds and the farms profitability.

Hatchery's are often blamed for supplying poor quality chicks with mycoplasma and E. coli etc., feed is blamed for its quality and not supporting the required weight gains. Pharma products are blamed for not protecting the birds from diseases, problems and their complications. The Vaccines are blamed for failure to protect the birds and not providing sufficient immunity to prevent outbreaks. Veterinarians and poultry advisors are blamed for not being able to solve the problems of the flock, and the farmers are blamed for their faulty management, self and /or over medication, inadequate facilities, poor hygiene and sanitation.

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Evaluation of FineX 3060 supplementation on Immune modulation, Tissue distribution and pharmacokinetics

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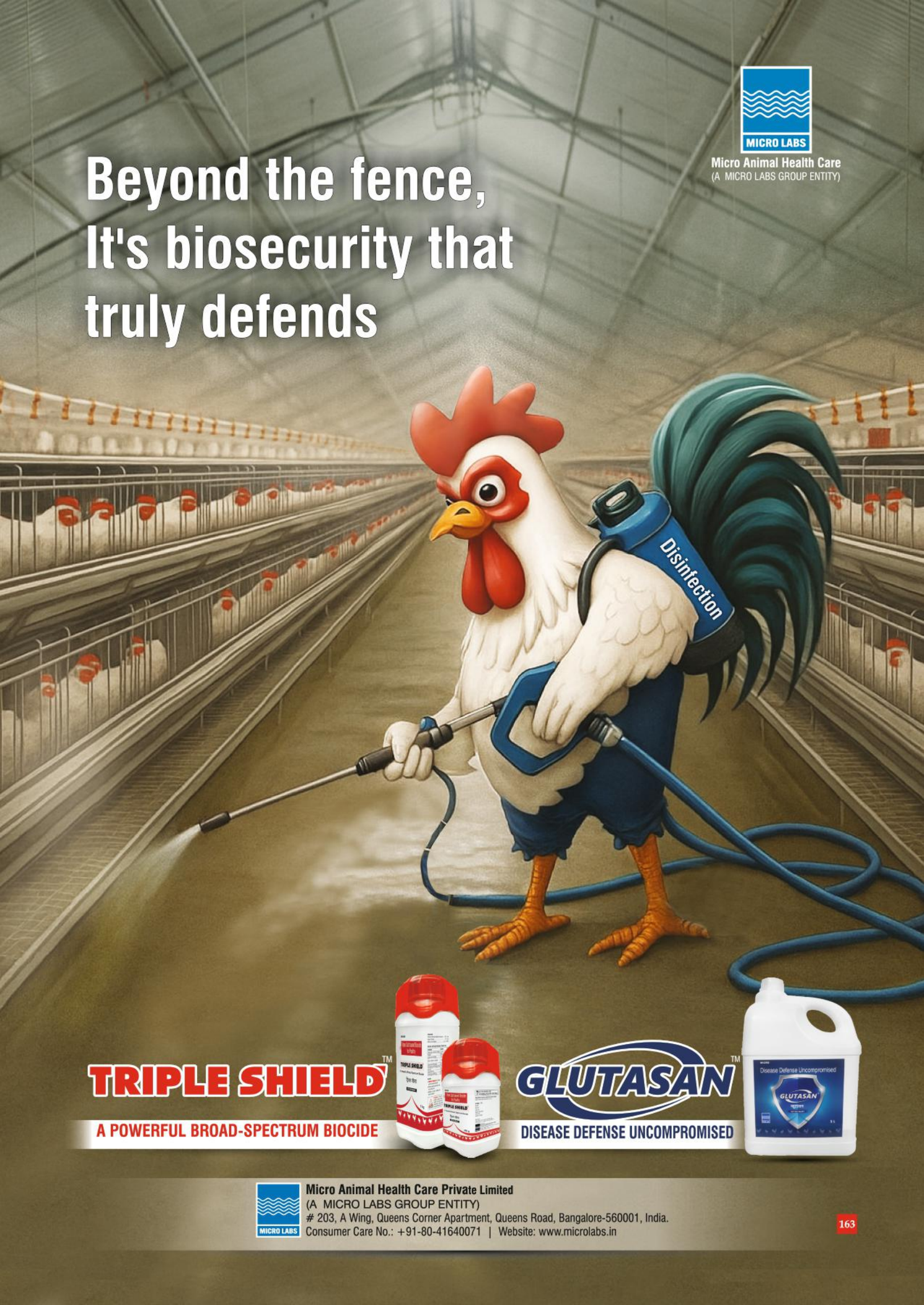
Introduction

The global poultry industry continues to face substantial challenges related to disease control, antibiotic resistance, and food safety concerns. The extensive use of antibiotic growth promoters (AGPs) in commercial poultry production has led to regulatory restrictions in many countries, necessitating the development of alternative strategies to maintain productivity while ensuring animal health and welfare [1]. Among the various alternatives being investigated, medium-chain fatty acids (MCFAs) have garnered considerable attention due to their multifaceted biological activities, including antimicrobial, immunomodulatory, and metabolic effects [2][3].

Lauric acid (C12:0), a saturated MCFA predominantly found in coconut oil and palm kernel oil, has demonstrated potent antimicrobial properties against various bacterial and viral pathogens [4]. The antimicrobial mechanism of lauric acid involves disruption of lipid membranes of enveloped viruses and gram-positive bacteria, making it particularly effective against common poultry pathogens [5]. Beyond its direct antimicrobial effects, lauric acid has been shown to modulate host immune responses, influence gut microbiota composition, and enhance nutrient metabolism in poultry [6][7].

The avian immune system comprises both innate and adaptive components, with B and T lymphocytes playing critical roles in humoral and cell-mediated immunity respectively [8]. B lymphocytes, characterized by the Bu1+ surface marker in chickens, develop primarily in the bursa of Fabricius and are responsible for antibody production [36]. T helper cells (CD4+) orchestrate immune responses by regulating both cellular and humoral immunity through cytokine production and direct cell-cell interactions [10]. Previous studies have demonstrated that dietary interventions can significantly influence lymphocyte populations and functional immune responses in broiler chickens [11][12].

