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10 Common Mistakes in Poultry Farming

- Inadequate housing and ventilation
- Poor biosecurity measures
- Poor Nutrition management
- Ignoring hygiene practices
- Failure to monitor health regularly
- Improper handling and management
- Lack of pest and predator control
- Inadequate record keeping
- Ignoring environmental factors
- Overlooking biosecurity training for staff

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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. Dhivyaa 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



From the Editor's Desk



Opportunities and Challenges in the Poultry Sector

The poultry sector has emerged as one of the fastest-growing segments of Indian agriculture, playing a vital role in food security, employment generation and farmer income. With rising population, urbanization and changing dietary habits, demand for poultry meat and eggs continues to grow steadily. This momentum presents significant opportunities, but the sector also faces structural and operational challenges that must be addressed for sustainable growth.

One of the key opportunities in the poultry industry lies in **increasing consumption and value addition**. Poultry products are affordable, high-quality sources of protein, making them essential for improving national nutrition. Growth in processed and ready-to-cook poultry products, driven by urban lifestyles and organised retail, is opening new revenue streams for integrators and entrepreneurs. Export potential for processed poultry products is also expanding, provided quality and biosecurity standards are consistently met.

Technological advancements offer another major opportunity. Modern breeding practices, precision feeding, climate-controlled housing, automation and digital monitoring systems are helping improve feed efficiency, bird health and overall productivity. Innovations in vaccines, diagnostics and disease management are strengthening biosecurity and reducing mortality. When adopted effectively, these technologies can significantly improve profitability and resilience across the value chain.

However, the poultry sector faces several challenges. **Feed cost volatility**, particularly maize and soybean prices, remains the biggest concern, as feed accounts for nearly 65–70 percent of production costs. Disease outbreaks such as avian influenza continue to pose risks, affecting farmer confidence, market stability and consumer sentiment. Climate change, with rising temperatures and unpredictable weather patterns, further adds to stress on birds and increases production costs.

Another pressing challenge is **market instability and price fluctuations**, especially for small and medium farmers who lack strong market linkages and risk-management mechanisms. Limited access to credit, insurance and technical guidance often restricts their ability to adopt modern practices. In addition, misinformation during disease outbreaks can severely impact consumption, highlighting the need for effective communication and consumer awareness.

To unlock the full potential of the poultry sector, a coordinated approach is essential. Strengthening farmer education, promoting scientific management, ensuring fair market access and encouraging investment in infrastructure and processing will be key. With the right blend of policy support, innovation and collaboration, the poultry industry can continue to be a powerful driver of rural livelihoods, nutrition and economic growth.

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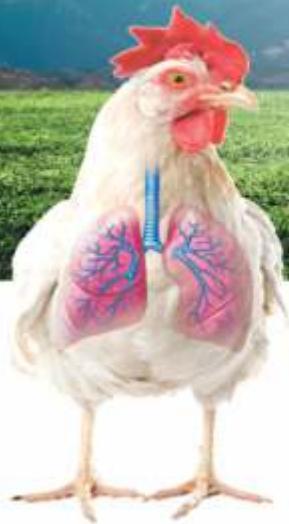
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S ▾ ShahTC	21
T ▾ Tiri Innovations	25
U ▾ Uttara Impex Pvt. Ltd.	13
V ▾ Ventri Biologicals	17
Z ▾ Zenex	31

Features

- 06 Editorial
- 08 Advertisement Index
- 09 Content

Press Release

- 56 India–EU Free Trade Agreement Concluded: A Strategic Breakthrough in India’s Global Trade Engagement



- 59 IPPE 2026: Setting New Global Benchmarks for the Poultry, Meat & Animal Food Industry



- 63 Bhuvana Nutribio Sciences, India & Andres Pintaluba S.A. (APSA) Spain, Successfully Hosts 2nd Technical Seminar under Bhuvana – Pintaluba Tech Series in Raipur
- 65 Alltech South Asia hosts Poultry Nutrition Summit 2025





Article

- 10** **Fungal Brooder Pneumonia: Causes , Diagnosis, Prevention and Control.**
Rajat Sood, Sachin, Raman*
- 12** **BUDGET POULTRY: Producing More with Less in a High-Cost Era**
Prof. Dr. ARM Ziaul Hasan
- 20** **Budgeting in Poultry Farming: A Key Tool for Profitability and Sustainability**
Shivam Singh Thakur
- 22** **Turbosil+ +**
A Multi-Mechanistic System to control A to Z toxins
Dr. C. S. Bedi, Dr. Himali Kishor Gotarane, Dr. Nithin Reddy, Dr. Arun Kumar
 **Guybro Animal Health Pvt. Ltd.**
- 26** **Biofilms: the bacterial fortress**
 **HUVEPHARMA**
We add performance to your business
- 30** **Application of Cold Plasma Technology in Meat Processing**
Amit Kulhar, Dushyant Kumar, Nitesh Choudhary, Shivam Singh Thakur, Sarjna meena
- 33** **Global Warming in Poultry**
P. Priyanka, G. Srinivasan and S. Gayathri
- 36** **Importance of Conserving of Indigenous Animal breed**
Lokesh kumar Gurjar, Monika karnani, Manju
- 38** **National Biodiversity Authority and It,s Role in Veterinary Science**
Dr. Akhil Lohe, Dr. Abhishek Sharma, Dr. Monika Karnani and Dr. Manju
- 40** **Plastic Pollution Turning Deadly for Dairy Animals**
Praveen Kumar Jatav, Sarjna Meena, Ashok Baidha, Rohitash Kumar, Yogesh Kumar
- 42** **Intellectual Property Disputes in Veterinary Medicine**
Dr. Rajendra Chhawari, Dr. Monika Karnani, & Dr. Manju
- 45** **Protecting the Golden Gateway: A Guide to Teat and Udder Affections in Bovines**
Kuljeet Singh
- 47** **Emerging Trend in IPR & Animal Husbandry**
Sachin Kumar Meena, Monika Karnani, Manju*
- 49**  **Hello Protein**
- 50** **Symptoms, Prevention and Treatment of CRD in Poultry**
Mr. Rakesh Kumar
- 53** **Trademark Protection for Veterinary Products and Animal Feeds**
Bharat Jangid, Monika Karnani, Manju

Departments

- 68** **News**
- 70** **Subscription Form**
- 70** **Editorial Calender**
- 71** **Egg Prices**



Fungal Brooder Pneumonia: Causes , Diagnosis, Prevention and Control.

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Brooder pneumonia is a fungal illness of the chicken respiratory system caused mostly by *Aspergillus fumigatus* spores, but other *Aspergillus* species such as *A. flavus*, *A. niger*, *A. glaucus*, and *A. nidulans* may also be involved. It causes enormous economic losses to the poultry industry by increasing death rates in both immunocompetent and immunodepressed animals. Brooder pneumonia is named for the fact that it occurs during the broiler's brooding period as an acute form with a high death rate and has a tendency to become chronic in older, immune depressed birds.

The major mode of transmission in chickens is by inhalation of fungal spores from mouldy litter or bedding material, feed material contaminated with fungus. Clinically, infected chicks exhibit respiratory distress. Clinical signs of chicks infected with aspergillosis includes-

- Respiratory distress: gasping, open-mouth breathing, rapid or laboured respiration.
- Increased mortality, often sudden, especially in young chicks.
- Lethargy and depression with huddling under the brooder.

- Anorexia and poor growth, leading to stunting.
- Ruffled feathers and weakness.
- Cyanosis or pale combs in severe cases.
- Occasional nervous signs if the brain is involved.

Typical lesions are white to yellow fungal nodules to plaques that form within the lungs and on the air sacs. There are two types of aspergillosis in poultry: acute and chronic. Acute aspergillosis often affects young birds and is associated with substantial morbidity and death. Chronic aspergillosis affects adult birds, particularly turkey breeders. Aspergillosis typically causes high morbidity and mortality in chicks and poults, whereas adult poultry are affected less frequently and usually experience lower morbidity and mortality.

