

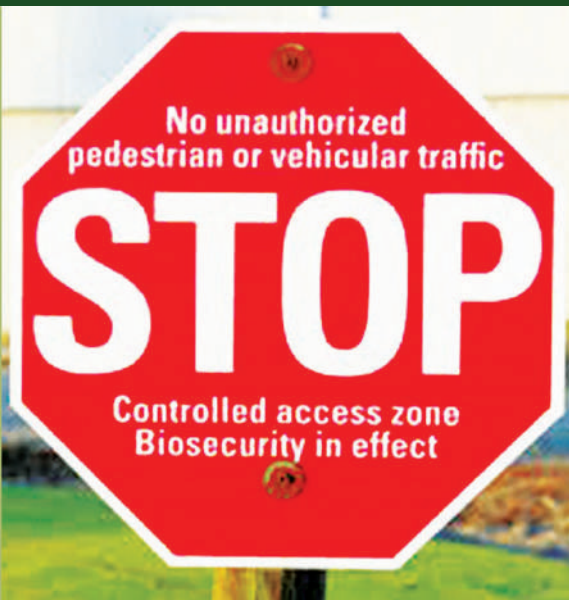


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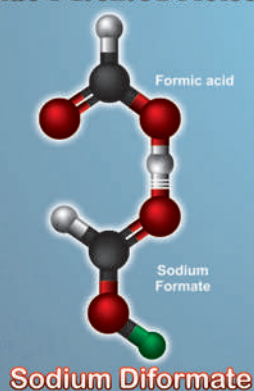
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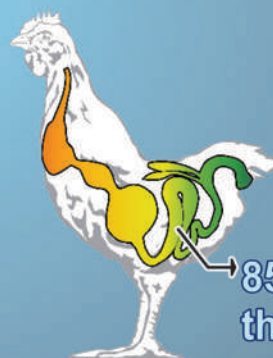
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A CALL FOR COLLECTIVE STRENGTH



India's poultry sector has long been a powerhouse of economic growth, providing affordable protein to millions and supporting countless livelihoods. Yet, the industry's fragmented representation remains a pressing challenge. The time has come to unite under a single, unified platform—one that can effectively engage with policymakers and drive cohesive marketing and consumption strategies.

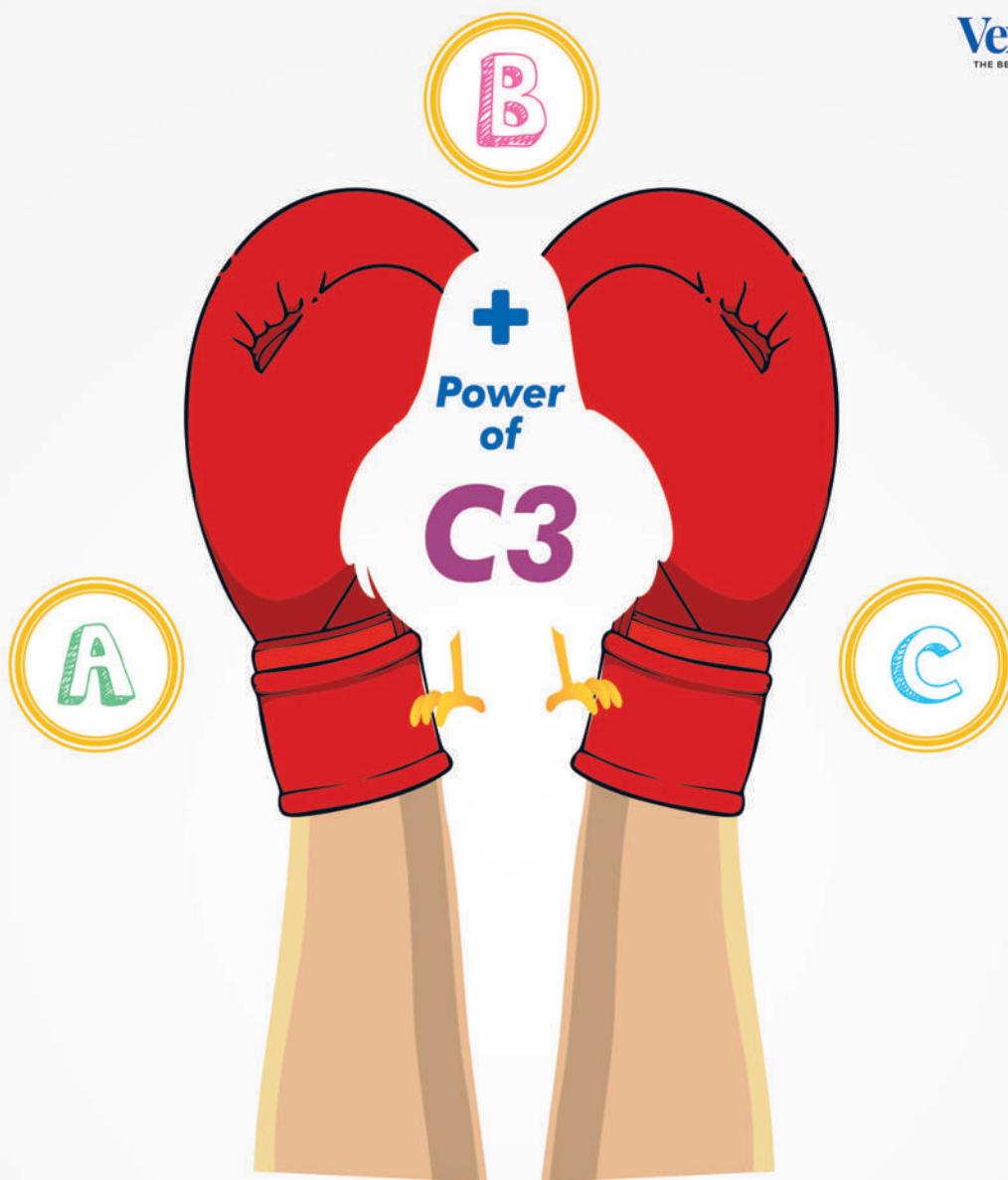
Over the past two decades, the Indian poultry industry has overcome numerous challenges to emerge as a leader in poultry production. It has navigated crises such as COVID-19, market volatility in feed inputs, fluctuating egg and chicken prices, and administrative indifference. Despite these obstacles, the industry has maintained its growth trajectory, edging closer to its production goals. This success is largely due to the growing awareness among stakeholders about their role in the poultry production chain.

However, while production has seen remarkable progress, the marketing of poultry products remains a critical challenge. A lack of coordinated efforts in poultry marketing has hindered the industry's ability to combat market inefficiencies. To sustain the current growth, India requires a robust, nationwide framework to strengthen the consumer-producer connection. This can be achieved through mentoring, networking, consumer education, and targeted campaigns.

Poultry consumption in India, despite its steady rise, is still hindered by misconceptions, cultural preferences, and unstructured promotional efforts. A consolidated platform could drive nationwide campaigns promoting the nutritional and economic benefits of poultry. It would offer a structured platform for knowledge sharing, resource pooling, and unified representation in domestic and international fora.

Just as collective efforts have streamlined production, a structured and standardised approach to poultry marketing—encompassing both eggs and chicken—is essential for continued sustainability and forging its own path to a more organised and influential future. Encouragingly, such models have been initiated successfully in state-specific associations in our country, for example, by West Bengal Poultry Federation (WBPF) which works through strategic coordination between producers and consumers. Such initiatives to extend a structured approach to each part of our vast subcontinent will be a big step towards ensuring a resilient and efficient poultry marketing ecosystem.

G. N. Ghosh
Managing Editor



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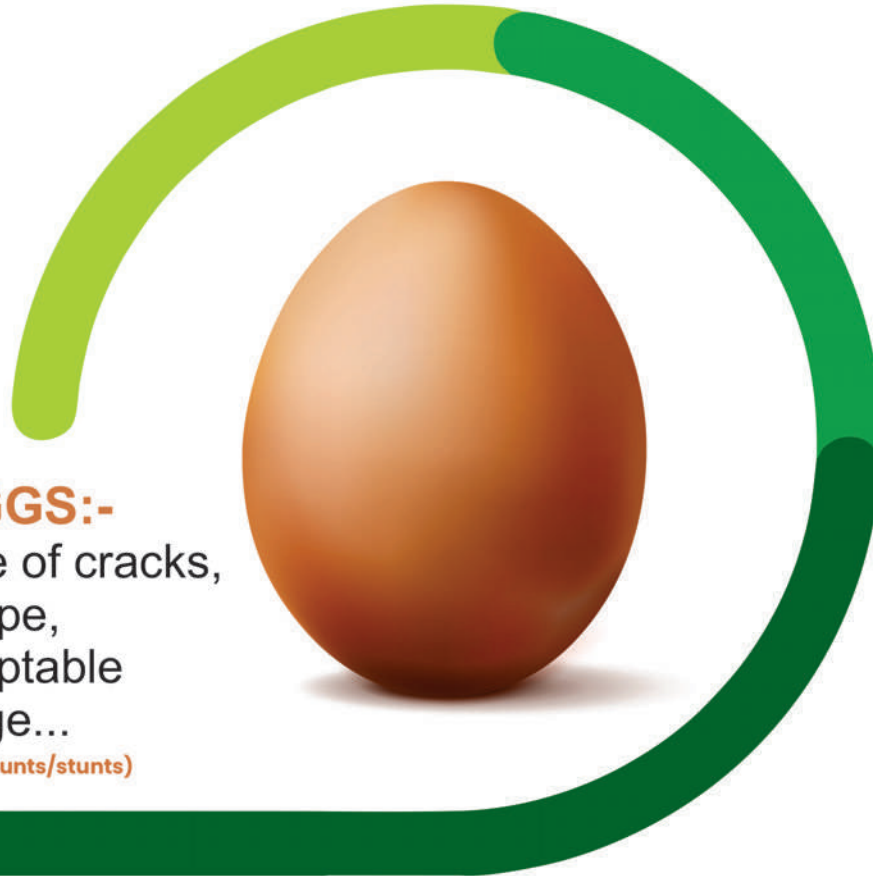
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Improvisation of Poultry Meat Quality: Prospects And Opportunities

By

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Introduction

Poultry meat is one of the most consumed meats worldwide with its wide acceptability, palatability, lack of religious taboos, and wide production. As modern consumers prefer low-fat meat with a high unsaturation degree of fatty acids (FA) and low sodium and cholesterol levels, chicken is the best-suited meat as an option. The nutritional value of chicken varies according to commercial cuts. Table 1 gives a comparison between breast meat and leg meat.

Functional foods are those foods used for specific health use (FOSHU); with this aspect chicken may also be considered as “functional foods”, which provide bioactive substances with favourable effects on human health. Chicken contains conjugated linoleic acid (CLA), vitamins and antioxidants, and a balanced Ω -6 to Ω -3 polyunsaturated FA (PUFA) ratio. During the last decades, the changes in lifestyle in developed countries have led to a meat market more and more addressed towards easy-handled and processed products called convenience food. Nowadays, the processed poultry meat products account for the lion's share of overall sold products. Further processed products are highly demanded due to their convenience, high food safety, and quality standards. These aspects stimulate poultry to adopt more strict protocols for the production of raw meat. Besides nutritional and sensorial properties, as well as food convenience level, consumers nowadays wish to have further information about the origin and method of production of meat-based food. Overall, quality traits of both poultry carcass and meat comprise hygienic aspects concerning safety and toxicology (presence of undesirable microorganisms or residues such as antibiotics, chemical contaminants, or hormones), nutritional value, and technological and sensory attributes (Table 2). Meat complex properties are influenced by multiple interacting factors that include genotype, feeding, housing, pre-slaughter handling, slaughtering, and processing.