Recent investigations have revealed that lauric acid supplementation can enhance growth performance, modulate serum metabolome, and alter gut microbiota composition in broilers [6]. Furthermore, lauric acid has been shown to improve intestinal morphology, reduce inflammatory responses, and enhance antioxidant capacity under challenge conditions [14][15]. However, comprehensive dose-response relationships and tissue distribution patterns of lauric acid in broiler chickens remain insufficiently characterized. Understanding the pharmacokinetics and tissue-specific accumulation of lauric acid is essential for optimizing supplementation strategies and elucidating mechanisms of action.



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The respiratory tract represents a critical target tissue for disease prevention in poultry, as respiratory pathogens cause substantial economic losses in commercial production [16]. The potential for lauric acid to accumulate in respiratory tissues and exert local antimicrobial and immunomodulatory effects has not been extensively investigated. Additionally, the dose-dependent effects of lauric acid on specific immune cell populations require detailed characterization to establish optimal supplementation levels for practical application.

This study was designed to evaluate the dose-dependent effects of dietary lauric acid supplementation on immune cell profiles, plasma pharmacokinetics, and tissue distribution in broiler chickens. Specific objectives included: (1) quantification of B and T lymphocyte populations using flow cytometry; (2) characterization of plasma lauric acid concentrations over time following dietary supplementation; and (3) determination of lauric acid accumulation in respiratory tissues. The findings from this investigation provide critical insights into the immunomodulatory mechanisms of lauric acid and establish evidence-based recommendations for its application in commercial broiler production.

Materials and Methods

Experimental Design and Animal Management

The experimental protocol was designed to evaluate dose-response relationships of dietary lauric acid supplementation in broiler chickens. Five experimental groups were established with appropriate sample sizes for statistical analysis. Group 1 (G1) served as the control group receiving standard commercial broiler diet without lauric acid supplementation. Treatment groups received the basal diet supplemented with lauric acid at four different concentrations: Group 2 (G2) at 375 g/MT, Group 3 (G3) at 500 g/MT, Group 4 (G4) at 750 g/MT, and Group 5 (G5) at 1000 g/MT feed.

All experimental procedures were conducted in accordance with standard guidelines for the care and use of agricultural animals in research. Birds were housed in conventional open pen sytem with ad libitum access to feed and water throughout the experimental period. Temperature, humidity, and lighting conditions were maintained according to commercial broiler production standards to ensure optimal growth and welfare.

Dietary Supplementation

The test compound, designated as FineX 3060, containing lauric acid as the active ingredient, was incorporated into the basal diet at the specified concentrations. The basal diet was formulated to meet or exceed the nutritional requirements for broiler chickens as recommended by standard poultry nutrition guidelines. Feed was manufactured using standard mixing procedures to ensure homogeneous distribution of the lauric acid supplement throughout the diet. Dietary treatments were maintained consistently throughout the experimental period.

Flow Cytometric Analysis of Lymphocyte Populations

Peripheral blood samples were collected for immunophenotyping of B and T lymphocyte subsets. Blood samples were processed for flow cytometric analysis using standard protocols for avian lymphocyte identification. B lymphocytes were identified using anti-Bu1 monoclonal antibody conjugated to appropriate fluorochrome, as Bu1 is a well-established surface marker for chicken B cells [17]. T helper cells were identified using anti-CD4 monoclonal antibody, which specifically recognizes the CD4 surface marker on helper T lymphocytes in chickens [18].

Flow cytometric acquisition was performed using a calibrated flow cytometer with appropriate optical configuration for multi-parameter analysis. Forward scatter (FSC) and side scatter (SSC) parameters were used to identify lymphocyte populations based on size and granularity characteristics. A minimum of 10,000 events were acquired per sample to ensure statistical reliability. Data analysis was performed using specialized flow cytometry software, with gating strategies designed to exclude debris, doublets, and non-lymphocyte populations. Results were expressed as percentage of positive cells within the lymphocyte gate.

Pharmacokinetic Analysis

Blood samples were collected at predetermined time points to characterize the pharmacokinetic profile of lauric acid following dietary supplementation. Sampling time points were established at 0, 0.5, 1, 2, 4, 8, 12, 24, 36, and 48 hours to capture both the absorption phase and steady-state concentrations. Plasma was separated by centrifugation and stored at appropriate temperature until analysis.

Lauric acid concentrations in plasma were quantified using validated analytical methodology. Sample preparation involved lipid extraction followed by derivatization procedures suitable for chromatographic analysis. Quantification was performed using gas chromatography-mass spectrometry (GC-MS) or liquid chromatography-tandem mass spectrometry (LC-MS/MS) with appropriate internal standards for accurate measurement. Calibration standards and quality control samples were included in each analytical batch to ensure accuracy and precision of measurements.

Tissue Distribution Analysis

At the terminal sampling point, birds were humanely euthanized, and tissue samples were collected for lauric acid distribution analysis. Lung and trachea tissues were collected, weighed, and processed for lauric acid quantification. Three animals per group (designated A1, A2, and A3) were utilized for tissue distribution studies to provide biological replication.