Diagnosis of brooder pneumonia

- Flock pattern: Sudden onset with rapid spread and high early mortality in chicks.
- Clinical signs: Severe respiratory distress, gasping, depression, and high mortality in young chicks.
- Post-mortem examination:

Thickened, cloudy air sacs with fungal plaques.

- Tracheal and bronchial involvement: Presence of caseous exudate or nodules.
- Histopathology: Granulomatous lesions containing septate, branching fungal hyphae.
- Fungal culture: Isolation of *Aspergillus* spp. (commonly *A. fumigatus*) from affected tissues.
- Direct microscopy: Demonstration of fungal hyphae in tissue smears using special stains (PAS, GMS).
- Cytology: Impression smears from lung or air sac lesions showing fungal hyphae and inflammatory cells.
- Molecular methods: PCR for confirmation of *Aspergillus* species.
- Environmental assessment: Detection of fungal

contamination in litter, feed, hatchery trays, or ventilation systems.

Prevention and control

- Use clean, dry and mould-free litter and avoid damp bedding materials.
 - Store feed properly to prevent fungal growth; discard mouldy or caked feed.
 - Maintain optimal brooder temperature and humidity to reduce fungal proliferation.
 - Ensure adequate ventilation to prevent moisture accumulation and spore build-up.
 - Maintain strict hatchery hygiene, including fumigation and sanitation of trays, incubators, and hatcher.
 - Daily cleaning and disinfection of feed and water utensils aids in eliminating infection.
- Use antifungal agents (e.g., copper sulphate in drinking water) as supportive measures.
 - Use good-quality chicks/poults from reputable hatcheries.
 - Regularly clean and disinfect poultry houses between batches.
 - Avoid overcrowding and reduce dust levels in sheds.
 - Remove and destroy affected birds to reduce environmental contamination.
 - Replace contaminated litter and thoroughly clean and disinfect housing.
 - Improve ventilation and correct management faults immediately.
 - Implement biosecurity measures to prevent recurrence.



Fig. Multiple small white fungal nodules on lung.

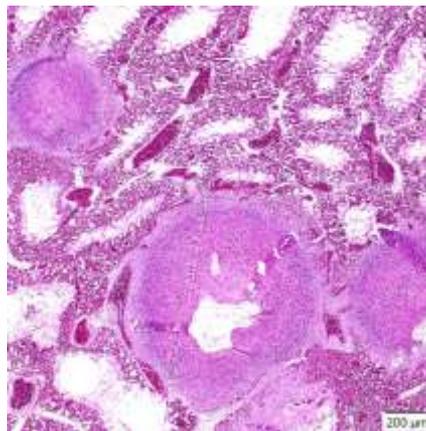


Fig. Round fungal nodules on the lung. HE stain

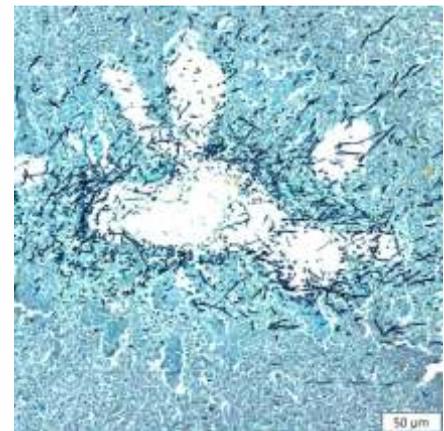
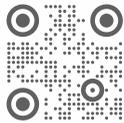


Fig. Multiple branching fungal hyphae (black) on the lung. GMS stain.



BUDGET POULTRY: Producing More with Less in a High-Cost Era

By

Prof. Dr. ARM Ziaul Hasan, PhD

Industrial Agricultural & Livestock
Production & Management Specialist



Introduction

The Brutal Truth Facing Poultry Producers Today

Let's cut the bullshit first: poultry production isn't "tough." It's brutally expensive. Feed costs are sky-high, input prices keep spiking, credit is tighter, and consumers are more price-sensitive than ever. If your margins are disappearing faster than profit forecasts after a feed price jump—good—that's reality. Ignoring it won't make it better.

Here's the hard fact: **there's no magic silver bullet** in 2026 that suddenly slashes your costs by 30% without compromise. What is available are practical strategies rooted in efficiency, discipline, and unapologetic optimization. This isn't feel-good fluff. Budget poultry management must be **data-driven, cost-effective**, and **results-oriented**.

This article strips out hype, focuses on

strategies that work, and challenges common but flawed assumptions—like "higher inputs always guarantee higher outputs," or "if we just wait, costs will come down." They won't—unless you restructure how you manage your operation.

We'll cover:

- Hard cost drivers and how to neutralize them
- Feed strategies that protect your bottom line
- Operational systems that reduce waste
- Labor productivity without burnout
- Basic tech investments worth the money
- Risk management that doesn't cost a fortune

And we'll do it with one core question:

How can you produce more with less—without cutting essential quality?

1. Cost Drivers in Poultry Production — What's Eating Your Bottom Line?

Before you slash costs, you must understand them. Many producers think feed is the enemy. It isn't. **Feed is the symptom** of broader inefficiencies. The real cost drivers are:

Feed — Not Just Cost, But Efficiency

Feed accounts for **65–75% of total production cost** in broilers and significant shares in layers. But the problem isn't high prices—it's poor conversion. If your feed conversion ratio (FCR) is mediocre, you're literally flushing money down the feeder.

Everyone knows feed prices are high. What they don't know is why their own costs are





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01 Improves immunity and reduce incidence of respiratory and viral diseases

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04 Improve carcass traits along with optimum performance of bird to get maximum production and efficiency

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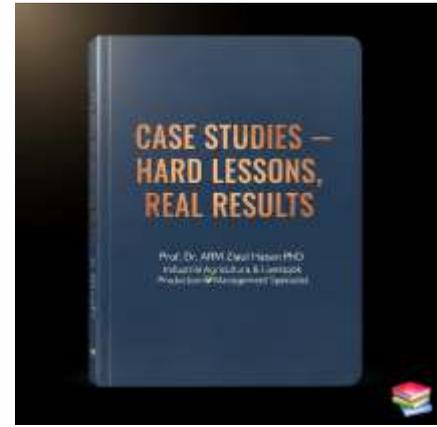
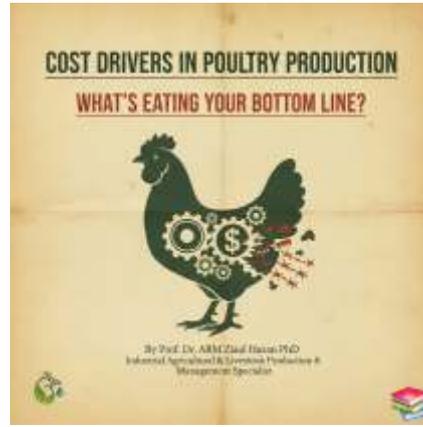
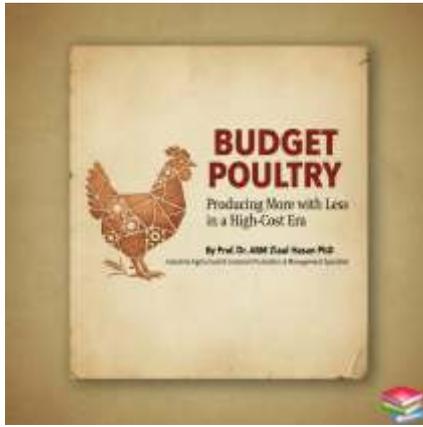
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disproportionate:

- Poor feed storage → spoilage
- Inaccurate formulations → nutrient waste
- Inconsistent mixing → variable flock performance
- Single nutrient optimization instead of balance → hidden inefficiencies

You don't beat high feed costs by buying cheaper feed; you beat it by getting *more output per unit of feed*.