Factors Affecting Poultry Meat Quality

Through the decades, meat-type birds have undergone intense genetic selection for muscle development and body weight which have induced histological and biochemical modifications of the muscle tissue. Several studies evidenced that fast-growing strains exhibit a high incidence of spontaneous or idiopathic myopathies like deep pectoral muscle disease, and increased incidents of stress-induced myopathies which may have great implications for meat quality and incidence of abnormal conditions such as pale, soft, and exudative (PSE)-like meat. This condition is associated with the poor water holding capacity, an increase of the meat paleness, and impaired texture in fresh meat and processed products.

Interventions in Feeding Management

The manipulation of poultry feeding has been proposed as a tool to modify fatty acid (FA) composition by mainly increasing

the amount of Ω -3 polyunsaturated fatty acids (PUFA). Algae extracts, hemp oil, linseed oil, or rapeseed oil are suitable sources for Ω -3 PUFA enrichment. The minimum feeding time required to achieve substantial FA modification in thigh and breast meat is one or two weeks before slaughtering, respectively. According to studies, the enrichment of conjugated linoleic acids (CLA) in poultry meat is not as effective as the enrichment of Ω -3 PUFA. The increasing of meat PUFA raises the lipid susceptibility to oxidation during storage and cooking. Lipid oxidation causes loss of nutritional and sensory values as well as the formation of potentially toxic compounds. To improve the oxidative stability, different antioxidant substances such as carotenoids, vitamin E, selenium, and vitamin C have been tested in several experiments to verify their potential antioxidant effect on poultry meat. Vitamin E appears as the most effective antioxidant in meat; however, the interest in using vegetable extracts from fruits, spices, seeds, grains, and herbs as substitutes of synthetic compounds is currently growing.

There is also an increasing interest to emphasise the presence in poultry meat of attractive meat-based bioactive components such as anserine, carnosine, L-carnitine, taurine, glutathione, and creatine to enhance the health image of meat and developing functional meat products. Poultry meat is particularly rich in anserine which is an endogenous antioxidant by chelating transition metals such as copper.

Interventions in Housing Management

The major share of poultry meat reaching the food market is produced using intensively-reared poultry birds by housing them indoors under close environmental control. Following the multiple and growing demand of certain consumers who are more and more sensitive to the cultural and ethical aspects of food consumption, the development of alternate systems like semi-intensive and free-range systems are increasing nowadays. Organic poultry production has a huge scope in this aspect. Recent studies conducted under alternative housing systems-like semi-intensive and free-ranging, evidenced that reduced stocking densities increased the possibility of movement and different feed sources from vegetation in outdoor areas modified the product quality. Indeed, birds kept under alternative housing systems showed lower carcass fat depots and higher PUFA content which enhanced the nutritional value of meat but reduced its oxidative stability.

Interventions of Slaughtering and Processing Procedures

The influence exerted by pre-slaughter handling has got more importance than various husbandry practices for final meat quality. High environmental temperatures, handling, and transportation contribute to the pre-slaughter stress that can determine yield losses, reduced product uniformity, and decreased carcass and meat quality. More careful bird handling has been reported as a crucial factor to reduce carcass defects such as haemorrhages, bruises, and broken bones. Catching is still mainly operated by hand, but in the last years, mechanical systems have been introduced to reduce labour costs and animal trauma and mortality. Moreover, pre-slaughter heat stress has been reported to accelerate rigor mortis development and to increase paleness in poultry meat.

Among slaughter and processing factors, stunning and early deboning exert the most important effects on carcass and meat quality. The animal welfare issues and product quality problems

Indian Research

due to the employment of high current electrical stunning in Europe have promoted the use of gas stunning.

The main advantage of some automated gas stunning systems is represented by keeping birds in transport crates until they are slaughtered, reducing animal handling and wing flapping and subsequent carcass defects. As for the early deboning issue, if the breast meat is removed from the carcass before the completion of rigor mortis (at least 4-6 h of aging), the muscle fibres contract and shorten the muscle, and the resulting meat is less tender. Extensive research has been done to develop slaughter methods that allow for the acceleration of rigor mortis.

The application of electrical stimulation to broiler carcasses seeks to reduce the toughness of meat that is deboned before the normal aging period. An emerging processing technique to improve sensory traits of poultry meat is marination which is capable of ameliorating flavour and tenderness and increasing product shelf life. The most common marination ingredient is sodium chloride, but there are strong pressures to reduce its use, because of

the relationship between increased sodium intake in consumer diets and hypertension. Sodium content in meat products can be lowered by sodium chloride reduction and/or substitution with other ingredients like potassium chloride or magnesium chloride.

Conclusions

Poultry meat is a food with high relevance for human nutrition. Meat quality and nutritional value can be further improved by suitable animal feeding strategies and innovations in rearing systems. In poultry, the shift towards further processed products has underscored the necessity for higher standards in meat traits to improve sensory characteristics and functional properties.

Moreover, the intense selection for muscle growth of meat-type birds has resulted in a higher incidence of abnormal conditions. Scientific interventions in feeding, housing, pre-slaughtering, slaughtering, and processing practices can result in quality meat production.

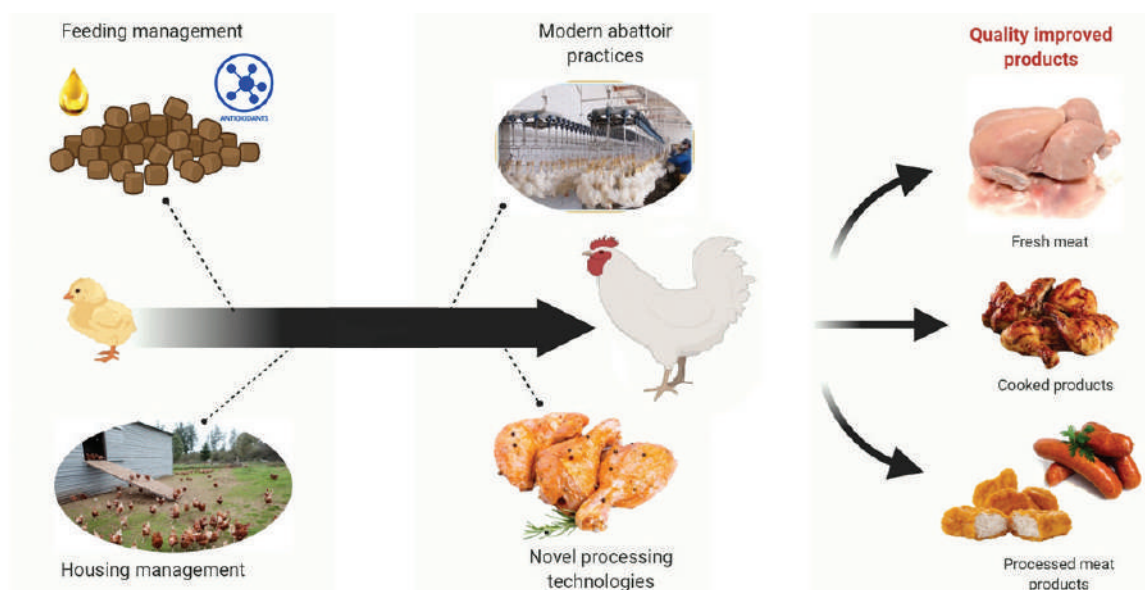


Figure 1: Interventions in feeding management, housing, processing practices can provide a good quality final product to consumers

Table 1. Composition and nutritional value of poultry expressed on a 100 g portion of meat (adapted from Cavani and Petracci, 2008; USDA, 2008)		
Nutrient	Breast	Leg
Water, g	74.8	76.1
Protein, g	23.1	20.1
Fat, g	1.2	3.8
Energy, kcal	104	115
Cholesterol, mg	62	80
Iron, mg	0.72	1.02
Sodium, mg	65	86

Table 2. Quality traits of carcass and meat in poultry	
Type	Quality trait
Carcass	Hygienic quality (microbial load and chemical residues)
	<ul style="list-style-type: none"> • Slaughtering yield • Weight of carcass and main cut-up • Appearance (colour and conformation) • Adipose tissue depot (consistency and colour) • Meat yield • Presence of defects (bruises, bone fractures, etc.)
Meat	Hygienic quality (microbial load and chemical residues)
	<ul style="list-style-type: none"> • Appearance (colour, shape and size) • Nutritional value • Chemical composition • Quality of proteins & lipids • Technological traits • pH, • Water holding capacity, • Texture, • Susceptibility to oxidation • Sensory attributes (tenderness, juiciness and flavour)

What's The Latest on HPAI Transmission, Infection?

Highly pathogenic avian influenza (HPAI) virus continues to take a heavy toll on US poultry while raising concerns about transmission to other species, including humans. How serious are these concerns and what are the transmission routes?

"To understand the big picture with transmission, we must remember that influenza A as a family has a wide host range," stated Erica Spackman, PhD, USDA Senior Research Scientist, during a recent webinar presented by the Poultry Science Association.

"In poultry specifically, individual strains of avian influenza A will adapt to host species through a process of circulating in that host," she added.

Spackman also explained that the current H5 viruses are much more infectious than in the past, creating new challenges.

She discussed the latest HPAI research on transmission pathways and factors impacting infection during the webinar.

From Dabbling Ducks to Chickens, Mammals

"Dabbling ducks are the natural host species from which all influenza A viruses probably originated," Spackman said. "It is the group that carries the virus, then the virus spills over into everything else...occurring through an environmental source is likely rather than direct transmission."

Despite ongoing HPAI outbreaks, gallinaceous poultry are not natural hosts for influenza, according to Spackman. Poultry generally need high doses of the virus for transmission to occur.

Researchers are studying how influenza is transmitted to mammals such as dairy cows and cats. "Compared to birds, mammals tend to have a cold-adapted influenza A virus that grows better in their bodies," Spackman explained.

"Cats seem to be universal victims of influenza transmission and have occasional influenza transmission from people," she added. "We've known for decades that cats tend to get seasonal influenza from their owners. So, the random one-off transmission of influenza to other species — cats, in this case — isn't really that remarkable."

'A Thousand Times More Infectious'

The virus can become well-adapted after long-term exposure at high levels in some host species. "We have these H9N2 low-pathogenic avian influenza viruses that are chicken-adapted and not seen in other species," Spackman said. "They are endemic in poultry in Africa, the Middle East and Asia and are generally controlled by vaccination. "But with H5N1 HPAI, it's a different dynamic. The infection is much shorter because of high mortality," she continued.

Unfortunately for US poultry, the current influenza viruses became more infectious after circulating in Asia, Europe and Africa and making it back to the Western Hemisphere.

"The viruses seem to have adapted much more to gallinaceous birds," Spackman said. "The viruses we see now right out of ducks, which are index cases from wild birds, are a thousand times more infectious for chickens than the H5 HPAIV in the US in 2014-2015."

Consequently, the virus is significantly harder to combat through biosecurity and biosafety. And it transmits more effectively than just a few years ago.

Although vaccination is used in other parts of the world, it doesn't completely block an influenza infection, Spackman noted.

Instead, current vaccines reduce how much virus is shed and how much virus is replicating at the site of exposure, therefore, reducing or eliminating the spread within the host.

Transmission Dynamics

"Regarding transmission, HPAI is not magical or different among other pathogens," Spackman said. "Viruses have only a few ways they can spread among farms, and those transmission routes aren't that different among viruses. How we treat them is universal for many pathogens."

Research indicates that how an animal is exposed influences virus transmission. One study found that intranasal exposure required 3 to 4 logs less virus for infection than exposure via eating or drinking. "Breathing in the virus occurs through aerosols, and fomites like dust and feathers that get coated with the virus can spread it," she said. "However, a little higher humidity level will reduce transmission."