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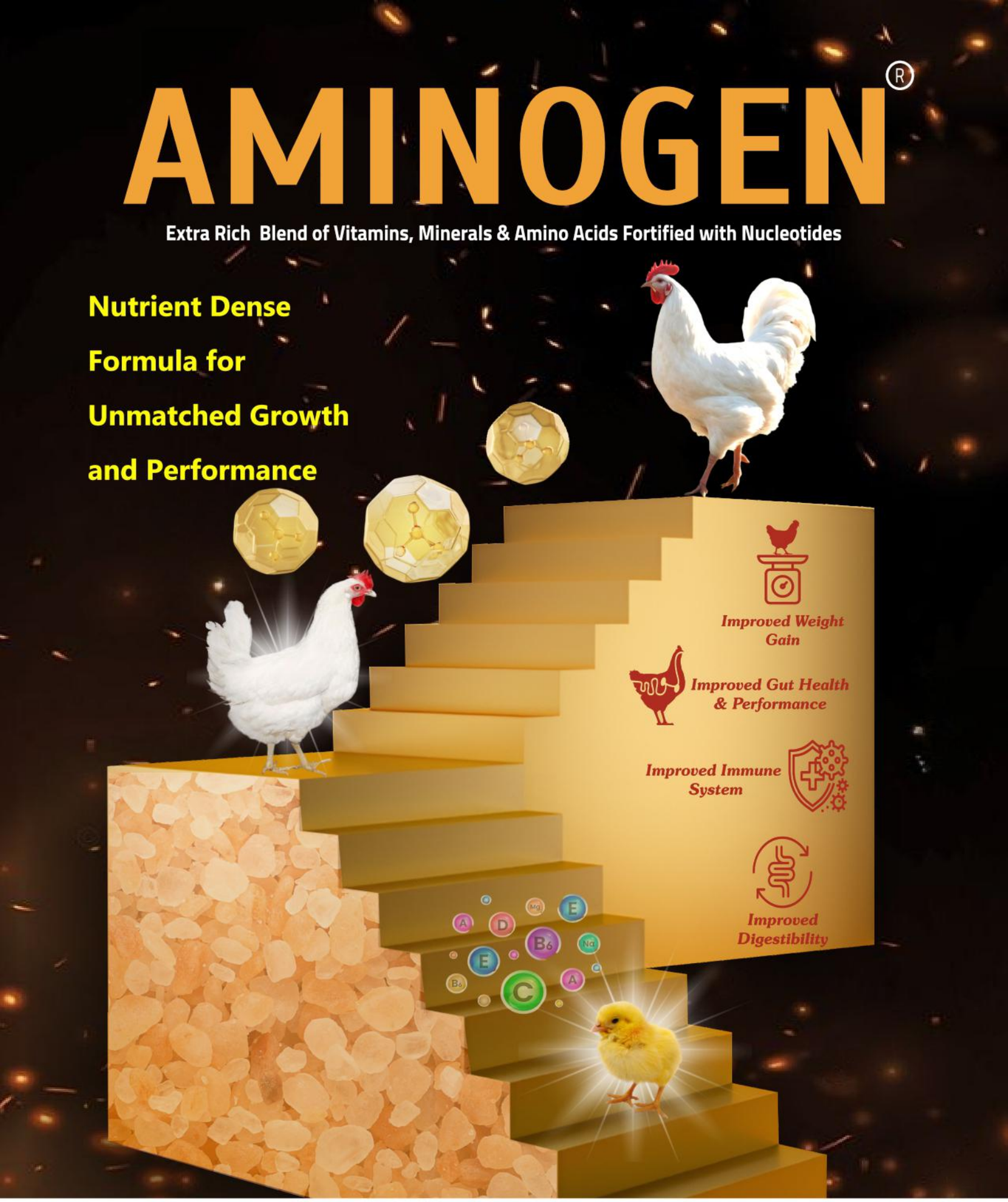

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Tissue samples were homogenized using appropriate mechanical disruption methods, followed by lipid extraction procedures optimized for fatty acid recovery. Lauric acid concentrations in tissue homogenates were quantified using the same analytical methodology employed for plasma samples, with appropriate matrix-matched calibration standards. Results were expressed as micrograms of lauric acid per milliliter of tissue homogenate (µg/ml). Tissue concentrations were compared across treatment groups to assess dose-dependent accumulation patterns.

Statistical Analysis

All data were subjected to appropriate statistical analysis to determine treatment effects and dose-response relationships. Descriptive statistics including mean and standard deviation (SD) were calculated for all measured parameters. Flow cytometry data for B and T lymphocyte populations were analyzed separately for each cell type. Pharmacokinetic data were evaluated at each time point, and area under the curve (AUC) calculations were performed to assess overall systemic exposure.

For tissue distribution data, individual animal values were recorded, and group means with standard deviations were calculated. The limit of detection for lauric acid in control group samples was established, with concentrations below detection limits designated as "ND" (not detected). Statistical comparisons between treatment groups were performed, with significance established at appropriate probability levels. All statistical analyses were conducted using Graphpad prism 5.0.

Results

Effects on B Lymphocyte Populations

Flow cytometric analysis of peripheral blood B lymphocytes revealed substantial dose-dependent effects of dietary lauric acid supplementation (Table 1). The control group (G1) receiving standard diet exhibited a baseline B cell percentage of 20.73 ± 0.52%. Supplementation with lauric acid at 375 g/MT (G2) resulted in an increase to 23.76 ± 0.77%, representing a 14.6% enhancement compared to control.

Group	B cells % (Bu1+)	Th cells % (CD4+)
G1-Standard diet	20.73 ± 0.52	51.54 ± 1.70
G2-FineX 3060 (375 g/MT)	23.76 ± 0.77	49.52 ± 0.74
G3-FineX 3060 (500 g/MT)	25.80 ± 0.42	48.89 ± 1.00
G4-FineX 3060 (750 g/MT)	28.82 ± 1.03	46.05 ± 0.80
G5-FineX 3060 (1000 g/MT)	23.10 ± 0.50	49.45 ± 1.27

Table 1: Flow cytometric analysis of B and T lymphocyte populations in peripheral blood. Values represent mean ± SD.

Progressive increases in B cell percentages were observed with increasing lauric acid concentrations. The 500 g/MT group (G3) demonstrated 25.80 ± 0.42% B cells, while the 750 g/MT group (G4) exhibited the maximum B cell percentage at 28.82 ± 1.03%, representing a 39.0% increase relative to control. Interestingly, the highest supplementation level of 1000 g/MT (G5) showed a reduction in B cell percentage to 23.10 ± 0.50%, suggesting a potential plateau or optimal dose effect at intermediate concentrations. The standard deviation values indicated consistent measurements within groups, supporting the reliability of the observed dose-response pattern.

Effects on T Helper Lymphocyte Populations

T helper cell (CD4+) populations exhibited a different response pattern compared to B lymphocytes (Table 1). The control group demonstrated a CD4+ cell percentage of 51.54 ± 1.70%. All lauric acid supplementation groups showed numerical reductions in CD4+ percentages relative to control, though the biological significance of these modest changes requires careful interpretation.