Labor — Hidden Inefficiencies

Labor costs aren't just wages. They're:

- Downtime
- Rework
- Mistakes from poor training
- Supervision redundancy

If your labor yields low output per hour, you're paying extra for waste—don't kid yourself that adding more hands solves an efficiency problem.

Utilities — Ignored But Significant

Electricity, water, heating/cooling—many operations treat utilities as fixed overhead. That's dumb. They're variable and controllable. Simple measures like efficient lighting, water recycling, and smarter ventilation cut costs materially.

Genetics & Health — Costs with Consequences

Cheap chicks, bad breeder schedules, and poorly designed vaccination programs are false economies. They save money upfront and cost you 3–5x in mortality, poor performance, and uneven growth.

2. Feed — The Core of Budget Optimization

Stop thinking about feed as a cost — start thinking about it as a **return on**

investment (ROI).

A. Precision Formulation — Stop Guesswork

Generic feeds are great for accountants—they're cheap. They're terrible for performance. The smartest producers use **formulation based on real data**:

- Weight targets
- Environmental conditions
- Ingredient availability
- Cost per nutrient unit, not cost per bag

You want least cost? No. You want **least cost for your target outcome**. That's optimization, not cheapness.

B. Feed Conversion Ratio (FCR) as King

If your FCR isn't improving year over year, you're failing. A 0.1 improvement in FCR can mean **massive** cost savings per cycle. Focus on:

- Balanced diets
- Phase feeding (not one feed for the whole cycle)
- Consistent particle size (avoids selective eating)

Trust me, tweaking feed composition based on weekly flock performance gives better returns than chasing lower ingredient prices.

C. Storage Discipline — No More Spoilage

High feed cost + high spoilage = losing twice. Most operations fail at basics:

- Poor silos
- Exposure to heat/humidity
- Inadequate stock rotation

Implement first-in, first-out (FIFO) rigorously. Train staff in correct

handling. Loss reduction is the easiest form of cost control.

D. On-Farm Feed Milling — Worth It or Not?

Stop romanticizing "self-mixing solves everything." It helps only if:

- You have reliable quality control
- You test ingredients regularly
- You have disciplined mixing protocols

Without these, self-mixing is expensive chaos.

3. Operations — Waste Kills Margins

Operational discipline differentiates survivors from struggling producers.

A. Biosecurity — Cheap Insurance

Biosecurity isn't some fancy checkbox. It's a bottom-line defender. One outbreak wipes out the year's hard cost reductions.

Implement:

- Controlled access points
- Sanitization zones
- Strict visitor protocols
- Regular audits

No excuses.

B. Standard Operating Procedures (SOPs) — Not Optional

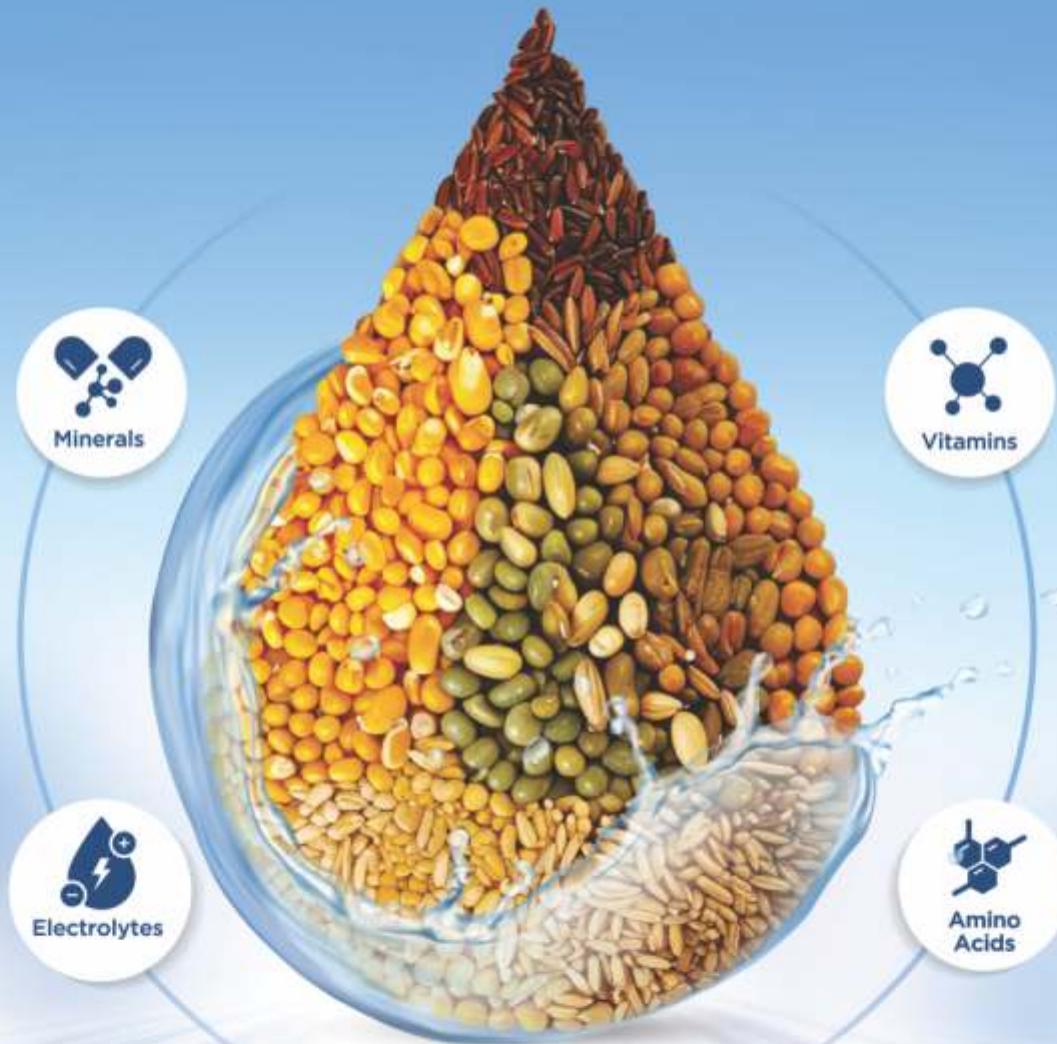
If your staff does things "their way," you have no control. SOPs are mandatory, not bureaucratic fluff.

SOPs must exist for:

- Feeding schedules
- Mortality handling
- Equipment cleaning
- Lighting and ventilation
- Data recording

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Track compliance. Then track outcomes.

C. Performance Tracking — Numbers Don't Lie

If you're not tracking:

- FCR
- Daily gain
- Mortality
- Uniformity
- Feed waste You're flying blind. Worse—you'll repeat the same mistakes.

Automate where possible. Even simple spreadsheets beat gut feelings.

D. Continuous Improvement — No Excuses

You must measure every cycle and ask:

- What dropped performance?
- What deviated from SOP?
- What did competitors do better? If you don't ask these questions, you won't improve.

Guessing doesn't count as learning.

4. Labor Productivity — Work Smart, Not Hard

Here's the blunt truth: most poultry operations are **labor-inefficient** because they tolerate chaos.

A. Cross-Training — Flexibility Wins

People who can do multiple tasks reduce downtime and fix bottlenecks. Don't fence roles rigidly—train for versatility.

B. Accountability — Everyone Has a Number

If a worker's output isn't measurable,



it's not real. Assign measurable tasks:

- Chicks processed per hour
- Feed handling accuracy
- Mortality reporting timeliness

Don't guess performance — quantify it.

C. Incentives — Not Platitudes

Pay based on attendance alone? That's a paycheck system, not a performance system.

Use:

- Bonus for meeting FCR goals
- Rewards for reducing feed waste
- Penalty for non-compliance with SOPs

Cheap? No. Effective? Hell yes.

5. Technology — Spend Where It Counts

Here's the reality: not all tech is worth your money. But the right tech pays back fast.