In field tests with outside-air sampling, researchers also learned that viruses do not travel far from the houses. "Generally, when viruses are detected outside a house, quantities are very low, and viability testing demonstrates that the virus is not always infectious," she added.

In another study, in-house airborne fomites appeared to be very important in viral spread. A high amount of the HPAI virus was found in feather pulp from chickens, turkeys and ducks.

"Basically, the growing cells inside the feather shaft are full of the virus, and the feather shaft seems to protect it," Spackman said. "Feathers are made to float around and stick to everything. So, if there's a good fomite, it's feathers."

Virus in the Environment

Considerable research is underway looking at how the virus is transmitted in the environment. Here are several highlights:

In studies evaluating soil types for transmission, sandy material did not transmit the virus well. Denser soils transmitted the virus more effectively, and birds became infected.

Research on feed indicated no evidence of HPAI transmission, from an epidemic standpoint. The virus didn't survive 24 hrs in feed.

Surface water is a possible source for HPAI transmission. Research showed the virus survived in field water for a month at 82°F (28°C) and for 270 days at 63°F (17°C). All samples where the live virus persisted were in cold environments like Alaska and Minnesota. The virus also survived in sediment.

A study on manure and litter, including pine shavings, found very little transmission of the virus.

Whether transmission occurs through small animals on poultry farms requires more research. "In studies on infected farms, we can find the virus and evidence of infection in mice and birds that live around the farms," Spackman said. "But it's unclear if the poultry were infected by the small animals or vice versa or a common environmental source."

Studies of the virus in house flies and blow flies demonstrated that it did not replicate in the insect guts and died off quickly within 24 to 28 hrs.

Less Farm-to-Farm Spread

"The good news is we really don't have farm-to-farm spread now," Spackman continued.

"But there is a lot the poultry industry is doing right, and we've learned a lot from our outbreaks in the past," she concluded.

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Article

Safe Feed For Safer Food

Dr. Maloshrie Bora
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Trouw Nutrition South Asia

In the world of animal agriculture, ensuring the health and productivity of livestock is crucial not only for the success of the farming industry but also for the safety of the food supply chain. One critical aspect of this process is the quality of animal feed. Feed is an integral part of the food chain, and its safety has been recognised as a shared responsibility. Feed, which includes a mix of raw materials such as grains, protein sources, and additives, must be safe, nutritious, and free of harmful contaminants. Poor feed quality, contamination with mould, and the presence of mycotoxins can lead to various health issues for animals and humans alike, ultimately compromising the entire food production process.

This article explores the importance of safe feed, efficient raw material handling, and optimal feed milling practices, focusing on controlling mould and mycotoxins. It will also delve into the significance of using good raw materials, proper storage techniques, and efficient milling processes to ensure safer food.

Raw material quality is paramount for safe feed and food production. Grains like corn, wheat, and barley face challenges in the field, susceptible to mould, mycotoxins, and harmful bacteria due to environmental factors. In addition to that, oilseeds like soy, canola, and sunflower, processed into high-protein meals, pose microbial risks. Rigorous quality control measures are essential, involving advanced agricultural practices, proper storage, and continuous monitoring. Implementing comprehensive strategies ensures product safety, upholding the integrity of the food and feed supply chain. Since animals are at the top of the food chain in many agricultural systems, ensuring their feed is safe from mould and mycotoxins is not only important for animal welfare but also for protecting the health of consumers who eat animal products such as meat, milk, and eggs.



Trouw Nutrition's Feed-to-Food Safety Program: A Credible Way to Ensure Safe Animal Feed and Safer Food for Mankind

Trouw Nutrition, a global leader in animal nutrition, recognises that the quality and safety of animal feed play a pivotal role in the overall food safety chain. The company's Feed-to-Food Safety Program is designed to ensure that feed ingredients and final feed products are of the highest quality, free from contaminants such as moulds and mycotoxins. This program addresses the challenges and provides a credible framework for achieving safer, more reliable feed and food products, ultimately safeguarding both animal health and consumer safety.

The Foundation of Trouw Nutrition's Feed to Food Safety Program

The Feed-to-Food Safety Program at Trouw Nutrition is built on several key pillars that focus on the entire feed production process, from sourcing raw materials to delivering finished products to farms and ensuring the safety of the food products we consume. The program is structured to ensure that the feed is safe, sustainable, and of the highest quality. These pillars include:

1. Good Raw Materials and Sourcing Standards

One of the first steps in the Feed to Food Safety Program is ensuring that the raw materials used to produce animal feed meet the highest standards of safety. This includes working with trusted suppliers who follow strict guidelines for quality

and safety. Regular audits, inspections, and testing are conducted to ensure that raw materials are free from harmful contaminants such as moulds and mycotoxins, which are particularly common in improperly stored raw materials.

2. Mycotoxin Control and Risk Management
Trouw Nutrition has implemented comprehensive mycotoxin management systems throughout the supply chain to monitor and control mycotoxins in both raw materials and finished feed products. The program includes:

- Prevention strategies such as guidance on sourcing raw materials from trusted suppliers and conducting regular testing for mycotoxins
- Detection through advanced diagnostic tools, which identify and measure the presence of mycotoxins in feed ingredients and finished products
- Deactivation methods, including the use of mycotoxin binders, which neutralise mycotoxins and prevent their absorption by animals. This ensures that any trace contaminants do not end up in the food supply

3. Efficient Storage and Handling

Proper storage conditions are critical in preventing contamination, and Trouw Nutrition emphasises the importance of controlled environments for raw materials and finished feed. The company ensures that storage facilities are designed to maintain optimal moisture

and temperature levels to prevent mould growth. Monitoring systems are in place to detect any environmental changes that could compromise the quality and safety of feed ingredients. In addition, Trouw Nutrition works with partners to improve storage practices at every stage of the supply chain, further reducing the risk of contamination.

4. Advanced Feed Milling Practices

In Trouw Nutrition's Feed to Food Safety Program, the feed milling process is optimised to ensure safety and consistency. This includes regular cleaning and sanitisation protocols to avoid cross-contamination, as well as stringent monitoring of critical parameters like particle size, moisture content, and mixing consistency. Efficient milling practices not only improve feed quality but also help to reduce the chances of contamination during the production process.

5. Traceability and Transparency

Trouw Nutrition's program emphasises the importance of full traceability throughout the supply chain. This traceability system enables the company to quickly identify any potential sources of contamination, take corrective actions, and ensure that only safe, high-quality feed reaches consumers. It also promotes transparency, giving farmers, animal producers, and consumers peace of mind knowing that the feed and food products they are consuming are carefully monitored and held to the highest standards.

6. Collaboration with Industry Partners

Trouw Nutrition understands that ensuring food safety is a collaborative effort. To this end, the company works closely with other stakeholders in the agriculture and food industries, including feed manufacturers, veterinarians, regulatory bodies, and research organisations. This collaboration enables Trouw Nutrition to stay at the forefront of best practices in feed safety, as well as contribute to industry-wide improvements in animal health, food safety, and sustainability.

How Trouw Nutrition's Program Contributes to Safer Food for Mankind

Trouw Nutrition's Feed to Food Safety Program directly impacts the safety of the food supply chain by reducing the risk of contaminants such as moulds and mycotoxins from entering animal feed. This is crucial because contaminated feed can lead to the accumulation of harmful substances in animals, which can then be transferred to humans through the consumption of animal products. By focusing on the entire feed production process and ensuring that feed is safe at every stage, Trouw Nutrition helps ensure that the food produced by these animals—be it meat, milk, eggs, or other products—remains safe for consumers. Additionally, the program contributes to public health by:

- **Reducing the risk of foodborne illness:** Contaminated feed can lead to illness in animals, which can then affect

the food products they produce. By controlling mycotoxins and moulds, Trouw Nutrition reduces the likelihood of these issues occurring, protecting both animals and humans

- **Improving animal welfare:** When animals consume safe feed, they are less likely to suffer from diseases and health issues associated with contaminated or poor-quality feed, leading to healthier animals and more productive farming systems
- **Supporting sustainable food production:** The program not only ensures the safety of the food supply but also promotes sustainable practices that help minimize waste and improve the efficiency of the feed-to-food process

Conclusion

Trouw Nutrition's Feed-to-Food Safety Program provides a credible, comprehensive framework to ensure the safety and quality of animal feed, which in turn leads to safer food for mankind. Through rigorous raw material sourcing, mycotoxin control, efficient feed milling, and a focus on traceability and transparency, Trouw Nutrition demonstrates its commitment to safeguarding the entire food production system. As the demand for safe, nutritious food continues to rise, the company's dedication to feed safety remains an essential element in ensuring that food products are safe, sustainable, and of the highest quality for consumers worldwide.



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**"I am very proud to be called a pig.
It stands for pride, integrity and guts."**

—Ronald Reagan

"Pigs Have Wings" observed PG Wodehouse through the title of his novel laced with gentle humour, yet we are familiar with the idiom "Pigs don't fly". Wodehouse spoke figuratively, and we know that unlike poultry, its competitor in the meat sector, neither do pigs have wings nor can they fly. But while the poultry species may be rich in eggs and meat, they certainly cannot be credited with any great flying prowess. So, in a way, the pigs too have taken another kind of flight to emerge as one of the biggest contributors to the meat basket of the world, thus making valuable addition to food and nutrition security. If the world consumed about 145-150 million tonnes poultry meat in the year gone by, pig meat i.e. pork was not too far behind at 124 million tonnes; bovine meat at 78 million tonnes and ovine at 17 million, no doubt popular choices in several regions, are not worthy to be called challengers to the eminence of poultry.

Poultry has been growing consistently, and impressively; the prognosis validated through innumerable studies projects similar growth in the years to come, and this growth would be the most striking in South Asia, hence India. Being the most

accessible, affordable, and above all acceptable meat, poultry shall continue to rule the roost all across the world. Pig meat shall, however, remain the second; and the margin of difference shall continue to increase as unlike poultry, pig meat, despite being the most protein dense, has been facing near stagnant growth over the past few decades and it has now registered a marginal negative growth.

Pigs, like small ruminants such as goats and sheep, are a viable enterprise, especially for small holders. Pigs require little initial investment; they are prolific and are good feed to meat converters compared to other livestock such as cattle. Pigs produce meat (pork) without contributing to the degradation of grazing lands and pork is particularly suitable for processing. Further, pork provides a more varied diet and pigs are one of the rare livestock species where nearly all parts of the animal can be consumed.

Why is pig meat taking a different trajectory? Delving into this question has thrown up a wealth of interesting information and answers.

Some foods, indeed, are taboos in different religious and ethnic groups, and hence tend to invite strong aversion. But no food evokes such intense opposition, nay hostility, as pork in some religious communities. One fourth of the global population is Islamic, and pork is the strictest of taboos in the religion of Islam. Obviously, the pig enters the competition for a share in the meat sector with a major handicap. In fact, Jews and some denominations of Christianity too shun pork. And, even though there is no outright prohibition, the majority of Hindus also avoid pork consumption as pig is considered an unclean animal.

Some theories suggest that the taboo that exists across the globe might have originated in the Middle East, the trigger

being the pigs' high water consumption in a water scarce region and their destructive nature towards crops. Further, the tendency of the pigs to scavenge makes them less desirable as a food source compared to other livestock. While not the primary reason, some also believe that the taboo might have stemmed from health concerns, as pigs were, in the past, believed to be carriers of diseases. However, the core explanations for aversion to pig and its meat are the strong religious and cultural beliefs; violations of the taboo get to be viewed as grave religious insults or cultural transgressions.

The gentlest of the livestock species, pigs have been a victim of the most irrational of prejudices which has led to spreading of misinformation, falsehoods and canards about them. It is high time we get the facts straight and judge the pig anew.