The 375 g/MT group (G2) showed 49.52 ± 0.74% CD4+ cells, while the 500 g/MT group (G3) exhibited 48.89 ± 1.00%. The 750 g/MT group (G4) demonstrated the lowest CD4+ percentage at 46.05 ± 0.80%, representing a 10.7% reduction compared to control. The highest dose group (G5) showed 49.45 ± 1.27% CD4+ cells. The inverse relationship between B and T helper cell percentages suggests potential compensatory mechanisms in lymphocyte homeostasis, as total lymphocyte populations maintain relatively constant proportions within the circulation.

Plasma Pharmacokinetics of Lauric Acid

Plasma lauric acid concentrations demonstrated clear dose-dependent patterns across all treatment groups and time points (Table 2). The control group (G1) exhibited baseline lauric acid concentrations ranging from 1.31 ± 0.10 µg/ml at time zero to 2.59 ± 0.35 µg/ml at 1 hour, likely representing endogenous lauric acid from standard dietary lipids and metabolic processes.

Time (h)	G1	G2	G3	G4	G5
0.00	1.31 ± 0.10	10.54 ± 0.26	15.45 ± 1.56	20.62 ± 0.65	28.57 ± 2.11
0.50	2.29 ± 0.21	11.50 ± 1.73	15.67 ± 0.30	22.15 ± 2.47	37.27 ± 2.04
1.00	2.59 ± 0.35	12.41 ± 2.01	17.03 ± 0.94	25.54 ± 0.65	46.10 ± 1.81
2.00	2.21 ± 0.51	11.03 ± 0.79	15.14 ± 0.97	24.02 ± 1.72	35.10 ± 3.50
4.00	1.94 ± 0.52	12.64 ± 1.04	17.27 ± 3.43	23.25 ± 1.29	37.22 ± 1.99
8.00	1.89 ± 0.30	10.85 ± 1.79	16.91 ± 1.13	19.29 ± 2.07	33.21 ± 3.01
12.00	2.03 ± 0.39	10.04 ± 0.83	18.04 ± 0.38	21.80 ± 1.55	38.52 ± 2.18
24.00	2.02 ± 0.18	10.54 ± 1.22	19.25 ± 0.48	19.90 ± 1.50	41.75 ± 1.15
36.00	2.16 ± 0.13	12.08 ± 0.86	15.29 ± 1.17	20.46 ± 3.45	36.32 ± 1.20
48.00	1.88 ± 0.16	12.21 ± 1.19	18.01 ± 0.67	21.73 ± 1.21	35.93 ± 3.47

Table 2: Plasma concentrations of lauric acid (µg/ml) over 48 hours following dietary supplementation. Values represent mean ± SD. G1 = control; G2 = 375 g/MT; G3 = 500 g/MT; G4 = 750 g/MT; G5 = 1000 g/MT.

The 375 g/MT supplementation group (G2) demonstrated substantially elevated plasma concentrations, with initial levels of 10.54 ± 0.26 µg/ml at baseline, representing an 8-fold increase compared to control. Plasma concentrations in G2 remained relatively stable throughout the 48-hour sampling period, ranging from 10.04 ± 0.83 to 12.64 ± 1.04 µg/ml, indicating sustained systemic exposure following continuous dietary supplementation.

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The 500 g/MT group (G3) exhibited baseline concentrations of 15.45 ± 1.56 µg/ml, with peak concentrations reaching 19.25 ± 0.48 µg/ml at 24 hours. The 750 g/MT group (G4) showed initial concentrations of 20.62 ± 0.65 µg/ml, with maximum levels of 25.54 ± 0.65 µg/ml observed at 1-hour post-sampling initiation. The highest supplementation level of 1000 g/MT (G5) produced the most substantial plasma concentrations, with baseline values of 28.57 ± 2.11 µg/ml and peak concentrations of 46.10 ± 1.81 µg/ml at 1 hour.

The sustained plasma concentrations observed across all timepoints reflect the continuous nature of dietary supplementation, where lauric acid intake occurs throughout the day rather than as a single bolus dose. The relatively stable concentrations over 48 hours suggest achievement of steady-state kinetics under continuous feeding conditions. The dose-proportional increases in plasma concentrations indicate predictable pharmacokinetic behavior across the tested dose range.

Tissue Distribution in Respiratory Organs

Analysis of lauric acid distribution in lung and tracheal tissues revealed dose-dependent accumulation patterns with substantial tissue-specific concentrations (Table 3). In the control group (G1), lauric acid was not detected (ND) in either lung or tracheal tissue samples, indicating that tissue concentrations from endogenous sources were below the analytical detection limit.

Tissue	Animal	G1	G2	G3	G4	G5
Lung	A1	ND	2.45	4.82	5.27	9.04
	A2	ND	3.35	4.25	5.98	9.16
	A3	ND	3.99	3.60	7.63	8.75
	Mean ± SD	-	3.26 ± 0.77	4.22 ± 0.61	6.29 ± 1.21	8.98 ± 0.21
Trachea	A1	ND	1.54	3.08	5.02	6.66
	A2	ND	1.85	3.95	5.55	6.53
	A3	ND	1.93	4.00	6.12	6.17
	Mean ± SD	-	1.77 ± 0.21	3.68 ± 0.52	5.56 ± 0.55	6.45 ± 0.25

Table 3: Tissue distribution of lauric acid (µg/ml) in lungs and trachea. Individual bird values (A1, A2, A3) and group means ± SD are presented. ND = not detected.

In lung tissue, the 375 g/MT group (G2) showed mean concentrations of 3.26 ± 0.77 µg/ml, with individual animal values ranging from 2.45 to 3.99 µg/ml. The 500 g/MT group (G3) exhibited lung concentrations of 4.22 ± 0.61 µg/ml, representing a 29.4% increase compared to G2. Progressive dose-dependent increases were observed, with G4 (750 g/MT) achieving 6.29 ± 1.21 µg/ml and G5 (1000 g/MT) reaching the highest lung concentrations of 8.98 ± 0.21 µg/ml.