A. Automation Where It Reduces Waste

Examples that work:

- Automatic feeders (consistent portions)
- Climate control systems
- Sensors for humidity and ammonia

If a tool saves more than it costs by reducing waste or improving performance—you buy it. End of debate.

B. Data Collection Tools — Don't Overbuy

You don't need fancy AI dashboards. You need accurate data:

- Weights
- Feed delivered
- Mortality



- Environmental conditions

Even simple digital logs beat paper and pencil by miles.

C. Drones and Sensors — Not Fluff

Used right, they give visibility and early warnings. Not used right, they're toys. Your choice.

6. Risk Management — Protect What You've Built

You can optimize until hell freezes over, but one shock can wipe profits:

- Disease outbreak
- Market collapse
- Input shortage
- Extreme weather

Budget breeds vulnerability unless you hedge.

Insurance — Not Luxury

Get the right coverage. Skipping insurance to save money is idiotic.

Diversify Markets

Don't rely on one buyer or one market. Use:

- Retail
- Wholesale
- Value-added products (cut, pack, brand yourself)

Contingency Feed Suppliers

When your primary supplier flops, you need backups. A small premium for reliability beats production stoppage.

7. Case Studies — Hard Lessons, Real Results

Case A — Small Producer, Big Waste

A 5,000-bird farm saw feed waste nearly 12% due to poor feeders and no SOP. After:

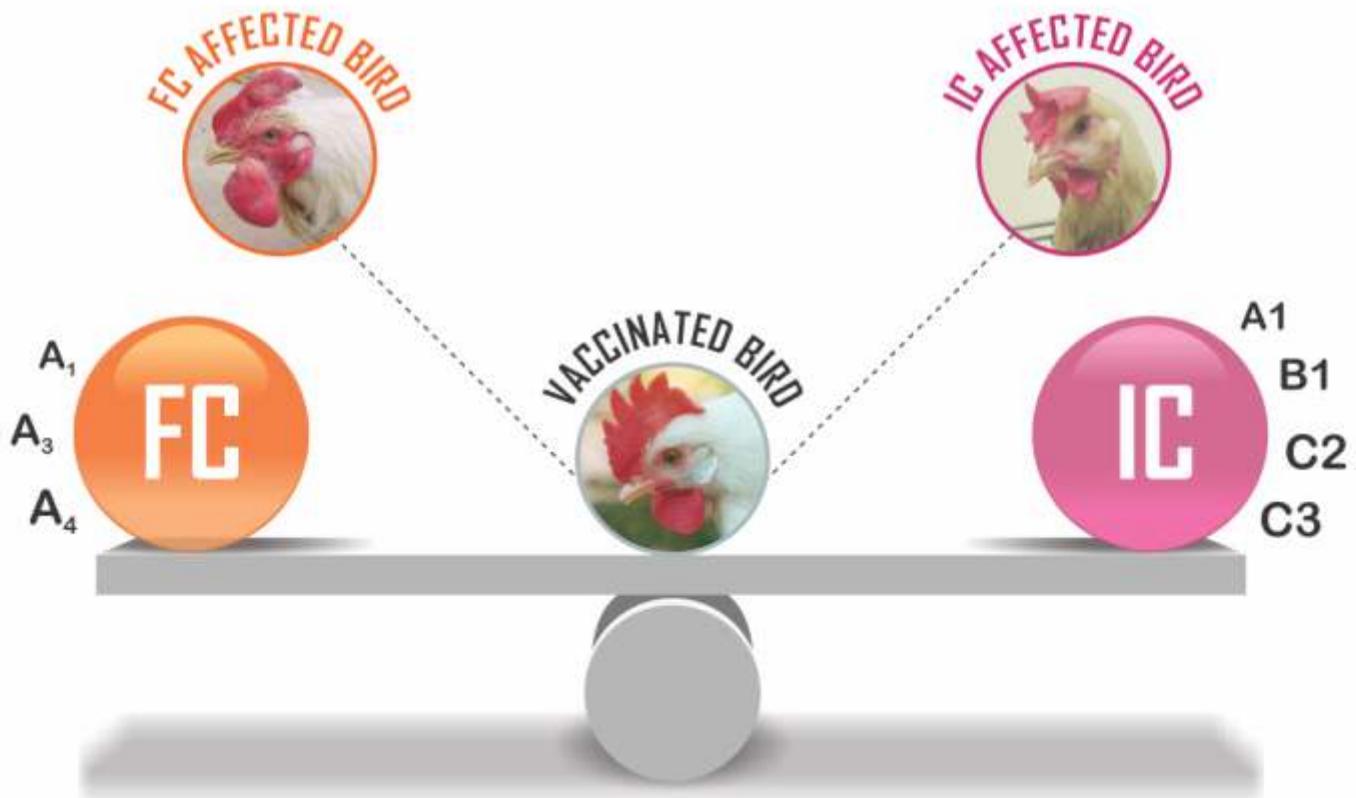
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- Implementing SOPs
- Daily tracking They cut feed waste to 4%, improving margins dramatically. No miracle—just discipline.

Case B — Automation ROI

A mid-sized operation adopted climate sensors and auto feeders. Initial cost: significant. ROI: one full cycle. Why? Reduced mortality, better FCR, stable environment. Spend where it drives savings.

Conclusion — You Don't Have a Cost Problem, You Have an Efficiency Problem

If you think the cost crisis will end soon — you're delusional. Input prices will remain volatile; demand will shift; competitors will adapt.

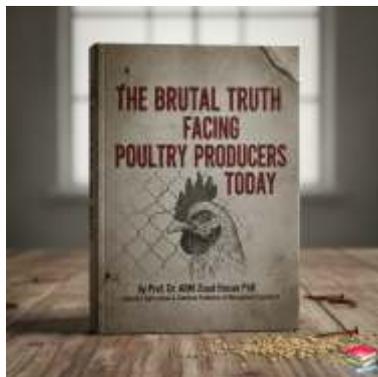
Your only sustainable advantage is efficiency. Not slogans. Not hope. Not cheap inputs. **Operational excellence grounded in data, discipline, accountability, and intelligent investment.**

Producing more with less isn't a slogan. It's a mandate. And it starts with:

- Facing hard truths
- Tracking real numbers
- Cutting waste
- Investing where it pays back

If you were expecting safe generalities—this wasn't written for you. If you want strategies that actually move the needle—this is your blueprint.

If you want this formatted for print layout or tailored with specific data from your operations (FCR benchmarks, cost tables, example SOP templates), just say so.



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Budgeting in Poultry Farming: A Key Tool for Profitability and Sustainability

Shivam Singh Thakur

MVSc Scholar

Post Graduate Institute of Veterinary Education & Research (PGIVER), Jaipur, Rajasthan, India

Introduction

Poultry farming is one of the fastest-growing sectors of Indian agriculture, providing affordable animal protein, employment, and steady income to millions of farmers. However, rising feed costs, disease risks, market volatility, and increasing input prices have made profitability highly sensitive to financial planning. In this context, budgeting in poultry farming emerges as a critical management tool to ensure cost control, efficient resource utilization, and sustainable growth. A well-planned poultry budget helps farmers forecast expenses, estimate returns, and make informed decisions.

Concept of Budgeting in Poultry Farming

A poultry budget is a systematic financial plan that estimates expected income and expenditure for a defined production period. It allows farmers to evaluate the economic feasibility of poultry enterprises such as broiler, layer, or breeder farming before investment and during operation.