Pigsty, that is how we refer to any room or place that is dirty or messy. What a travesty associating one of the cleanest animals with dirt and mess! Pigs do not defecate where they eat or sleep; in fact, even the newborn piglets would walk away from their abode to relieve themselves; aren't they a notch above the human babies too? Pigs do not sweat as they don't have many sweat glands, yet we have the pejorative proverb "sweat like a pig" perpetuating the falsehood. It certainly is defamatory to the entire species. Yes, the pigs do roll and wade in mud, and swim in water. They need to keep cool in the absence of sweating. An added reason is to prevent the skin from getting sunburned. How different is it from our species lying on the sand on the beaches?

Associating stupidity with pigs is another stupid idea of ours. Do we not have a proverb for this, "to cast pearls before swine"? You would be surprised to learn



that pigs are considered one of the smartest mammals on Earth. A pig possesses the intelligence level of a human toddler. It has been observed that a pig is able to solve complex problems, use tools to get things done, understand numbers, recognise their own names and respond when they are called. In experimental studies conducted, pigs could locate objects and even identify images on the screen. This reveals that pigs display the same characteristics that we associate with intelligent animals such as dogs. Because of their excellent memory, pigs are trainable and capable of much more than we give them credit for.

Not only do the pigs possess advanced communication skills, they also have excellent memory and the ability to use spatial information. As they have a wide range of hearing, they communicate with one another through auditory signals. Amazingly, they can also communicate with humans as they have the capacity to learn to decipher human gestures and vocal cues. They can navigate through mazes and return to their fold even after traversing long distances.

Contribution of pork to our meat basket is 3.72% of our total production

of 10.25 million tonnes last year. Pig farming remains a vocation in some specific areas such as the North East, and in specific communities. In fact, the prejudices are so strongly ingrained that

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piggery gets associated with those who are considered to be in the lowest rungs of the caste hierarchy. By holding on to these prejudices we would be denying our population access to rich, yet affordable, sources of nutrition. After all, lean pork is a storehouse of proteins, vitamins and minerals; it is generally agreed that pork

provides the most valuable support for muscle mass retention. Moreover, pigs are an extremely versatile livestock species. They could be raised in a spectrum of systems ranging from massive, capital-intensive production units to small, labour-intensive family units, in which pigs scavenge for food. Being highly social animals, they happily coexist with others, thus they are a good species for mixed livestock farming.

Promotion of pig farming and encouraging consumption of pork would be a huge challenge. It is curious that despite being the most populous nation and one of the fastest growing economies in the world, we stand at the bottom of the ladder in consumption of meat at a per capita of a paltry around 3 kilograms per year, marginally behind our neighbour Bangladesh which stands at 3.4 kilograms. Another paradox is that we are the fifth biggest producer of meat in the world. Religion and culture remain the most significant influences in our choice of foods. Still worth a try to go *whole hog* and advocate incentivising piggery for nutrition and economic development.

Pigs are more than just *oink* and *grunt*; they are certainly not *boaring*.



Automate Your Poultry Production

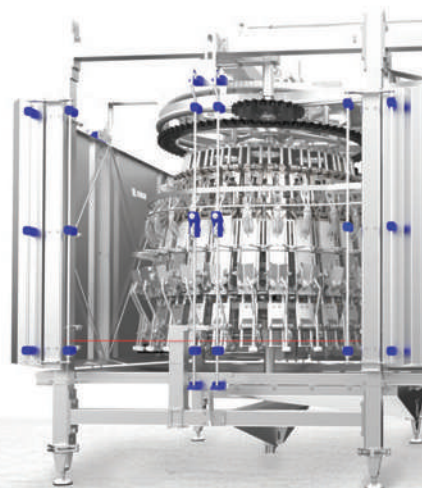
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COVER



BIOSECURITY REINFORCEMENT SEASON

The dynamic business of broiler farming is challenged by the summer months of hot and humid conditions. While broilers are bred for rapid growth, they lack the ability to regulate body temperatures, making them vulnerable to stress and diseases. **IPR** reports on extra vigilant biosecurity measures for the vulnerable summer months

Biosecurity in general refers to the methods taken to prevent disease from entering a country, region or farm. Biosecurity measures for daily operations are either meant to “isolate” a farm from pathogens or diseases that may come from outside the farm or “contain” a disease to prevent its spread to other farms during disease outbreaks. Key to all these is to manage disease transmission through the movement of people, equipment and birds. The strength of biosecurity measures is very dependent on the observation of the measures by the people working on the farm. It is thus important to develop standard operating procedures, signage and to routinely train personnel on biosecurity measures.

During disease outbreaks depending on the disease involved measures employed may be made stronger. When implementing biosecurity measures on a farm, one needs to consider things like:

1. The disease most likely the farm may get challenged by e.g. Avian influenza
2. How the disease is transmitted e.g. Avian influenza can be transmitted through droplets in air or direct contact with sick birds
3. The farm setup and infrastructure
4. Number of farm personnel



socio-climatic that require a change in the course of the program.

Considerations on the Relationship Between Etiology, Host and Environment Etiological Agents

They will be mentioned simply as pathogens or agents of enteritis because in the epidemiological approach they will be treated as agents of enteric diseases, despite the fact that each agent is represented by innumerable species. They are characterised by being highly resistant to environmental conditions in which they remain viable for months, and entering the organism of a new host through the beak, hence the term faecal-oral transmission diseases.

Hosts

Enteritis agents lack host specificity. This knowledge gives us scientific authority to control the set of agents that cause enteric syndrome in a population and invalidates any control procedure directed at one or a few etiologic agents. Taking *Salmonellae* alone as an example, they have been found to infect more than 2,600 species of cold and warm-blooded hosts.

Environment

The host-parasite relationship is modulated by the environment in its most diverse components, such as socio-economic conditions (poverty and wealth; level of education), climate, nature of the soil, vegetation, forests (presence of predatory animals, wild birds, wild animals), nature of animal exploitation (poultry breeding only or mixed with other animal species), presence of free range and backyard farms etc. The balance of host-parasite relationship is achieved when the environment favours poultry production that is the object of the program and when it is unfavourable, poultry farming faces an increase in the occurrence of diseases and the damages become evident.

It should be noted here, that in disease prophylaxis (eradication, prevention and control) measurements are applied to the different components of the environment. When prophylaxis measurements balance the defensive forces of the host and the offensive forces of the environment, disease manifests itself at a controlled level, as shown in Figure 2, and productivity is not compromised. The balance between the defensive forces of the host and the aggressive forces of the environment.

The chain of transmission or epidemiological chain consists of the following links:

In the context of animal health, the prophylaxis of infectious diseases in poultry population, whether for prevention or control, is always directed at the population of a given geographical area (Animal Health) or at poultry facilities (Veterinary Preventive Medicine/ Biosecurity) and the fundamental requirement for its implementation is the knowledge of epidemiology of transmissible diseases.

It is the science that studies the mechanisms of disease transmission in animal populations and the prophylaxis measures which, for their application, it is necessary to know the etiological agent involved, the host, and the environment.

It is the ability to solve problems with learning how to think and not what to think to outline a poultry health program.

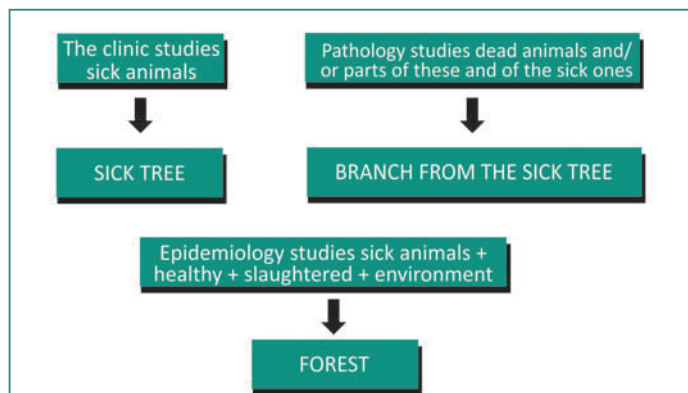


Figure1 : Representation of the pillars of clinical practice, pathology and epidemiology

Without epidemiology there is no scientific basis for the practice of animal health and biosecurity. The focus of the clinician is the sick animal; it is like looking at a sick tree. Its purpose is treatment. The focus of pathology is a part of the animal (macroscopic and microscopic lesions, blood serum, organ fragments) with the objective of studying the path that a pathogenic agent travels in the organism of an infected or diseased animal. It is like looking at the wood of a diseased tree. The focus of epidemiology is the environment where the animals live (farm) and the surroundings where the risk factors are present (freeranging wild and domestic animals) livestock farms, water sources (rivers, lakes, reservoirs), sanitary landfills, garbage dumps, rodents, insects etc.

The disease control programme must be well designed both biologically (effectiveness) and economically (efficiency). It must also be dynamic in order to evolve according to changes in the situation as assessed by the frequency of occurrence of the disease/infection, economic conditions (cost-benefit), political or



Figure 2 :The chain of transmission of the diseases that constitute enteric syndrome



Source of Infection

Domestic and free-living birds, including wild birds that harbour the parasite in their organism and release it into the environment. They can be sick, carriers (healthy, incubating or convalescents and reservoirs) – birds of other species and domestic and wild animals.

Disposal Routes

Ways or vehicle used by the parasite to reach the environment. It is the feces.

Routes of Transmission

Means or vehicles used by the parasite to enter the new host. They are water, food, bedding, flies, beetles, boots, hands contaminated by the parasite.

Entrance Door

Access of the parasite to the new host, which is the mouth.

Susceptible

New host to be infected.

In the absence of effective control measures, this cycle repeats itself indefinitely in the population, resulting in a gradual increase in prevalence.

Prophylaxis Measures

Measures in Relation to Sources of Infection

Treatment of poultry when appropriate and removal of lot when established by legislation (Salmonella).

Measures Related to Transmission Route

Fences on the walls to prevent animals from entering outside the hatchery; sanitary barrier (sanitary gate) and hygiene of employees and visitors); cleaning of areas outside the shed (emphasis on

rodents and flies); complete drinking water treatment, storage and distribution networks; proper waste collection and disposal of dead animals; cleaning and disinfection of the floor, feeders, drinking fountains, curtains in the sanitary void, beetle control in the sanitary vacuum, prevention and control of pests (rodents, flies and beetles du. ring lodging).

Measures Relating to Susceptible

Vaccination when available.

Outlining an Enteric Syndrome Control Program – Biosecurity

1. Guideline

Definition of initial, intermediate and final objectives. Drafting of the Procedures Manual and preparation of standard operating procedure (SOP) sheets.

Initial Objective is to introduce biosecurity measures. Intermediate Objective is to reduce morbidity and/or mortality and increase productivity; Final Objective or Purpose is to improve the health conditions of the birds.

2. Execution

Preparatory Phase includes continuous and systematic application of procedures set down. It involves periodic evaluation to correct the course. The Consolidation Phase is to reach the final objective, adjusting biosecurity measures to prevent the reoccurrence of infections or diseases. And the final Maintenance Phase is the continuation of the previous phase, but integrating it into the Animal Health Plan of the establishment or zone.

This needs to be followed by periodic evaluations, not only by performing laboratory tests to assess the presence or absence of the pathogen, but mainly through statistical analysis of health indicators (morbidity, mortality); production indicators.

The statistical tests are quite simple, such as the test of difference between proportions for qualitative variables and the test of difference between averages for quantitative variables, always establishing *q priori*, the level of rejection of the null hypothesis. (*a ou p*).

The components of biosecurity measures are Conceptual biosecurity, Operational biosecurity and Structural biosecurity. Conceptual biosecurity refers to the prevention or control measures against hazards in the environment to delimit the measures related to the fence and sanitary gate. Structural biosecurity refers to prevention or control measures against hazards present in facilities, objects, utensils, beddings, pests etc. Operational biosecurity refers to hygiene measures to internal staff, visitors, subcontracted and permanent staff.