Tracheal tissue demonstrated similar dose-dependent accumulation patterns, though absolute concentrations were generally lower than corresponding lung values. The 375 g/MT group showed tracheal concentrations of 1.77 ± 0.21 µg/ml, increasing to 3.68 ± 0.52 µg/ml in the 500 g/MT group. The 750 g/MT and 1000 g/MT groups exhibited tracheal concentrations of 5.56 ± 0.55 and 6.45 ± 0.25 µg/ml respectively.

The ratio of lung to tracheal concentrations remained relatively consistent across treatment groups, ranging from 1.15 to 1.84, suggesting similar tissue penetration characteristics despite anatomical and physiological differences between these respiratory structures. Inter-animal variability, as reflected by standard deviation values, remained modest across treatment groups, indicating consistent tissue accumulation patterns within dose groups.

Discussion

This study provides comprehensive evidence for dose-dependent immunomodulatory effects and tissue distribution patterns of dietary lauric acid supplementation in broiler chickens. The findings demonstrate significant enhancement of B lymphocyte populations, sustained plasma pharmacokinetics, and substantial accumulation in respiratory tissues, supporting the potential application of lauric acid as a natural feed additive for improving immune function in commercial poultry production.

The observed dose-dependent increase in B lymphocyte percentages represents a significant finding with important implications for humoral immunity in broilers. B lymphocytes play essential roles in antibody production and adaptive immune responses against bacterial and viral pathogens [19]. The maximum enhancement of B cells at the 750 g/MT dose level, with a subsequent decrease at 1000 g/MT, suggests an optimal dose range for immunostimulatory effects. This biphasic dose-response pattern has been observed with other immunomodulatory compounds and may reflect complex regulatory mechanisms involving cytokine networks and lymphocyte homeostasis [20].

Previous investigations have demonstrated that lauric acid modulates immune function through multiple mechanisms, including direct effects on immune cell membranes, alteration of signaling pathways, and modification of inflammatory mediator production [13][15]. The enhancement of B cell populations observed in this study aligns with previous reports showing that medium-chain fatty acids can stimulate lymphocyte proliferation and activation [21]. The bursa of Fabricius, the primary site of B cell development in chickens, may be particularly responsive to dietary fatty acid composition, potentially explaining the substantial effects observed on circulating B cell percentages [9].

The modest reduction in T helper cell percentages accompanying B cell increases likely reflects physiological mechanisms maintaining lymphocyte homeostasis rather than immunosuppressive effects. Total lymphocyte counts typically remain relatively constant, and reciprocal changes in lymphocyte subset proportions are commonly observed [22]. Furthermore, the absolute numbers of CD4+ cells may remain unchanged or even increase despite proportional reductions, emphasizing the importance of considering both relative and absolute cell counts when interpreting immunophenotyping data.

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The immunomodulatory effects of lauric acid may involve multiple molecular mechanisms. Lauric acid has been shown to influence lipid raft composition in cell membranes, potentially affecting receptor clustering and signal transduction pathways critical for lymphocyte activation [23]. Additionally, lauric acid and its metabolites can modulate gene expression patterns through effects on transcription factors and epigenetic mechanisms [24]. The sustained plasma concentrations observed in this study provide continuous exposure of immune tissues to lauric acid, potentially explaining the substantial immunological effects observed.

The pharmacokinetic data reveal sustained plasma lauric acid concentrations over the 48-hour sampling period, reflecting the continuous nature of dietary supplementation in commercial poultry production. Unlike single-dose administration studies, continuous feeding results in steady-state kinetics where input from dietary absorption balances elimination through metabolism and incorporation into tissues [25]. The dose-proportional increases in plasma concentrations across treatment groups indicate predictable absorption and distribution characteristics.

Medium-chain fatty acids, including lauric acid, undergo absorption and metabolism through pathways distinct from long-chain fatty acids [26]. Following intestinal absorption, lauric acid is transported via the portal circulation to the liver, where it undergoes β-oxidation or incorporation into lipoproteins for systemic distribution [27]. The relatively rapid achievement of steady-state concentrations observed in this study suggests efficient absorption and distribution kinetics.

The sustained plasma concentrations have important implications for biological activity. Continuous exposure of immune cells to lauric acid in circulation provides ongoing immunomodulatory stimulation rather than transient effects. Additionally, sustained plasma levels support consistent delivery of lauric acid to peripheral tissues, including the respiratory system, where local antimicrobial and anti-inflammatory effects may contribute to disease resistance [28].

Inter-individual variability in plasma concentrations, as indicated by standard deviation values, remained modest across most time points and dose groups. This consistency suggests predictable dose-response relationships suitable for practical application in commercial production settings. However, factors such as individual variation in feed intake, digestive function, and metabolic capacity may influence actual lauric acid exposure in production environments, warranting consideration during implementation.

The substantial accumulation of lauric acid in lung and tracheal tissues represents a particularly significant finding given the importance of respiratory health in poultry production. Respiratory diseases caused by bacterial and viral pathogens impose substantial economic losses through mortality, reduced growth performance, and increased medication costs [35]. The preferential accumulation of lauric acid in respiratory tissues may provide localized antimicrobial and immunomodulatory effects that enhance resistance to respiratory pathogens [29].

The antimicrobial properties of lauric acid against respiratory pathogens have been demonstrated in vitro, with efficacy against gram-positive bacteria and enveloped viruses [30]. The tissue concentrations achieved in this study (up to 8.98 µg/ml in lung tissue) may be sufficient to exert direct antimicrobial effects against colonizing pathogens. Additionally, lauric acid can modulate local inflammatory responses in respiratory tissues, potentially reducing excessive inflammation that contributes to tissue damage during infection [14].

The dose-dependent accumulation pattern observed in both lung and trachea indicates predictable tissue distribution characteristics. The slightly higher concentrations in lungs compared to trachea may reflect differences in blood perfusion, tissue composition, or active transport mechanisms. Both tissues demonstrated clear dose-response relationships, supporting the ability to modulate tissue concentrations through dietary supplementation levels.