Major Components of a Poultry Budget

Fixed Costs

- Poultry shed construction
- Equipment (feeders, drinkers, brooders)
- Depreciation
- Interest on fixed capital

Variable Costs

- Feed cost (60–70% of total cost)
- Day-old chicks
- Vaccines and medicines
- Litter material
- Electricity, water, and labour

Income Sources

- Sale of birds (broilers or spent

layers)

- Egg sales
- Sale of manure and litter
- Cull bird income

Importance of Budgeting in Poultry Farming

- **Cost Control:** Helps identify major cost components and reduce unnecessary expenses
- **Profit Estimation:** Assists in calculating break-even point and net returns
- **Risk Management:** Prepares farmers for feed price fluctuations and disease outbreaks
- **Credit Planning:** Essential for availing bank loans and government schemes
- **Decision Making:** Supports expansion, diversification, or contract farming decisions

Common Budgeting Challenges

- Volatile feed prices
- Sudden disease outbreaks
- Market price instability
- Poor record keeping at farm level

Adoption of digital tools, farm records, and advisory support can overcome these challenges.

Conclusion

Budgeting is not merely an accounting exercise but a strategic management practice in poultry farming. With increasing production costs and market uncertainties, a well-structured poultry budget enables farmers to maximize profitability, reduce financial risks, and ensure long-term sustainability. Strengthening financial literacy among poultry farmers is essential for the future growth of the sector.



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Turbosil++

A Multi-Mechanistic System to control A to Z toxins

(Aflatoxin to Zearalenone)

Authors: Dr. C. S. Bedi, Dr. Himali Kishor Gotarane, Dr. Nithin Reddy, Dr. Arun Kumar

Guybro Animal Health Pvt. Ltd.

Mycotoxins continue to impose a significant biological and economic burden on livestock systems, compromising gut integrity, organ function and productive efficiency even at subclinical levels. Modern feed matrices frequently harbour multiple mycotoxins simultaneously, making single-mode detoxifiers insufficient. **Turbosil++** addresses this challenge with scientifically engineered, multi-mechanistic platform that integrates **Adsorption**, **Biotransformation** and **Bioprotection** to deliver broad-spectrum defence against mycotoxins, endotoxins and chemical residues.

At the core of its functionality is an advanced **Adsorption** mechanism. **Turbosil++** possesses highly active surface structure with precise pore dimensions and optimal charge distribution, enabling rapid and selective interaction with wide array of polar and non-polar mycotoxins. Its dipolar binding capability and enhanced cation exchange characteristics facilitate the formation of stable, irreversible toxin–binder complexes within the gastrointestinal tract. These complexes are biologically inert and non-absorbable, ensuring the toxins remain confined to the digestive lumen and are efficiently eliminated from the body. This mechanism significantly reduces toxin bioavailability without interfering with the absorption of vitamins, minerals or other essential nutrients—a critical parameter for maintaining productive efficiency.

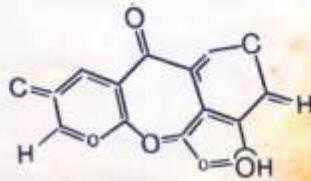
Complementing adsorption, **Turbosil++** introduces a powerful **Biotransformation mechanism**. Through targeted enzymatic activity, the product modifies the chemical structure of absorbed mycotoxins, converting them into non-toxic or significantly less harmful metabolites. This irreversible detoxification step prevents secondary interactions of toxins with epithelial cells, immune cells and metabolic tissues. By altering toxin functionality at the molecular level, **Turbosil++** helps prevent cellular damage, oxidative stress and inflammatory cascades typically associated with chronic mycotoxin exposure. This mechanism provides a deeper biological safeguard beyond mere toxin binding, ensuring systemic protection.



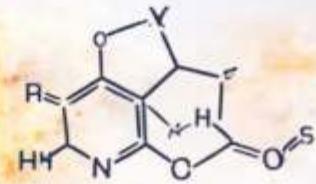
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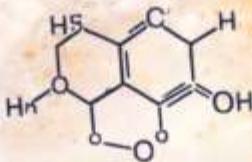
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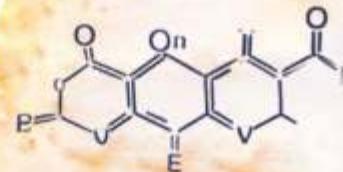
Aflatoxins



T2 Toxin



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The other mechanism, **Bioprotection**, strengthens host physiology to counteract the downstream effects of toxin challenge. **Turbosil++** supports mucosal integrity, enhances immune responsiveness and assists in maintaining optimal liver tissue function—an essential factor given the liver's central role in toxin metabolism and clearance. Its antioxidative properties mitigate the generation of reactive oxygen species induced by mycotoxin insult, thereby protecting cell membranes, enzymes and metabolic pathways from oxidative degradation. This tri-layer defence system improves gut environment stability, supports microbiota balance, enhances nutrient utilisation and ultimately promotes superior growth performance and feed conversion efficiency.

Extensive in vitro and in vivo evaluations validate **Turbosil++** as a highly specific, safe and consistent mycotoxin management tool. Its stability across varying pH conditions and resilience during pelleting and extrusion processes ensure reliable efficacy in diverse feed manufacturing systems. Additionally, its anti-caking characteristics improve feed handling and storage quality. The product has demonstrated measurable benefits in improving protein and fibre digestibility, enhancing reproductive and hepatic health, increasing egg production and reducing the systemic impacts of multi-toxin exposure.

In a production environment where mycotoxin co-contamination is increasingly the norm, **Turbosil++ provides a scientifically robust, multi-dimensional solution** that surpasses traditional toxin binders. By integrating three distinct modes of action—adsorption, enzymatic detoxification and physiological protection—it establishes a comprehensive shield that preserves gut integrity, protects vital organs and enhances animal performance. As a next-generation tool for toxin mitigation, **Turbosil++** stands as a critical component in achieving feed safety, biological resilience and production efficiency in modern livestock systems.



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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.

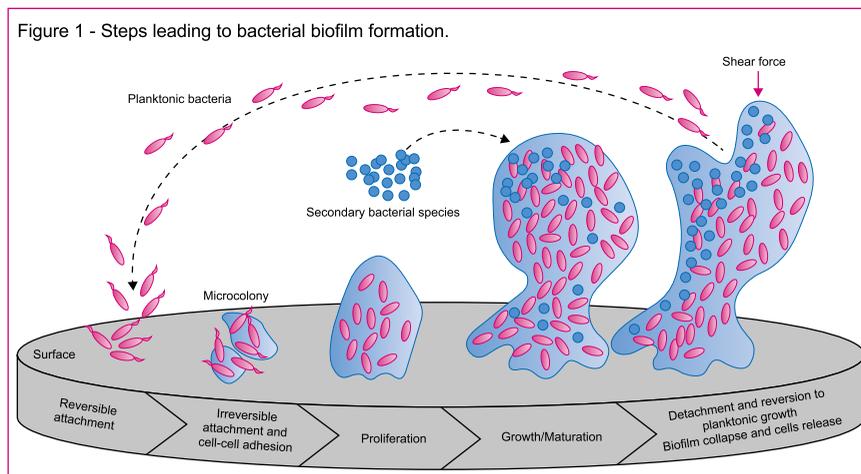
Bacteria have adapted to a “biofilmed” state to survive unfavourable environmental conditions such as those which are poorly oxygenated, have extremes in temperature or are lacking in nutrients. In the natural environment, biofilms act as a reservoir for microbial species, constitute a major component 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-cro-bial 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 relies on 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:





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1) Physico-chemical resistance

is the failure of an agent to penetrate the full depth of the biofilm. 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 biofilms 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.

To know more, please contact Huvepharma technical team



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Application of Cold Plasma Technology in Meat Processing

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Introduction

Cold plasma (CP) technology is an emerging non-thermal processing method showing significant promise in the meat processing industry. It involves ionized gas at near-room temperature that generates reactive oxygen and nitrogen species (ROS and RNS), capable of inactivating microorganisms without the adverse thermal effects associated with conventional heat treatments. This technology has been studied as a tool for microbial safety, shelf-life extension, curing, and quality enhancement in various meat products.

Principles and Mechanism

Cold plasma is a partially ionized gas containing ions, electrons, neutral particles, and energetic reactive species. The ionization process uses electrical energy rather than heat, enabling treatment at ambient temperatures. The reactive species produced during plasma generation — such as ozone (O₃), hydrogen peroxide (H₂O₂), and nitrogen oxides — effectively disrupt microbial cell membranes and DNA, leading to microbial inactivation.