Here's a basic and detailed biosecurity checklist for poultry farms to use for their biosecurity requirements.



BIOSECURITY CHECKLIST

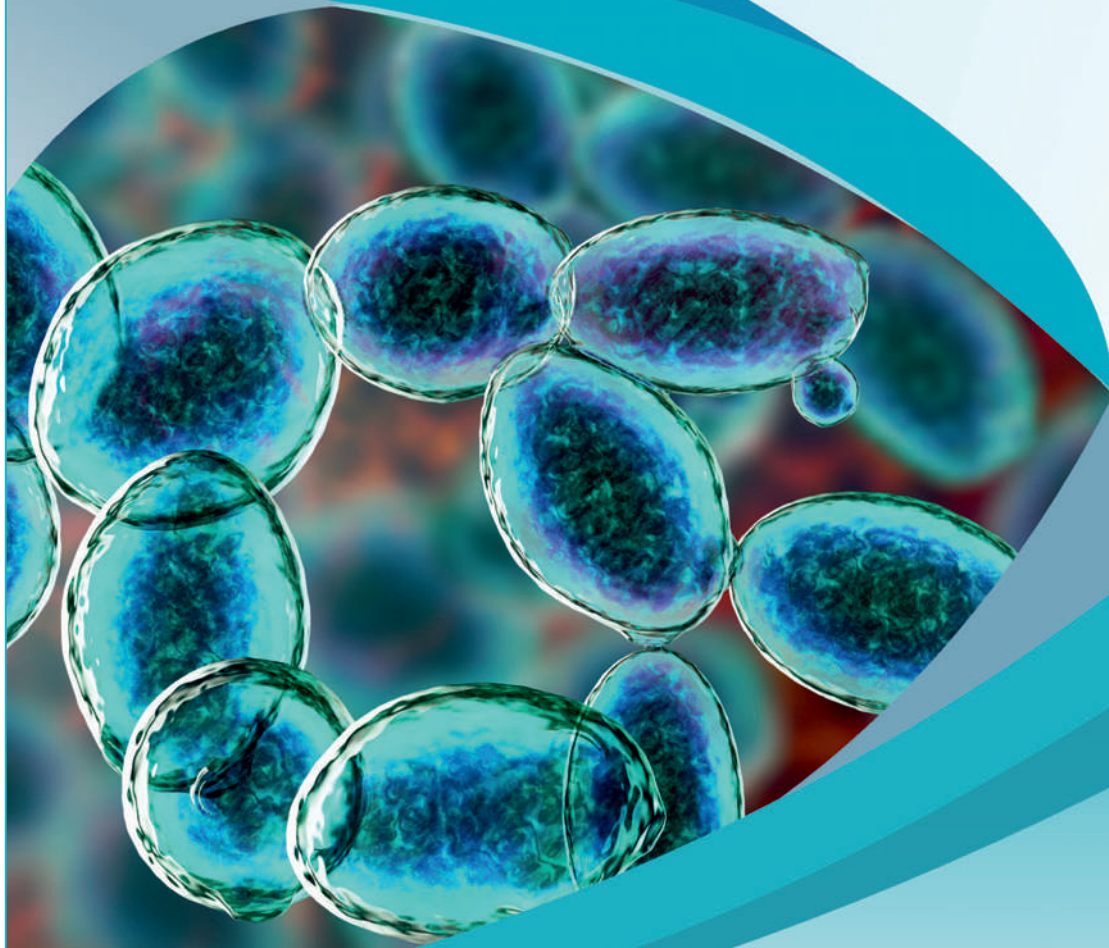
1.	Premises	YES	NO
	Are premises positioned away from major roads and routes?		
	Are premises situated away from dams and other major water bodies?		
	If there are waterbodies close by are they covered to prevent waterfowl from settling?		
	Are there biosecurity warning signs at the entrance?		
	You should have signs informing visitors of any biosecurity requirements you have (e.g. Personal Protective Clothing)		
	Is the farm fenced with sufficient deterrents for predators & unauthorised access? (The farm or area around the chicken houses should ideally be completely fenced and unauthorised access prevented)		
	Do you have trained site staff in control at access points to manage entrance and egress and help with biosecurity procedures?		
	Do you only allow essential vehicles, people and equipment on the farm?		
	"Do you have a way of keeping record (e.g. visitor's book) at the access point? This book should record movement in and out of the farm of vehicles, equipment and people."		
	Do you have a way of checking whether visitors, to the farm have not been in contact with other poultry from other regions for at least 72 hours?		
	Do you have a way of checking where vehicles and equipment have been before entering?		
	Do you have a way of properly disinfecting vehicles and equipment as they enter the farm?		
	Do you have a way of controlling that personnel do not bring in or take out chickens/equipment/visitors on the premises without proper authorisation?		
	Do you ensure that the sequence of visiting flocks/houses is from the youngest flock age to the oldest flock age?		
	Is your shower unit/complex separated from the houses?		
	Do you ensure that there is no movement in the shower unit from the "clean" side to the "dirty" side?		
	Is the protective clothing issued assisting with distinguishing between visitors and staff?		
	Do you ensure that when site staff bring in food on site it is in a sealed container?		
	Is the office separate from entry and exit points and shower premises?		
	Is there a well maintained footbath placed at entrance to poultry houses on site?		
	Is there a notice of the correct use of footbaths close to where these are situated?		
	Are the sides of the poultry houses (anywhere where birds and vermin can enter) covered with a suitable netting material that prevent all unwanted birds?		
	Is there adequate vermin control?		
	Do you have a pest control procedure?		
	Is there a potable water supply?		
	Is water suitably monitored?		
	Is your feed kept in an area that birds or vermin cannot access and is it protected from the elements?		
	Do you have a dedicated place where farm mortalities are kept and disposed of away from the chicken houses?		
	Is there adequate housekeeping both outside and inside the chicken houses?		
	Is there adequate drainage of water around the houses?		
	Is the area around feed silos clean and does not attract vermin or birds? (No feed spillages)		
2.	Personnel	Yes	No
	Do your personnel shower upon entering and exiting the site?		
	If there is no shower facility is there a demarcated change facility?		
	Are personnel provided with a change of clothes from "street clothes"?		
	Do you provide for a place where personnel can store personal clothing and items at the external side/ "dirty" side of the shower?		
	Are your personnel provided with sufficient farm clothes hooks and storage space available at shower points of entry and exit?		
	Are you personnel provided with gumboots at shower points of entry and exit?		

	Are your personnel supplied with an additional pair of colour-coded boots on entry of the chicken houses? (need to be able to tell the difference between the boots for walking outside and inside the chicken house)		
	Are your personnel provided with protective wear?		
	All personnel entering or exiting using the footbath effectively?		
	Is the flow on the shower facility from dirty to clean?		
	Is the PPE provided clean and not a source of contamination for the farm? (PPE should be cleaned and decontaminated depending on the level of biosecurity desired)		
3.	Visitors	Yes	No
	Are vehicle access gates locked at all times?		
	Is the entrance and egress of persons on foot managed?		
	Are vehicle and equipment moved between farms?		
	Are vehicle and people checked if they have not been on another poultry farm? E.g. for at least the past three days.		
	Are visiting vehicles, personnel vehicles, and feed and maintenance vehicles at access point of entering sites and departure disinfected?		
	Are vehicle that transport placement, transfers and depletion chicks cleaned and disinfected?		
	Is there a dedicated "dirty" vehicle available for use in an event of a notifiable disease outbreak? (This vehicle is disinfected but is used to carry potentially contaminated things)		
4.	Equipment	Yes	No
	Is all equipment used on the farm and/or in the houses dedicated to the farm and/or chicken house?(ideally equipment should be dedicated to houses as far as possible)		
	Is all equipment entered on farm disinfected through fumigation or spraying with a disinfectant?		
	Is all farm equipment sanitized during the clean-out phase?		
	Is equipment kept in a sanitary condition to prevent harboring of dust, insects and vermin?		
5.	Feed	Yes	No
	Is feed sourced from a reputable supplier		
	Do they follow HACCP?		
6.	General	Yes	No
	Do you know your flock's disease status?		
	Do you purchase chickens from a reputable supplier (chicks and pullets)?		
	Do you have a vaccination programme?		
	Do you have adequate quarantine procedures for people, equipment and birds?		
	Are shavings adequately disinfected such that they do not introduce diseases?		
	Are personnel encouraged to have good hygiene practices? E.g. Use PPE and disinfectants as needed		
	Do you periodically train your personnel on biosecurity and how to identify sick chickens?		
	Do you have a Biosecurity Plan?		
	Do you have a cleaning and disinfection programme?		
	Are dead birds and manure handled in a way that does not pose a biosecurity risk?		
	Do you have standard operating procedures for ensuring that you comply with the things indicated above?		



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Article

Challenging International Trade Dynamics - United Efforts of Industry and Regulators Can Address Trump's Tariff Threat



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Managing Director



Dr. Priyanka Kamble
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Huvepharma SEA (Pune) Pvt. Ltd

The United States' latest move towards reciprocal tariffs has created serious concerns for India's agricultural and livestock sectors. While the exact details of the tariff hikes are yet to be revealed, early signs suggest a major impact

on Indian farm exports, with poultry being one of the hardest-hit industries. If these tariffs are implemented, they could weaken India's competitive position, disrupt trade, and cause heavy financial losses for farmers and exporters.

A Harsh Reality: Indian Agriculture and Poultry Under Fire

According to the Global Trade Research Initiative (CTRI), Indian exports—especially in agriculture—are at high risk of facing sharp tariff hikes. The report highlights that shrimp, dairy, and processed foods could be among the most affected. While poultry is not specifically mentioned, it falls under the broader agricultural category, meaning it could face similar challenges, possibly leading to a significant drop in exports.

Under the proposed reciprocal tariff system, the United States wants to match India's high import duties on US farm products. The figures are striking—while India currently imposes an average of 37.7% tariffs on US farm imports, the US charges only 5.4% on Indian agricultural exports.

This imbalance has led to the possibility of higher US tariffs on Indian farm goods, including poultry, which could take effect soon.

India has maintained a 100% import duty on US frozen chicken legs since 2023 to protect its domestic poultry industry. This high duty was introduced to prevent an influx of cheap American chicken, which is often sold at lower prices due to limited demand in the US. Without this protection, Indian poultry farmers could struggle to compete, as low-cost imports might flood the market and drive down local prices.

In contrast, India has reduced import duties on certain other US food items. For instance, tariffs on products like frozen turkey and specific berries were lowered to 5-10% in early 2024 as part of trade adjustments. However, the 100% duty on US frozen chicken legs remains unchanged, highlighting the sector's sensitivity and the government's continued commitment to shielding domestic poultry producers.

Now, with the US considering retaliatory tariffs on Indian agricultural exports, the situation could become even more challenging. If higher duties are placed on shrimp, dairy, or processed foods and poultry, it could put immense pressure on



India's agri- livestock sector. This rising trade tension underscores the need for strategic negotiations to safeguard India's farming and poultry industries from economic setbacks.

The Broader Trade Conflict: US Pressures India on Tariff Reductions

The US Secretary of Commerce has insisted on a broad-based trade agreement under which India would lower tariffs across various sectors, rather than engaging in a prolonged, product-specific negotiation process. However, this approach has raised concerns as the US is exerting significant pressure on India to accept trade demands that overwhelmingly favour American



interests. The emphasis on placing “everything on the table” could lead to concessions that may not align with India’s long-term strategic goals.