The mechanism of lauric acid accumulation in respiratory tissues likely involves incorporation into cellular phospholipids and tissue lipid pools. Medium-chain fatty acids can be incorporated into membrane phospholipids, potentially altering membrane fluidity and affecting cellular functions [31]. This incorporation may provide sustained local effects beyond the duration of plasma exposure, contributing to prolonged biological activity.

Integration of the immunological and pharmacokinetic findings suggests that the 750 g/MT supplementation level provides optimal effects for practical application. This dose level produced maximum B cell enhancement, substantial plasma concentrations, and significant respiratory tissue accumulation while avoiding potential adverse effects that might occur at higher doses. The reduction in B cell percentages observed at 1000 g/MT suggests that excessive supplementation may not provide additional benefits and could potentially interfere with normal immune regulation.

Economic considerations are important when determining optimal supplementation levels for commercial applications. While the 1000 g/MT dose produced highest tissue concentrations, the marginal increase compared to 750 g/MT may not justify the additional cost. Feed cost represents a major component of poultry production expenses, and supplementation strategies must balance biological efficacy with economic feasibility [32].

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The findings of this study align well with previous investigations examining lauric acid effects in poultry. Studies by Zhang et al. [6] demonstrated that lauric acid supplementation improved growth performance and immune responses in broilers, though their study utilized different dose levels and assessment methods. The tissue distribution data extends previous knowledge by providing quantitative measurements of lauric acid accumulation in respiratory tissues, an aspect not thoroughly characterized in earlier investigations.

Research by Zhao et al. [14] examining lauric acid monoglyceride and cinnamaldehyde combinations reported improvements in intestinal morphology and inflammatory markers, supporting the anti-inflammatory properties of lauric acid observed indirectly through immunological measurements in the current study. The enhancement of B cell populations observed here complements previous findings showing beneficial effects on humoral immune responses.

Studies examining medium-chain fatty acids in other livestock species have reported similar immunomodulatory and antimicrobial effects [33]. This cross-species consistency supports fundamental mechanisms of action that may be broadly applicable across animal production systems. However, species-specific differences in immune system organization, particularly the unique role of the bursa of Fabricius in avian immunity, warrant caution when directly extrapolating findings between species.

The results of this study have direct implications for commercial broiler production. Implementation of lauric acid supplementation at 750 g/MT could enhance immune function, potentially reducing the disease incidence and improving production efficiency. Respiratory tissue accumulation may be particularly beneficial in production systems where respiratory challenges are common, such as high-density housing or environments with suboptimal air quality.

Integration of lauric acid supplementation into comprehensive health management programs could reduce reliance on antibiotic interventions while maintaining or improving flock health. This approach aligns with global initiatives to reduce antibiotic use in animal production and consumer preferences for products raised with minimal pharmaceutical interventions [34]. The natural origin of lauric acid from coconut and palm kernel sources may provide marketing advantages for products from supplemented flocks.

Limitations and Future Directions

Several limitations of this study warrant consideration. The investigation focused on immunological endpoints and tissue distribution but did not include molecular mechanisms underlying the immunomodulatory effects warrant further investigation. Gene expression studies examining effects on immune-related genes, cytokine production, and signaling pathways would elucidate mechanisms of action. Microbiome analyses could reveal effects on gut microbial composition and metabolic activity that may contribute to systemic immune modulation.

Conclusion

This study demonstrates that dietary lauric acid supplementation produces dose-dependent immunomodulatory effects and achieves substantial accumulation in respiratory tissues of broiler chickens. The optimal supplementation level of 750 g/MT enhanced B lymphocyte populations by 39%, maintained sustained plasma concentrations, and achieved lung tissue concentrations of 6.29 µg/ml. These findings support the potential application of lauric acid as a natural feed additive for enhancing immune function and respiratory health in commercial broiler production.

The enhancement of B cell populations suggests improved capacity for humoral immune responses, while respiratory tissue accumulation provides localized antimicrobial and immunomodulatory effects relevant to disease resistance. The dose-response relationships characterized in this investigation establish evidence-based recommendations for practical implementation.

Further research should evaluate protective efficacy against specific pathogens, long-term production performance effects, and molecular mechanisms of immune modulation. The integration of lauric acid supplementation into comprehensive health management programs offers a promising strategy for reducing antibiotic dependence while maintaining optimal flock health and productivity in modern poultry production systems.

Vaccine's alone can not prevent or stop any Poultry Disease

Dr. S.K. Maini
Consultant - Vesper Group, Bengaluru.

Indian poultry industry regularly faces the disease challenge due to poor hygiene and sanitation, failure to identify and control the immune suppressors like the various stresses, presence of mycotoxins and their metabolites, poor handling, storage and administration of the vaccines and lack of knowledge and understanding of how the vaccines work in the birds body to prevent the diseases.

Un-necessary and over enthusiastic vaccine programs are given by vaccine manufacturer's, the hatcheries, veterinarians, poultry advisors, and sometimes the farmers take their own decisions in consultation with other local influencer's, farmers and the vaccinators.

Only the age of the birds is considered, not their health, body weights, stress factors, the weather conditions etc. and it is assumed that a good, timely job has been performed.

The different types of poultry vaccines available in the market for the prevention and control of several important diseases, besides the availability of the various antibiotics and therapeutic agents are:

Live-attenuated viral vaccines for Marek's, ND, F.Pox, IB, IBD, . (single and combined)

Inactivated or killed viral vaccines. ND, IB, IBD, IBH, ILT, AI, CAV, EDS, (single and combined) Mycoplasma vaccines, the Bacterial vaccines like the Coryza, Fowl Cholera, E-coli etc., and the vaccine for Coccidiosis.

Vaccines play a crucial role in poultry disease prevention and control, in reducing morbidity and mortality by stimulating the immune system to recognize and fight off specific pathogens. By introducing a vaccine (harmless form, attenuated organism or fragment of a pathogen) into the bird's body through any route, this vaccine stimulates and initiates, the development of both antibodies and the corresponding memory cells that provide long-term immunity, reducing the likelihood of future outbreaks.

For vaccines to work efficiently and protect its recipient, an active, fit and fine immune system, supported by stress free environment, practices and procedures, good well-balanced nutrition, mycotoxins and endotoxins free feed, proper handling, storage and administration of the vaccine are a must.