The principal antimicrobial mechanism of CP is oxidative

damage mediated by ROS and RNS, which attack cell walls, proteins, and nucleic acids of microbes. This results in rapid and efficient pathogen reduction with minimal impact on product temperature.

Microbial Decontamination and Food Safety

Ensuring meat safety through reduction of foodborne pathogens — such as *Salmonella*, *E. coli*, and *Listeria* — is a major application of CP technology.

- CP treatments have shown significant microbial reductions on meat surfaces. Research has demonstrated reductions of multiple log units in pathogens like *L. monocytogenes* and *E. coli* with dielectric barrier discharge (DBD) treatments.
- CP is effective against a broad range of microorganisms, including bacteria, yeasts, and spores, making it a versatile tool for meat decontamination.

The non-thermal nature of CP means that microbial safety can be enhanced without compromising the structural integrity or nutritional value of meat.

Shelf-Life Extension and Quality Preservation



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*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 available on request.

Cold plasma can extend the shelf life of meat products by:

- Reducing surface microbial load, delaying spoilage.
- Inhibiting endogenous enzyme activity that leads to degradation during storage.

Studies indicate that CP treatment, when optimized, causes minimal changes in texture, color, and sensory attributes, although effects vary with treatment parameters and meat type.

However, the generation of reactive species can also promote lipid oxidation in some cases, potentially affecting quality attributes like flavor and color. Strategies such as reducing treatment intensity or combining CP with antioxidants may help mitigate these effects.

Novel Functional Uses in Meat Processing

Beyond decontamination, CP technology is being investigated for **innovative functional applications:**

- **Alternative Curing Methods**

Plasma-activated liquids can generate nitrite in situ, which functions as a curing agent in processed meat products, potentially reducing the need for added synthetic nitrites.

• Meat Tenderization and Protein Modification

Preliminary studies suggest that CP may influence muscle protein structure and collagen, potentially modifying tenderness and water binding. These functional changes could support new processing strategies in the meat industry.

Advantages and Challenges

Advantages

- **Non-thermal processing:** Preserves nutritional and sensory qualities.
- **Effective microbial control:** Capable of reducing pathogens rapidly.
- **Versatile applications:** From decontamination to curing and quality enhancement.

Challenges

- **Optimization needed:** Treatment parameters must balance microbial inactivation with quality retention.
- **Equipment and cost:** Initial installation and qualified operation can be barriers to adoption.
- **Regulatory considerations:** Certification for food contact systems is required before industrial scaling.

Future Prospects

Research continues to refine CP systems for consistent and scalable application. Areas of focus include:

- Standardization of treatment protocols.
- Integration with other non-thermal techniques.
- Comprehensive safety assessments and regulatory approvals.

With continued development, CP technology holds potential to transform meat processing into a safer, more sustainable, and quality-oriented industry.

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Global Warming in Poultry

Introduction:

Climate change has been one of the biggest environmental stressors challenging the global animal industry as it adversely affects performance and health status of the animals, particularly chickens, because chickens are vulnerable to heat stress and they could only tolerate a narrow range of temperature. From an animal welfare point of view, stress response due to heat stress during the growing phase of production and potential preventive measures are to be controlled and to be implemented to satisfy the consumers' demand for stress-free meats.

Global warming:

Global warming is an aspect of climate change, referring to the long-term rise of the planet's temperatures. It is caused by increased concentrations of greenhouse gases in the

atmosphere, mainly from human activities such as burning fossil fuels, and farming.

Causes for global warming:

- Greenhouse gases
- Deforestation
- Pollution
- Per capita carbon emissions

Green house gases:

Greenhouse gases are defined by their radiative forces (defined as the change in net irradiance at atmospheric boundaries between different layers of the atmosphere), which change the earth's atmospheric energy balance. GHGs include carbon dioxide (CO₂), carbon monoxide (CO), nitrous oxide, methane, hydrofluorocarbons, and sulfur hexafluoride.

Emission of green house gas:

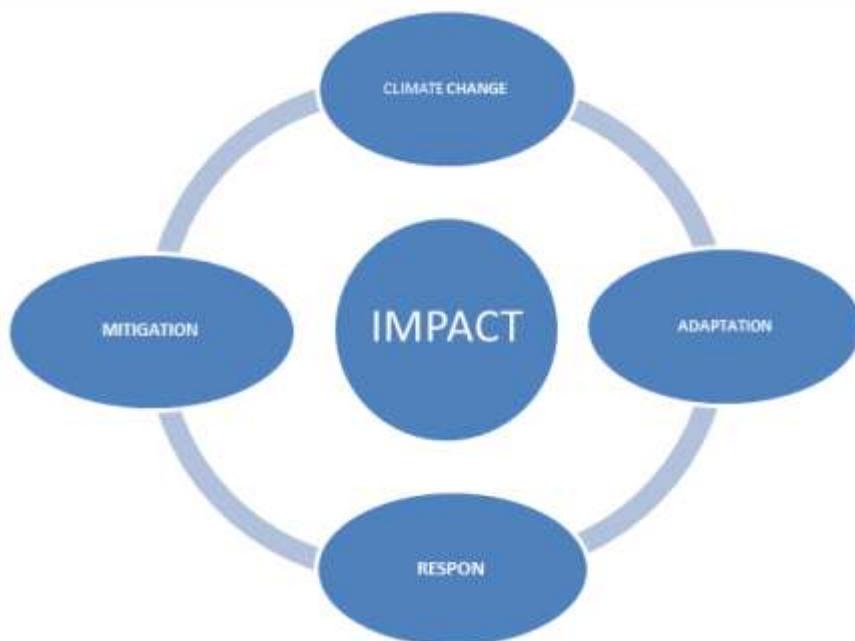
- CO₂ – from fertilizer production for use of energy



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- N_2O – from application of N fertilizer and manure
- NH_4 – from ruminants

Emission of nitrate:

- From fertilizer
- From manure

Emission of ammonia:

- From use of fertilizer
- From manure

Carbon credit:

A “carbon credit” represents a certified reduction in GHG emissions equal to one metric tonne of carbon-dioxide equivalent. These carbon credits can be generated when producers voluntarily take action to reduce emissions that would have been emitted under normal production operations.

Poultry industry address carbon foot print:

A carbon footprint is the total amount of greenhouse gases (including carbon dioxide and methane) that are generated by our actions.

Propane use:

- 68 percent of the emissions from the broiler and pullet farms
- 0.3 percent of the total

emissions from breeder farms

- The propane used on these farms is mainly for heating during brooding and the colder times of the year.

Electricity use:

- Breeder farm – 85 percent
- Pullet farm – 30 percent
- Broiler grow out farm – 29 percent

Benefits of emission of green house gases in poultry industry:

Manure management:

Every kg of organic matter will yield 0.5 m3 of biogas. Anaerobic co-digestion of chicken manure with different feedstock. Adding lignocellulose materials, primary sludge, food waste, or green waste could improve the properties of the

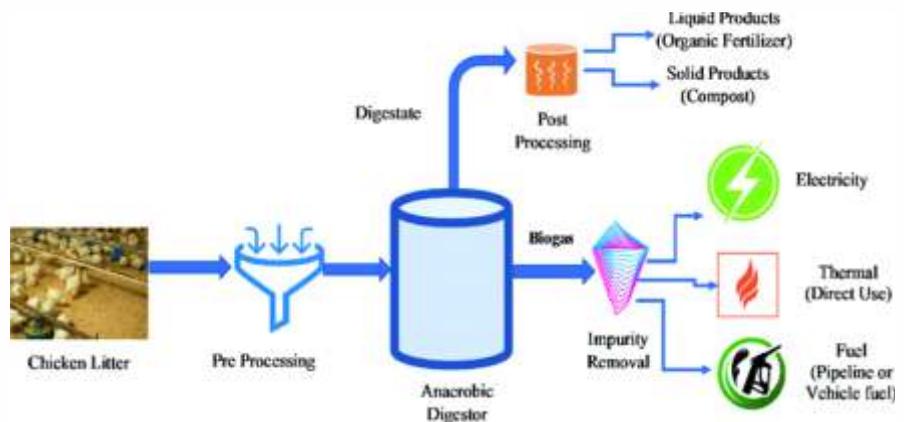
chicken manure. The supply of essential nutrients for microbes is essential for the anaerobic digestion process. Co-digestion process maintains the pH at a neutral level. Co-substrate fermentation greatly improves the stability of microbial communities and subsequent microbial augmentation