Agriculture, along with other sensitive sectors such as dairy, marine, and poultry produce, must remain excluded from any such trade-offs. The US argument that India imposes high tariffs on American agricultural products is not without merit, but it overlooks the broader livelihood and economic dimensions of India’s agricultural sector. Low tariffs on US agricultural exports to India could open the floodgates to subsidised American farm products, undermining domestic farmers and eroding rural employment.

While India’s total agricultural, dairy, and marine exports to the US currently stand at just \$5 billion, the immediate impact of retaliatory tariffs may seem manageable. However, the long-term consequences could be far more damaging.

A further decline in exports below this already modest figure would leave little room for recovery, particularly in sectors where India is still striving to gain a foothold.

The poultry industry, in particular, faces an existential threat—if export barriers tighten, it could inflict massive losses on Indian poultry farmers and exporters, crippling a sector that has long been a cornerstone of India’s agri-trade ambitions.

Why the Poultry Industry Should be Concerned

The poultry industry, one of the fastest-growing parts of India’s agricultural sector, could face serious problems if these tariffs are imposed:

- **Loss of Market Access:** The US has been an emerging market for Indian poultry exports. Higher tariffs could make it too expensive for Indian producers to sell there, forcing them to look for alternative markets in an uncertain global economy
- **Reduced Price Competitiveness:** If tariffs rise sharply, Indian poultry will struggle to compete with Brazil, Thailand, and the US itself, which are already dominant in the global poultry trade
- **Supply Chain Disruptions:** Many Indian exporters have long-term trade agreements with US buyers. A sudden increase in tariffs could break these partnerships, leaving Indian exporters with unsold stock and financial losses
- **Impact on Domestic Markets:** If poultry exports slow down, excess supply may flood the domestic market, leading to falling prices and losses for farmers

How the Poultry and Agriculture Industry can Respond

As the threat of US tariffs looms large, India’s poultry and agricultural sectors must act quickly to limit the damage. Here’s what needs to be done:

- **Immediate Trade Discussions:** The Indian government must



negotiate with US officials to reduce the risk of excessive tariff hikes and ensure fair trade terms

- **Defending Strategic Sectors:** Policymakers must strongly argue for the exclusion of agriculture, dairy, and marine sectors from broader trade negotiations to protect farmers’ interests
- **Exploring New Markets:** Poultry exporters should look for alternative markets in Europe, the Middle East, and Africa to lower their dependence on the US
- **Investing in Higher-Value Products:** Processed and premium poultry products can fetch better prices, even with higher tariffs, helping exporters maintain profits
- **Revisiting Domestic Trade Policies:** India should reconsider its own high import duties on US agricultural products to avoid worsening trade tensions while maintaining protective measures where necessary

The Road Ahead: A Call to Action

If the US goes ahead with its tariff hike, India’s poultry and farm exports could face serious financial losses, threatening jobs and billions in revenue. The industry must come together, engage with policy makers, and take steps to protect its future.

The global trade environment is changing fast, with protectionist policies becoming more common. Will India act in time to safeguard its agricultural exports? The coming months will decide whether India remains strong in the global poultry trade or struggles under increasing tariff pressures.



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Cleantab: Enhancing the Health of Poultry by Combating Harmful Microbes in the Water



Introduction

Water is the most critical nutrient in poultry production, but often overlooked. The total content of water in a bird averages from 65-70% of its lean body mass and water consumed by birds is generally

utilised for nutrient transportation, body temperature regulation, joint lubrication and various intra and extracellular biochemical reactions. Water is needed in every aspect of animal metabolism. Water is also a primary constituent in two of the most essential processes of life in chicken digestion and respiration, which is key to thermoregulation. To keep the poultry flock healthy, adequate quality and quantity of potable water should be provided throughout the rearing period. Drinking water systems should be cleaned and flushed on a regular basis to remove any microbiological or mineral buildup in the lines. Water is presumed safe if it has no microbial population, as long as the mineral content is safe and there are no undesirable pollutants. However, the amount of bacteria in water is not always associated with disease in flocks until it exceeds a particular infectious threshold. Table 1 shows the allowable quantities of bacteria in colony forming units (cfu) per milliliter (ml) in drinking water for poultry operations.

According to research, more than 95% of the biomass in water pipes sticks to the pipe walls as biofilm, leaving only 5% hanging in the bulk water. Under favourable conditions such as a suitable coop temperature, low water flow in the waterline, and adequate nutrients, DWS can produce a perfect environment for microbial development. *Campylobacter jejuni*, *E. coli*, *Pseudomonas*, and *Salmonella* are common bacteria discovered in poultry drinking water that create biofilms in DWS. Various tactics are used to improve water quality, including acidity and magnetisation of drinking water, both of which have been shown to suppress pathogen growth. Treatment with these strategies has been found to increase animal development performance and minimise disease spread. Chlorinated drinking water is widely employed in the poultry industry due to its convenience of use, cost-effectiveness, and broad antibacterial characteristics.

Sodium Dichloroisocyanurate (NaDCC)

NaDCC, a sodium salt of chlorinated hydroxytriazine, provides free available chlorine (FAC) in the form of hypochlorous acid (HOCl) for water disinfection. Sodium dichloroisocyanurate

Table 1: Drinking Water Quality Guidelines for Poultry

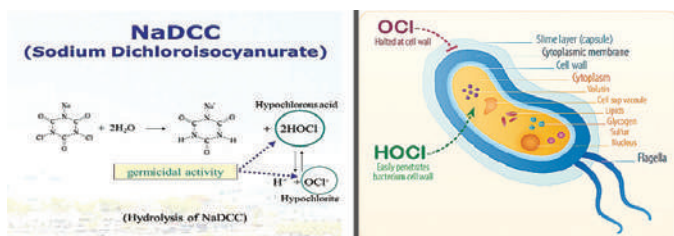
Contaminants	Ideal level	Max. acceptable level	Remarks
Total Bacteria	0/ml	100/ml	0/ml is desirable
Coliform Bacteria	0/ml	50/ml	0/ml is desirable
Nitrates and Nitrites	--	25mg/l to 45mg/l	Levels from 3 to 20mg/l affects performance
pH	6.8 to 7.5	--	A pH of less than 6.0 is not desirable. Levels below 6.3 may degrade performance
Total Hardness	60 to 180mg/l as CaCO ₃	--	Hardness levels less than 60 are unusually soft; greater than 180 are very hard
Calcium	60mg/l	--	--
Chloride	14mg/l	250mg/l	Levels as low as 14mg/l may be detrimental if the sodium level is higher than 50mg/l
Copper	0.002mg/l	0.6mg/l	Higher levels produce a bad odour and taste
Iron	0.2mg/l	0.3mg/l	Higher levels produce a bad odour and taste
Lead	---	0.2mg/l	Higher levels are toxic
Magnesium	14mg/l	125mg/l	Higher levels have a laxative effect. Levels above 50mg/l may affect performance if magnesium and chloride levels are high
Sodium	32mg/l	---	Levels above 50mg/l may affect performance if sulfate or chloride levels are high

Source: Carter and Sneed

(NaDCC), a white powder with a molecular weight of 219.9 g/mol, is deemed safe and effective for disinfecting drinking water. Sodium dichloroisocyanurate (NaDCC) is known commercially as Cleantab (Stallen South Asia. Pvt. Ltd).

Dissociation of Cleantab (NaDCC) in Water

NaDCC releases half of its free available chlorine initially, leaving "reservoir chlorine" that is released once the original free available chlorine has been used up. NaDCC tablets' reservoir chlorine may be especially advantageous when water is subject to high organic loads, as is common in resource-poor and remote settings. NaDCC (sodium dichloroisocyanurate) releases HOCl (Hypochlorous acid) and OCl (Hypochlorite acid) in water, while other chlorinating agents release only OCl. Hypochlorous acid



Dissociation of Cleantab

Mode of action of Cleantab

(HOCl) is 80-100 times more effective as hypochlorite ion (OCl^-). HOCl works faster because it is electrically neutral and is able to enter the negatively charged cell wall, while OCl^- is electrically negative and is, therefore, repelled by the cell wall (like two negative magnets) and can only act on the surface.

What is Biofilm?

A biofilm is a collection of organic and inorganic, living and dead material collected on a surface. Once attached, they form extracellular polymeric substances (EPS) which are very tough polysaccharides that protect the bacteria from degradation. Biofilm provide a home for harmful pathogenic organism which are dangerous for the health of birds. Biofilms are also known to cause blockages in small tubing, pipes and nipples.

Mode of Action of Cleantab

Cleantab (NaDCC) releases HOCl and OCl^- on exposure with water. HOCl primarily causes cell damage of microbial cell due to its oxidative action. HOCl hydrolyses the peptide chains of micro-organism. It decreases the ATP production of microbial cell leads to microbial cell death. HOCl can oxidise and break down the extracellular polymeric substances (EPS) that protect and hold the biofilm together. This disruption of the EPS matrix allows NaDCC to penetrate deeper into the biofilm. This leads to the microbicidal and biofilm disruption action of Cleantab.

Dosage

For normal water 1 tab for 600L of water. For heavy to moderate contamination 1 tab in 300L of water.

1 Tablet/Volume of water						
Application	For birds	Roof spraying	Hand washing	Equipment	Vehicle	Foot bath
Water (L)	600 (normal water) 300 (heavy to moderate contaminated water)	600	30	6	3	3

Advantages of Cleantab Over Other Water Sanitisers

Comparative points	Cleantab (NaDCC)	H_2O_2	NaOCl	O_3
Stability	Very stable	Less stable at higher temperature	Stable degrade over the time	Unstable generated on site
Cost	Lower cost	More expensive when used in bulk	Moderate cost	Higher cost
Activeness on different pH	Active on broad pH range.	Neutral to slight acidic pH.	Active in neutral to slightly alkaline pH.	Active across a wide range of pH but costly
Long action	It has long action due to reservoir chlorine	It does not act for long time.	It does not act for long time.	It does not act for long time as it decomposes quickly.

Benefits

Cleantab is effective against common microbes like E. coli, Pseudomonas, Salmonella and Campylobacter jejuni etc. It also reduces ammonia and hydrogen sulphide gas in faecal matter of poultry birds. Cleantab has broad spectrum uses in poultry - cleans and inhibits biofilm formation, active in hard water, gentle, safe and easy to use.

Conclusion

Stallen South Asia Pvt. Ltd. provides effective and affordable solution for sanitisation of water used on poultry farms. Cleantab is effective against microbes like E. coli, Pseudomonas, Salmonella, Campylobacter and Clostridium etc which hampers production.

References available on request





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IPR Espresso

Americans Smuggling Eggs From Mexico? Cracking Under Pressure

Egg prices in the US have skyrocketed, reaching over \$10 per dozen in some cities. Meanwhile, in Mexico, eggs cost as little as \$2, sparking a wave of desperate smuggling attempts. Border agents report a 36% rise in egg interceptions, with San Diego seeing a 158% increase. Some smugglers hide eggs under blankets or in car seats, risking a \$300 fine. The crisis stems from avian flu, which has devastated US poultry farms. The government is cracking down, launching investigations of imposing a 25% tariff on imports. As prices climb and desperation grows, Americans are willing to take risks for a cheaper breakfast.

The egg war is far from over. President Trump is defending his tariffs as U.S. allies retaliate. Also, Trump says his administration has done a lot of things to get egg prices down.

IPEMA Champions Innovation and Collaboration at Key Poultry Conferences

The Indian Poultry Equipment Manufacturers Association (IPEMA) reinforced its leadership in the poultry sector by actively participating in two significant industry events—the Conference on Livestock and Poultry Development in North East India (Shillong, Meghalaya) and the WVPA (India) Conference 2025 (Puducherry).

IPEMA at the Conference on Livestock and Poultry Development in North East India

Held on 27th & 28th February and organised by the Indian Chamber of Commerce in collaboration with the North Eastern Council (NEC), Ministry of DoNER, the event focused on enhancing poultry and livestock development in the North East.