On one thinks about the birds and their immune system, it's like giving the blue pill (Viagra) to a mule (who cannot reproduce), and expect excellent performance, and later blame the color, size, weight and shape of the pill.

It is common for the farmers, field staff and the veterinarians, to either blame the vaccine for failure to protect the birds and prevent certain diseases, or blame the migratory birds, the rodents, the large population of indigenous un-vaccinated birds.

These knowledgeable people are under the influence of the marketing staff of the vaccine manufacturing and marketing personnel of the hatcheries, pharma companies, local veterinarians and poultry advisors.

The Indian poultry industry faces a typical problem, nearly 16 to 20 different types of vaccines are used for the commercial layer's during the 20 weeks of their growing. Whichever vaccine is made available by the vaccine manufacturing companies to them is used, thinking the disease will totally prevented.

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Companies first produce the vaccine and promote it on national basis, using the field Veterinarians, Poultry Advisors, Influencer's, Pharma Distributor's, and the companies marketing and sales promotion staff, giving them sales targets and subsequently ensuring trips to Goa, Bangkok, Seoul and Manila or other places of their interest, irrespective of the actual requirement of the vaccine against a particular disease in their area's.

Vaccination programs should be tailored to the specific diseases prevalent in an area or a region and adopted to the type of poultry production being followed, and certainly not one program for the entire length and width of the country.

Nearly 70 to 75 % of the field problems, failure of the vaccine to prevent the diseases, or less than the expected protective response are all due to immuno-suppression, as a result of various types of stresses, mycotoxins and endotoxins coming through feed and the environment, and a small percentage (approximately 15 %) is actually due to the vaccine handling, storage and administration techniques, and the balance is due to changes in the circulating field virus strains, mutations, non-protective virus serotypes or mis- match of the vaccine and the field virus .

Knowledge and understanding of how the immune system works and how the vaccines protect against the diseases is a must for any vaccine to be effective and perform well in the field, a good active and functional immune system is a basic requirement, supported with well-balanced nutrition, minimum stress, protection from immune system suppressive items in the feed ingredients and the environment, good and effective hygiene and sanitation practices.

In addition to all the above, regular body weight checks, assessment of the health and body condition of the birds, information about the locally prevalent diseases and problems, regular use of immune stimulants and boosters is required, especially during the chick and grower stages or else the best vaccines produced and made available by the World Renowned Vaccine manufacturer's will also fall short of or fail in protecting the birds from the field related problems and diseases, resulting in less than desirable results.

A change in our thinking is required, with respect to the working of the vaccines, disease prevention and control, regular check of bird's health and body weight in relation to the vaccination programs, the understanding of immune suppression and its reduction/protection, appropriate actions as and when required, are the need of the hour for the safety and protection of the birds to ensure their production and overall performance.

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Biofilms: the bacterial fortress

TECHNICAL TEAM, HUVEPHARMA SEA

One common survival strategy used by bacteria is to form biofilms. These communities and their inherent resistance to antimicrobial agents are at the root of recurrent bacterial infections in livestock rearing.

Bacteria have adapted to a "biofilmed" state to survive unfavourable environmental conditions such as those which are poorly oxygenated, have extremes in temperature or are lacking in nutrients. In the natural environment, biofilms act as a reservoir for microbial species, constitute a major component of the bacterial bio-mass and guarantee ecological balance. But in livestock buildings, they are a source of permanent contamination that is particularly difficult to eliminate.

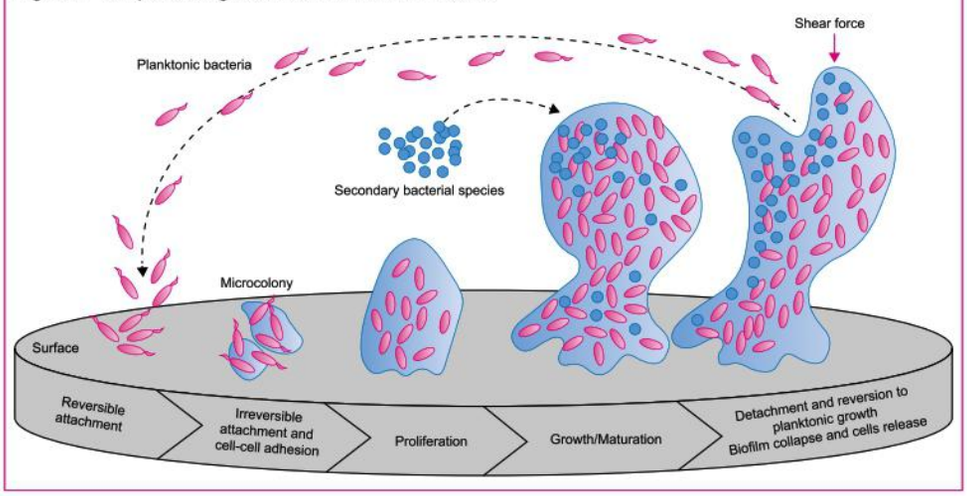
A livestock rearing house is a closed space with a dynamic mi-crobial ecosystem due to the high concentrations of organic matter, high temperatures and high humidity levels. The characteristics of this microbial ecosystem are determined by the microbiota of each animal and that of the herd. Animal excrement regularly enriches the microbiota of the building, especially with strains of enterococcus, coliforms, tract of the animals. The presence of animals in the barn causent air. This warm air rises to the top of the building, carrying with it many micro-organisms in the form of bioaerosols. Thus, all surfaces of the building become contaminated and biofilms are formed (see Figure 1).