Poultry manure has many uses:

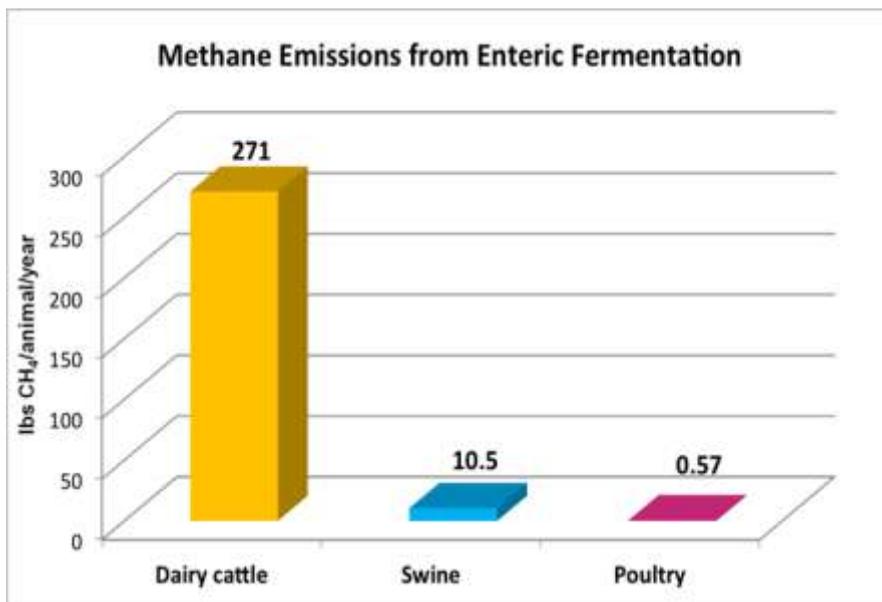
- Fertilizer
- Soil health
- Livestock feed
- Composting
- Biogas and organic fertilizer
- Biochar

Adaptation suggestions:

Poultry farmers should reconsider



IMPROVING



building design in new builds to more effectively cope with new climate and weather extremes, including the installation of more/new equipment to cope with new climate extremes.

Mitigation of greenhouse emissions from poultry production:

- Poultry production GHG mitigation opportunities can be classified into categories relating to **poultry feed crop production, bird housing heating and manure management**. It can be achieved by selecting cropping and

Study	Percentage of total emission		
	Crop production	Fossil fuel heating	manure
Verge et al., (2009)	57	38	5
Thynelius,(2008)	67	17	16
Cederberg et al., (2009)	84	3	13

management systems that increase nitrogen efficiency in poultry feed production. Possible options to increase nitrogen efficiency include using crops with that require less nitrogen per unit of yield compared to traditional poultry feed crops or tillage or crop management methods that reduce crop nitrogen requirements.

- Typical commercial poultry production systems require auxiliary heating in many production locations. The use of fossil fuels to heat poultry houses generates GHG emission. Fossil fuel use can be reduced by adopting conservation measures that reduce house heating requirements and by replacing fossil fuels with alternative, renewable fuels. The replacement of fossil fuels with renewable fuels such as wind, solar, biomass, energy crops, the combustion of poultry broiler litter, or other manures, and CH₄ produced from manure, can

provide a direct reduction in GHG emissions.

- Mitigation options involve the selection of manure management options that reduce the formation of N₂O. The production of N₂O in manure management systems requires anaerobic conditions. As such, maintaining aerobic conditions during manure storage by keeping manure dry and reducing manure storage time can help reduce N₂O emissions.

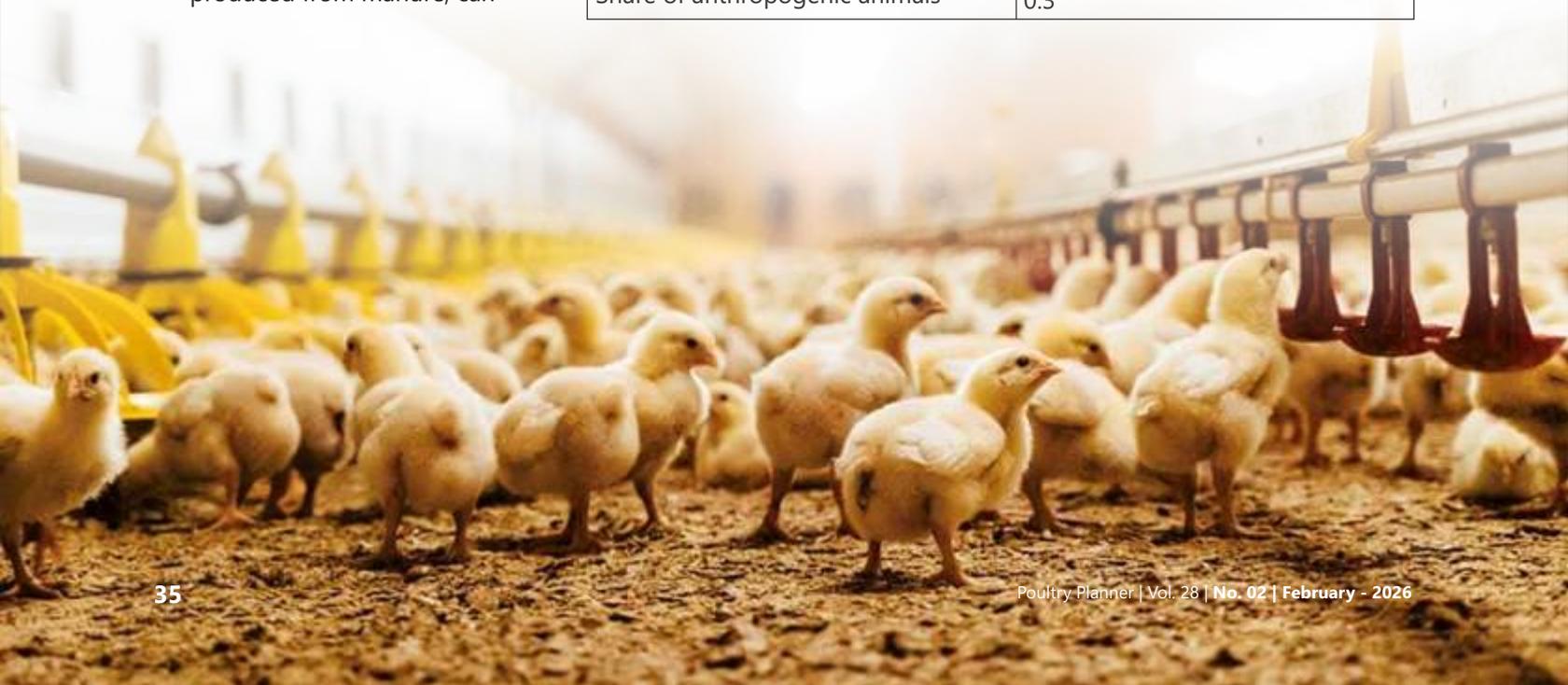
Greenhouse gas emission related

	Million tonnes co2 equivalent
CARBONDIOXIDE	
Nitrogen fertilizer production for feed	18
On – farm energy consumption	52
Slaughtering	18
International trade (transport)	0.3
NITROUS OXIDE	
Indirect fertiliser emission	0.02
Total	88.3
Share of livestock sector	2
Share of anthropogenic animals	0.3

to poultry production:

CONCLUSION

- Because meat poultry are gaining weight throughout the grow-out cycle it is more appropriate to use emission factors for a bird produced basis than to use average bird weight to estimate emissions.
- Pollutants including oxygen demanding substances, ammonia, solids nutrients, pathogen trace elements antibiotics, pesticides, hormones, odour and other air borne emissions. Existing scientific knowledge is sufficient for problem recognition.