Uday Singh Bayas, President of IPEMA, spoke at Plenary Session III on 'Poultry Developments,' addressing industry trends, technological advancements, and sustainable farming practices. IPEMA emphasised the importance of advanced equipment, biosecurity measures, disease management, and efficient supply chains to modernise poultry production in the region. It also reaffirmed its commitment to empowering poultry entrepreneurs in North East India through innovation, investment, and collaboration.

WVPA India Conference 2025: Advancing Poultry Science and Innovation

The WVPA (India) Conference 2025 took place at the Rajiv Gandhi Institute of Veterinary Education and Research (RIVER), Puducherry, under the theme "Wings of Innovations: Flock Forward for Future Poultry Production."

Prominent speakers included:

- Mr. Tarun Shridhar, I.A.S. (Retd), Former Secretary, DAHAD, Govt. of India (Keynote Speaker)
- Dr. K.N. Selvakumar, Vice Chancellor, TANUVAS
- Dr. U.C. Sharma, President, Veterinary Council of India
- Dr. A.S. Ranade, Technical Advisor, VIP

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- Dr. Shirish Nigam, President, INFHA
- Mr. Uday Singh Bayas, President, IPEMA
- Dr. Abhinav, University of Connecticut, USA
- Dr. Ong Hipra, Malaysia
- Mr. Ranpal Dhanda, President, PFI
- Dr. Jeetendra Verma, President, WVPA India

IPEMA President, Uday Singh Bayas was felicitated for IPEMA's contributions to industry innovation.

With active participation in these two prestigious events, IPEMA continues to spearhead innovation, modernisation, and collaboration in the Indian poultry sector. The association remains dedicated to advancing poultry technology, ensuring sustainable growth, and fostering industry-wide partnerships for a more resilient future.



First Person

In Conversation With...

Innovation continues to be the driving growth factor for Kärcher GMBH globally. In 2011 the company launched over 100 new products as they entered India. A global market leader in cleaning technology, the company is characterised by ingenuity, world class performance and innovative problem solving. **IPR** catches up with **Jatinder Kaul**, Managing Director, Kärcher India on the company's eventful journey in the Indian poultry industry

Kärcher India, a subsidiary of Kärcher GMBH, headquartered in Germany is the world's leading cleaning technology provider across industries. This family owned enterprise is spread across 78 countries and 150 subsidiaries with 14,400 employees worldwide. In India since 2011, it has 14 branch offices and provides a wide range of cleaning solutions for domestic and industrial use. Led by Managing Director, Kärcher India, Jatinder Kaul, with a team of 300 employees and a wide network of dealers and service centres across the country, it provides products such as high-pressure washers, vacuum cleaners, floor scrubbers etc.

Kärcher India strongly focuses on providing after-sales service and support to its widely engaged customer base in India. The company designs its products, services and processes to be environmentally compatible.

IPR Kärcher is globally known for its cleaning technology. How do you see the role of advanced cleaning solutions in the Indian poultry sector?

JK The Indian poultry sector is evolving rapidly, and maintaining high hygiene standards is crucial to preventing disease outbreaks, ensuring bird health, and improving productivity. Traditional cleaning methods are labour-intensive, water-consuming, and often inconsistent in eliminating harmful pathogens. Kärcher's mechanised cleaning solutions, such as high-pressure washers, industrial vacuum cleaners, and steam cleaners, provide efficient, consistent, and scientifically proven cleaning methods that reduce microbial contamination. By integrating automated and high-performance cleaning systems, poultry farms can achieve superior hygiene while optimising resources like water, time, and workforce efficiency.

IPR What are the key differences in cleaning requirements for broiler farms, layer farms, and breeder farms?

JK Each poultry farming type has specific cleaning challenges, requiring tailored solutions to meet these unique requirements:

- **Broiler Farms:** Require intensive deep cleaning between batches to prevent bacterial build-up and maintain flock health. High-pressure washers effectively remove organic waste and biofilm, ensuring a sanitised environment
- **Layer Farms:** Demand regular upkeep to maintain egg



hygiene. Industrial vacuum cleaners and sweepers help manage dust and debris efficiently

- **Breeder Farms:** Need stringent disinfection protocols to prevent disease transmission to offspring. Steam cleaners provide chemical-free sanitisation, reducing the risk of cross-contamination

By utilising mechanised cleaning solutions, poultry farms can enhance biosecurity and maintain consistent hygiene standards with minimal manual effort.

IPR With increasing concerns about antimicrobial resistance (AMR), how can effective cleaning solutions reduce reliance on disinfectants and antibiotics?

JK Antimicrobial resistance is a serious global challenge, and preventive cleaning plays a vital role in reducing dependence on antibiotics. High-pressure washers and

steam cleaners ensure thorough organic matter removal, which is crucial because disinfectants work best on clean surfaces. By using hot water high-pressure cleaners and steam technology, farms can achieve 99.99% bacteria elimination without relying heavily on chemical disinfectants. This approach reduces chemical usage, minimises residue, and promotes healthier livestock, ultimately contributing to sustainable poultry farming.

IPR **IPR: How do you see the regulatory landscape evolving in terms of biosecurity and sanitation in Indian poultry farms?**

JK JK: Biosecurity regulations in India are becoming increasingly stringent as authorities focus on disease control, food safety, and environmental sustainability. We anticipate mandatory sanitation protocols, stricter waste disposal guidelines, and reduced antibiotic usage in poultry farms. Mechanised cleaning solutions align with these evolving regulations by offering water-efficient, chemical-free, and high-performance cleaning technologies that meet global hygiene standards. Such equipment helps poultry farmers comply with emerging policies while optimising their operational efficiency.

IPR **What initiatives have you undertaken to promote sustainable cleaning practices in India's poultry industry?**

JK At Kärcher, sustainability is at the core of our innovation strategy. We actively promote:

- **Water-saving cleaning solutions:** Our high-pressure washers use up to 80% less water than traditional methods while delivering superior cleaning power
- **Chemical-free steam cleaning:** Kärcher's steam cleaners eliminate pathogens using only superheated steam, reducing chemical dependency
- **Energy-efficient technology:** Our hot water pressure washers optimise energy consumption while maximising cleaning effectiveness
- **Training & awareness programs:** We work closely with poultry farmers to educate them on best practices for mechanised, sustainable cleaning to enhance biosecurity and environmental responsibility

IPR **How is Kärcher incorporating smart technology, or IoT, in its cleaning solutions for poultry farms?**

JK Kärcher is pioneering smart, data-driven cleaning solutions that enhance efficiency and monitoring in poultry farms. Our IoT-enabled high-pressure washers offer:

- **Real-time performance tracking:** Farmers can monitor water usage, operating time, and machine efficiency remotely
- **Predictive maintenance:** Smart sensors detect potential issues and send alerts, minimising downtime and reducing maintenance costs
- **Automated cleaning programs:** Pre-set cleaning cycles eliminate manual inconsistencies and ensure standardised hygiene levels

By integrating remote monitoring and operational analytics, Kärcher's smart cleaning solutions empower poultry farmers with greater control and transparency.

IPR **How do your pressure washers and steam cleaners compare to traditional cleaning methods in terms of efficiency and effectiveness?**

JK Traditional cleaning methods rely heavily on manual labour, excessive water use, and inconsistent results. Kärcher's mechanised cleaning solutions offer a faster, more efficient, and resource-optimised alternative:

- **High-pressure washers (HD & HDS series):** Deliver deep cleaning in half the time compared to manual scrubbing while using up to 80% less water
- **Steam cleaners:** Provide chemical-free disinfection, eliminating bacteria and viruses at high temperatures
- **Industrial vacuum cleaners:** Effectively remove dust, feathers, and debris without dispersing contaminants into the air

By replacing outdated methods with Kärcher's mechanised cleaning technology, poultry farms can enhance hygiene, improve workforce efficiency, and lower operational costs.

IPR **What is the ROI for poultry farmers when switching from manual cleaning to automated cleaning solutions?**

JK Investing in mechanised cleaning solutions delivers a high ROI by improving efficiency, biosecurity, and long-term cost savings. Key benefits include:

- 30-50% improvement in workforce efficiency due to optimised cleaning processes
- Up to 80% water savings with high-pressure technology
- Faster turnaround times between production cycles, increasing farm productivity
- Extended equipment lifespan due to reduced exposure to corrosive cleaning chemicals
- Improved bird health and higher yield from superior hygiene practices

By switching to advanced cleaning solutions, poultry farmers gain long-term savings, improved operational efficiency, and better compliance with biosecurity regulations.

IPR **What is Kärcher's long-term vision for transforming poultry farm sanitation in India, and what innovations can we expect in the coming years?**

JK Kärcher's vision is to redefine poultry farm sanitation in India by integrating innovative, sustainable, and mechanised cleaning solutions that enhance efficiency and hygiene. Our focus areas for future development include:

- Fully mechanised cleaning systems for large-scale poultry operations
- Eco-friendly technologies that reduce water and chemical consumption
- Advanced steam and hot water solutions for chemical-free disinfection
- IoT-based remote monitoring to help farmers track and optimise their cleaning processes

We are committed to empowering poultry farmers with next-generation cleaning solutions that drive efficiency, enhance food safety, and contribute to a healthier, more sustainable poultry industry in India.



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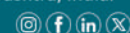
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Event

Glamac's Annual Meeting 2024-25

Glamac International Pvt. Ltd. organised its Annual Meeting at Pattaya from 9th to 13th March. The event brought together teams from India, Nepal, and Bangladesh to review performance, unveil a new product, and strategise for the future.

Key Highlights of the Meet

- **Strategic Roadmap:** Managing Director, Abir Mukherjee outlined the company's vision in "Way Forward 2025-2026"
- **Marketing & Sales Strategies:** Dr. Manish Chaurasia (AGM - Sales & Marketing - Key Accounts) led sessions on brand promotion, while Dr. Rajesh Reddy (Product Manager) presented insights on digital marketing
- **Product Launch:** Dr. Sumon Nag Chowdhury (AGM - Technical & Marketing) introduced the new product 'VAP', followed by an interactive demo product detailing session by Dr. Rahul Mogale (Product Manager)
- **Performance & Budgeting:** Sales Review for 2024-25 was presented by Vinod Mishra, AGM - Sales North & South and Amit Debnath, Zonal Sales Manager, East & Nepal. Sujit Jadhav, Sr. Manager, Finance and Operations presented Budget 2025-26. . The meeting also featured an open forum with senior management.

The Annual Award Ceremony celebrated outstanding contributions:

- **Best Employee:** Sujit Sitaram Jadhav
- **Glamac Superstar:** Rohit Gulati (Promoted to Sr. Regional Manager)
- **Crowning Achievement:** Rizwan Basha and Rajesh Bihari Jauriyar
- **Top Performer:** Dr. Rahul Sambhaji Mogale and Upendra Kumar Dwivedi (Promoted to Regional Manager)
- **Commitment & Sincerity:** Dr. Sumon Nag Chowdhury and Ramakrishna Amancha

According to Abir Mukherjee, "Our Annual Meeting is a testament to our commitment to innovation, collaboration, and excellence. As we move forward into FY 2025-2026, we remain focused on innovative products, delivering exceptional solutions and fostering global partnerships and sourcing."

Glamac is strengthening its leadership team where Key Account business in South Asia will be the major focus area with the appointment of Dr. Manish Chaurasia - AGM Sales & Marketing -Key Accounts and KBD Md. Mehedi Hasan - Country Manager -Bangladesh.