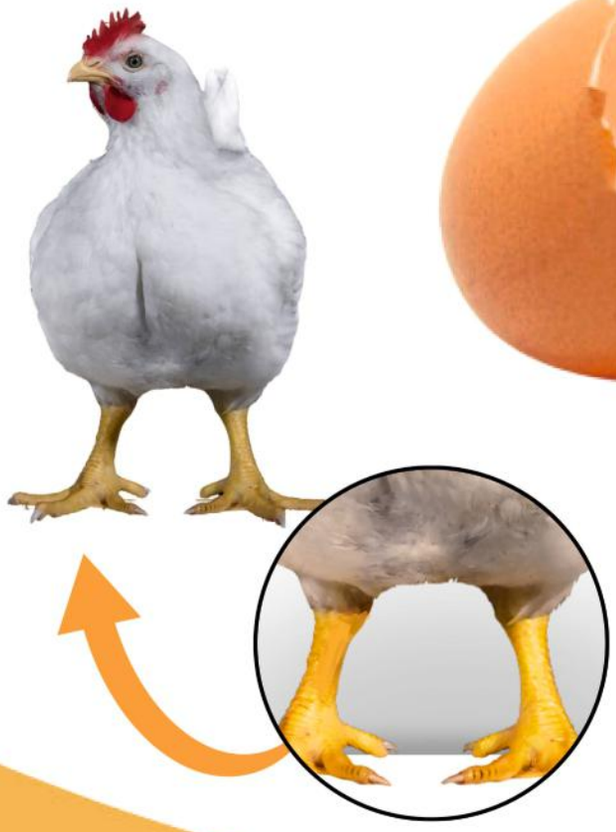
Biofilms are complex structures, constituting a considerable bacterial reserve in livestock buildings. They are formed on surfaces through the accumulation of stacked bacteria which secrete a protective polysaccharide or extracellular polymeric substances (EPS) during the maturation phase. This mucous matrix is excreted through a network of channels in which the medium can circulate.

The thickness of the biofilm does not increase indefinitely. Large aggregates or single cells may detach from mature bio-film and can directly seed other surfaces. The detachment of parts of the biofilm is partly due to variations in temperature and humidity inside the buildings. This contributes to air- borne bacterial spread, causing increased infectious pressure and new animal contaminations (see Figure 2).

The structures forming biofilms contain channels in which nutrients can circulate, and cells in different regions of a biofilm exhibit different gene expressions. The biofilm is therefore a mosaic of micro-niches containing different species but also different phenotypes of the same bacterial species. The cohesion of this microbial community relieson synergistic interactions and homeostatic mechanisms. The complexity of biofilm structure and metabolism has led to the analogy of biofilms to tissues of higher organisms eukaryotes), highlighting their remarkable evolutionary importance. Bacteria in a biofilm can be 1,000 times more resistant than individual bacteria. They acquire increased resistance to antimicrobial agents in two main ways:

Figure 1 - Steps leading to bacterial biofilm formation.





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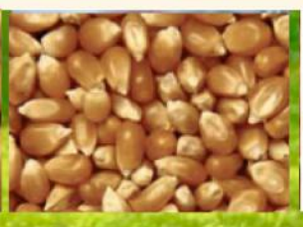

itpsa

Industrial Técnica Pecuaria, S.A.

7a planta , Barcelona SPAIN

Contact :Dr.Sameer Sawant

Mobile number: +91 9820282842

1) Physico-chemical resistance

is the failure of an agent to penetrate the full depth of thebiofilm. Polymeric substances like those that make up the matrix of a biofilm are well known to retard the diffusion of antibiotics or disinfectants.

2) Extra-chromosomal resistance

Bacterial resistance to disinfectants is higher when bacteria are in biofilms, due to the acquisition of specific resistance genes carried by plasmids (circular periplasmic chromo-somes). In a biofilm, the plasmids are transferable between bacteria by intercellular bridges. Thus, the acquired resistance can be quickly spread to all bacterial species via horizontal transfer.

Numerous bacterial species and genera that cause infections in animals, and which may or may not have zoonotic potential, can form biofilms. Some examples are:

- Salmonella
- Campylobacter
- Escherichia coli
- Pseudomonas
- Staphylococcus
- Streptococcus

Biofilms increase infectious pressure and bacterial resistance to antibiotics, disinfectants and the immune response of the host. In animal husbandry, contamination of surfaces, air conditioning, ventilation and water distribution system with bio-films is a huge problem. But several of these bacterial species also have an impact downstream in food industries because of their ability to cause infections or food poisoning in humans.

Biofilms are therefore a constant threat to biosecurity because of their ability to diffuse into the environment and colonise all kinds of media. Their resistance to extreme conditions, including disinfection procedures, only makes matters worse. Trying to disinfect without breaking biofilms is useless, and the best and most economical way to break the biofilm is to use detergents. Before the disinfection step, it is imperative to carry out a cleaning step with a detergent to dissolve and eliminate both the visible organic deposits and most of the EPS of the biofilm.

Adherence to this procedure and to general biosecurity management rules guarantees increased effectiveness of the disinfectant and suitable decreasing contamination of the surfaces before placing a new flock or herd in the building. Huvepharma, through its expertise in biosecurity and animal health, provides a range of detergents and disinfectants to eliminate biofilms.

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40 -70 points#

Improvement in cFCR

Upto 70 g

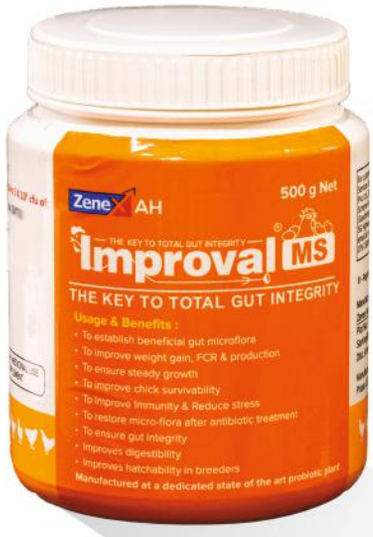
Improvement in BWT in open shed

Upto 120 g

Improvement in BWT in EC shed

Upto 30%

Improvement in livability vis-à-vis antibiotic control



#1 FCR point represent third/last decimal point of 1000

*Majority of field trials were conducted at same farm with multiple sheds in integrations across various geographical locations and at different time of the year. Some of the integrators were generous in sharing complete production indices while others communicated the summary of the trial results. In the field trials, Improval MS was compared with antibiotic/probiotic/antibiotic + probiotic/probiotic + prebiotic control. Detailed reports availble on request.

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