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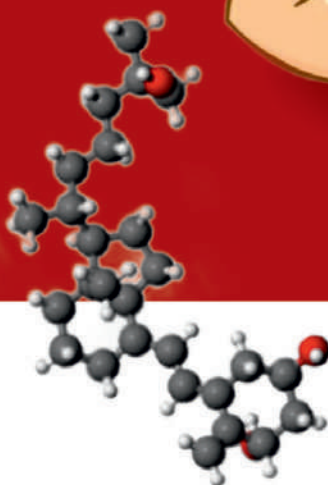
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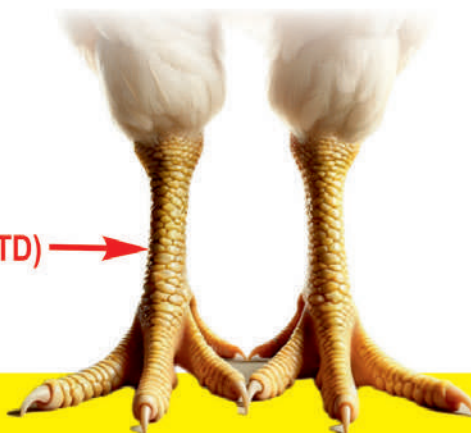
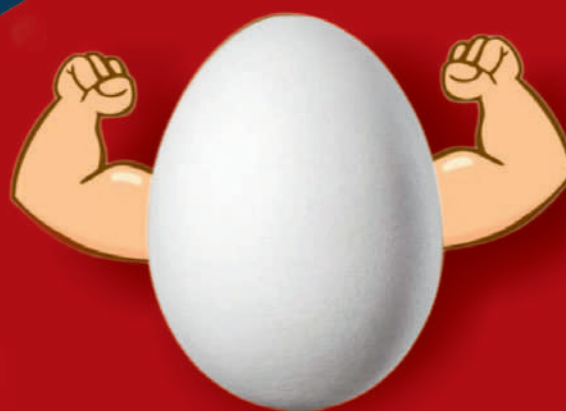


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Event

CLFMA Seminar at Kolkata



CLFMA of India, in association with U.S. Grains Council and West Bengal Poultry Federation organised a seminar in Kolkata on 6th March titled, “Poultry Scenario – What Lies Ahead.” In his opening address, Sumit Sureka, Deputy Chairman, CLFMA of India, highlighted the poultry sector’s significant contribution to India’s food and nutritional security and its integration with the broader agricultural economy.

Chairman, CLFMA of India, Divya Kumar Gulati, highlighted the need for innovation, policy cohesion, and diversified feed strategies to navigate challenges such as supply-side pressures, rising input costs, and regulatory uncertainties.

In their presentations, Amit Sachdev and Reece Cannady, both of the U.S. Grains Council provided insights into global feed stock trends and suggested U.S. sorghum as a potential alternative feed ingredient for the poultry sector in India.

Dr. Harshakumar Shetty of Venkateshwara Hatcheries presented an overview of the Indian poultry sector and highlighted key challenges and emerging opportunities.

Dr. Ajit S. Ranade, Head, Technical Committee, CLFMA of India spoke about the various educational and skilling interventions initiated by CLFMA of India.

The presentations were followed by a panel discussion moderated by Divya Kumar Gulati. Participants in the panel discussion were Sumeet Sureka, Sameer Agarwal, Dr. Harshakumar Shetty, Madan Mohan Maity, Neeraj Kumar Srivastava and Naveen Pasupathy.

The seminar concluded with the vote of thanks by Sameer Chotai, President (East Zone), CLFMA of India.

The event was coordinated and executed with utmost finesse by industry veteran, T. Srinithi, Executive Director, Amrit Breeder Farms.





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Event

PFI Delegation Visits Kemin Plant

A Poultry Federation of India (PFI) team comprising Ranpal Dhanda, Sanjeev Gupta, Rahul Khatri and Ricky Thaper recently visited the Ambattur Industrial Estate, Chennai manufacturing facility of Kemin Industries South Asia Pvt. Ltd.

This visit provided insights into the cutting edge research, sustainability initiatives and advanced processes of Kemin Industries.

The team from Kemin which facilitated the visit included Sushanta Dey, Director-Marketing, Dr. Saravanan Sankaran, Director-Sales (Monogastrics), Dr. Sushant Labh, National Techno Commercial Manager - Enzymes, Dr. Bayjut Bostami, Business Manager-Sales, Rahul Mittal, Product Manager-Enzymes and Vijayakumar J, General Manager-Operations.



Announcement

IPA Acquires Kwaliti Animal Feeds

Indian Poultry Alliance (IPA), a subsidiary of Allana Group recently acquired Kwaliti Animal Feeds Pvt. Ltd. for Rs. 300 crores with a another Rs. 200 crores earmarked for further expansion. This acquisition reinforces IPA's vision to drive consolidation and growth in the Indian poultry sector.

Kwaliti Animal Feeds, established in 1983, has built a reputation for high quality animal feed, live chicken, and processed poultry products. With a fully integrated business model which includes feed mills, soy processing, breeding farms, hatcheries, broiler integration, and value added poultry products, the company has a strong presence in western and southern India.

This acquisition integrates Kwaliti's partnerships with major food service providers and QSRs into IPA's supply chain, thereby enhancing efficiency, expanding market reach, and fostering innovation in poultry and animal nutrition solutions.

Commenting on the acquisition, Moiz Chunawala, Chairman IPA, said "This acquisition further strengthens our poultry value chain, enhancing efficiency, sustainability, and market reach. Leveraging our deep expertise and world-class infrastructure, we are investing in advanced technologies, automation, and precision breeding to drive productivity while minimising environmental impact. Our commitment to responsible waste management and ethical sourcing will set new industry benchmarks, delivering lasting value to both partners and consumers. As part of its expansion strategy, IPA will invest Rs 2000 crores over the next three years to scale up to 7 manufacturing units, integrate advanced technology, and strengthen cold chain logistics and distribution networks. This investment will also fuel our expansion



into key metropolitan markets and strengthen our export strategy, with three more acquisitions planned this year" .

Sanjeev Deshpande and Ajit Lokur, Director and Managing Director & Co-Founder, Kwaliti Animal Feeds Pvt. Ltd., commented, "When we founded Kwaliti Animal Feeds 42 years ago, our vision was to provide top-tier poultry nutrition and solutions. Joining IPA ensures that vision continues to flourish with enhanced resources and expertise. We are excited about the new growth opportunities this collaboration will bring."

With rising consumer demand for high-protein diets and value-added poultry products, this acquisition cements IPA's leadership position in the industry. The integration process will commence immediately, ensuring a seamless transition for employees, customers, and business partners.

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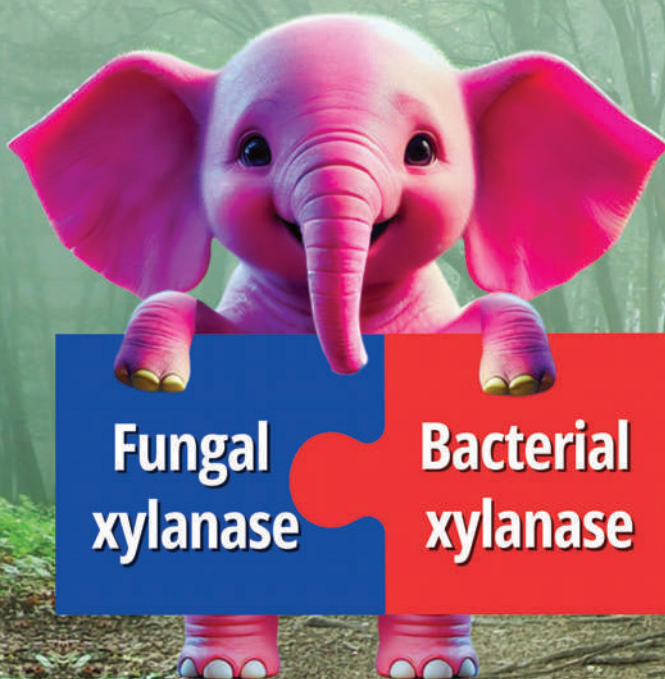


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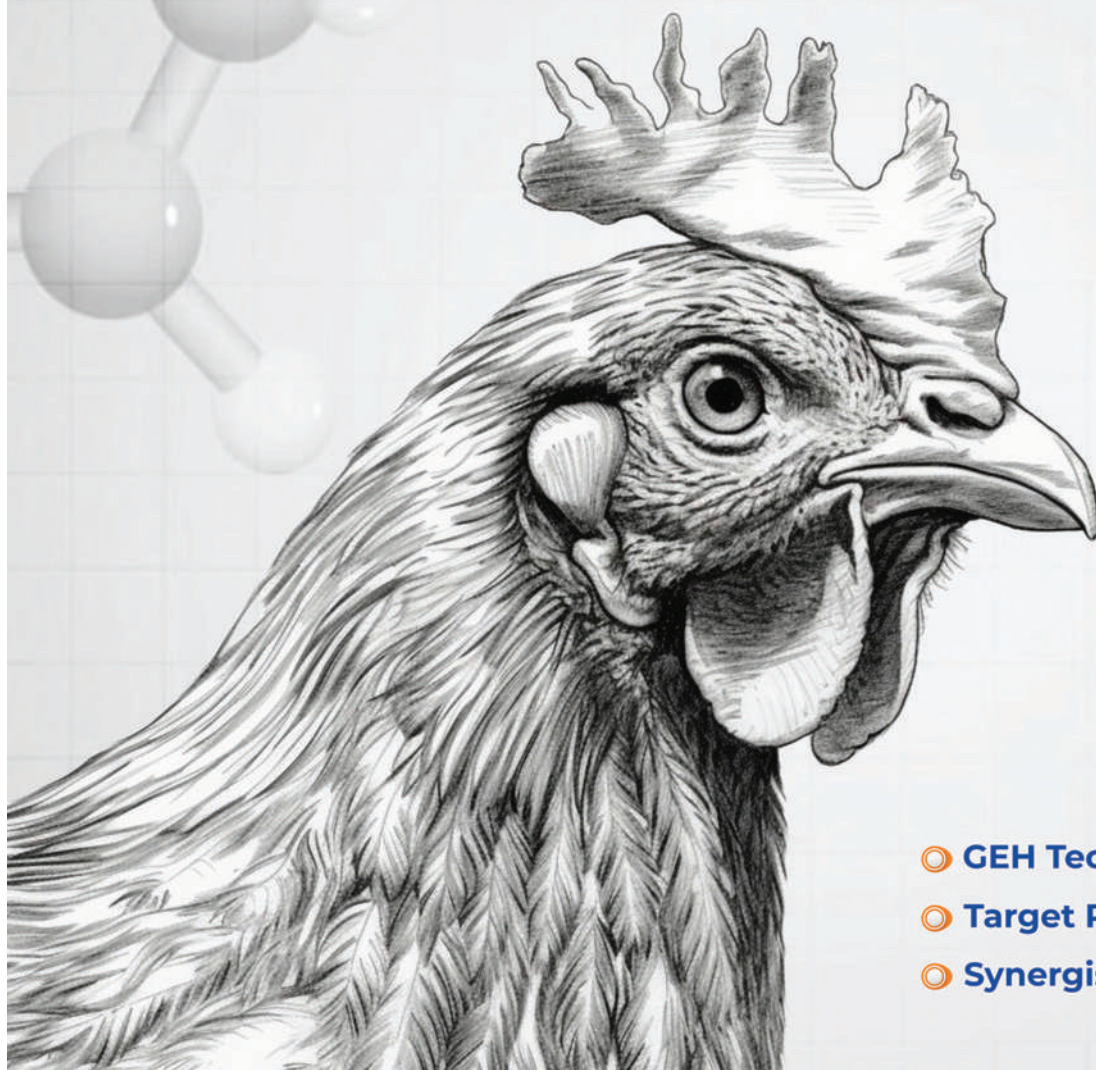
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