Importance of Conserving of Indigenous Animal breed

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Abstract

Indigenous livestock and poultry breeds are invaluable genetic resources that support sustainable agriculture, rural livelihoods, and food security in India. These breeds are well adapted to local climatic conditions, resistant to diseases, and suitable for low-input farming systems. Conservation of indigenous breeds ensures preservation of genetic diversity for future generations while supporting cultural traditions and scientific research. This article highlights the importance of conserving indigenous cattle and poultry breeds, their advantages, and strategies for their sustainable conservation.

Keywords:

Indigenous cattle, Native poultry, Breed conservation, Livestock biodiversity, Genetic resources

Introduction

India is one of the world's twelve mega-biodiversity countries, possessing rich livestock and poultry genetic resources. According to the National Bureau of Animal Genetic Resources (NBAGR, 2023), India has about 307.4 million cattle, with 53 registered indigenous cattle breeds, and around 851.81 million poultry, including 22 registered indigenous chicken breeds. These native breeds have evolved over centuries, adapting to local agro-climatic conditions, feed resources, and disease challenges.

Indigenous cattle are characterized by features such as flat forehead, drooping ears, a well-developed hump, and a large dewlap. Similarly, indigenous poultry breeds play a vital role in rural economies by providing supplementary income, nutritious eggs, and meat to marginal and small farmers.

Importance of Indigenous Breeds

Indigenous breeds offer several advantages over exotic breeds:

- Disease resistance and better survival under tropical conditions.
- Ability to thrive under low-input management systems.
- Suitability for draught power in agriculture.
- Superior brooding ability in native poultry.
- Better quality products such as tastier meat and sweeter milk, often fetching premium prices.
- Cultural importance in local rituals and festivals.

Why Breed Conservation is Essential

Conservation of indigenous breeds is crucial for:

- Maintaining genetic diversity for future breeding and climate resilience.
- Preserving cultural heritage linked with native livestock.
- Supporting scientific research in genetics, physiology, and adaptation.
- Preventing extinction of valuable breeds adapted to harsh environments.

Conservation Strategies for Indigenous Poultry

1. Genetic Improvement

Using Major Genes:

Incorporation of useful genes such as Naked Neck (Na), Dwarf (Dw), Frizzle (F), and Fibromelanosis (Fm) can enhance productivity and heat tolerance in indigenous poultry.

2. Improved Management:

Reducing mortality in scavenging systems through better housing, nutrition, and hygiene.

3. Health Care:

Vaccination (especially against Newcastle disease) and farmer awareness programs significantly reduce mortality.

Conservation Strategies for Indigenous Livestock

1. Population Monitoring:

Regular livestock census and breed-wise documentation at national and state levels.

2. Identification of At-Risk Breeds:

Studying threats such as indiscriminate crossbreeding and declining population size.

3. Conservation Approaches:

- In situ conservation: Maintaining breeds in their native tract.
- Ex situ in vivo: Conservation through live animal populations.
- Ex situ in vitro: Cryopreservation of semen, embryos, and DNA in gene banks.

Conclusion

Indigenous breed conservation must be prioritized through region-specific breeding policies that prevent indiscriminate crossbreeding. Advanced reproductive technologies such as artificial insemination, frozen semen, and embryo transfer should support conservation efforts. Breed shows, farmer incentives, awareness programs, and documentation of success stories can further motivate farmers to preserve native breeds. Collective efforts by policymakers, scientists, and farmers are essential to safeguard India's rich livestock biodiversity for future generations.

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National Biodiversity Authority and Its Role in Veterinary Science

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Abstract

Biodiversity forms the biological foundation of veterinary science, influencing livestock improvement, disease resistance, wildlife health, and the sustainability of rural animal-based livelihoods. In India, the conservation and governance of biological resources are coordinated under the Biological Diversity Act, 2002, through the National Biodiversity Authority (NBA). This article explores the significance of the NBA in shaping policies and practices relevant to veterinary science. It highlights NBA's regulatory role in the access and use of genetic resources, its support for indigenous livestock breeds, the conservation of wildlife, the protection of ethnoveterinary knowledge, and the enforcement of Access and Benefit Sharing (ABS) mechanisms. Emphasis is also placed on the growing relevance of biodiversity governance in combating emerging infectious diseases, preventing biopiracy, and promoting sustainable veterinary research. The article concludes that the synergy between biodiversity management and veterinary science is crucial for national food security, One Health initiatives, and future scientific innovation.

Introduction

Veterinary science, traditionally concerned with animal health, disease prevention, and livestock productivity, is deeply interconnected with biodiversity. India recognized as one of the world's 17 megadiverse countries supports thousands of domesticated and wild species, many of which hold untapped genetic, ecological, and medicinal value. The rich diversity of indigenous livestock breeds such as Gir, Sahiwal, Tharparkar, Jamunapari, Marwari, and Nicobari fowl not only contributes to food security but also embodies adaptive traits shaped over centuries. Similarly, wildlife species serve as ecological indicators and play critical roles in understanding zoonotic diseases, ecosystem balance, and conservation biology.

To safeguard this biological wealth, the Government of India established the National Biodiversity Authority (NBA) under the Biological Diversity Act, 2002. While commonly viewed from an environmental or botanical lens, the NBA has significant implications for veterinary science. Its regulatory frameworks influence research involving genetic resources, livestock breeding programs, wildlife–veterinary interventions, ethnoveterinary practices, and commercial use of animal-based

biological material.

As veterinary science advances through genomic technologies, vaccine development, biotechnology, and wildlife health surveillance, the need for structured biodiversity governance becomes increasingly important. This article examines how the NBA supports veterinary science, strengthens animal genetic resource conservation, and promotes ethical, sustainable scientific advancement.

Role of the National Biodiversity Authority in Veterinary Science:

1. Conservation of indigenous livestock genetic resources:
 - India's native breeds possess valuable traits such as heat tolerance, disease resistance, high grazing ability, and climatic adaptability. NBA safeguards these genetic resources by:
 - Regulating access to animal genetic material (semen, embryos, tissues).
 - Preventing unauthorized export and biopiracy.
 - Supporting community-based conservation of breeds.
 - Implementing Access and Benefit Sharing (ABS) to reward breeders and pastoral communities.
2. Regulating veterinary research and biotechnology:

- Microbial isolates
- Biological samples
- Wildlife tissues
- Genetic material for vaccine or drug development

The NBA ensures that research involving India's biological resources follows legal and ethical standards. Approvals are required for:

- International collaborations
- Material transfer to foreign labs
- Commercialization of vaccines, diagnostics, or probiotics based on native biological material

3. Preservation and documentation of ethnoveterinary knowledge:

Traditional livestock-healing practices contribute significantly to rural animal health. The NBA supports:

- Documentation of ethnoveterinary practices through People's Biodiversity Registers.
- Recognition and protection of traditional healers' knowledge.
- Fair benefit sharing when herbal or indigenous veterinary medicines are commercialized.
- This bridges traditional knowledge with modern veterinary research.

4. Wildlife conservation and one health approach:

Veterinarians are central to managing wildlife diseases, translocation, rescue operations, and reproductive

technologies. NBA contributes by:

- Regulating access to wildlife samples for disease diagnosis and research.
- Protecting threatened species by ensuring ethical scientific interventions.
- Supporting disease-monitoring programs, crucial for controlling zoonotic infections like avian influenza and leptospirosis.
- This aligns with the One Health concept, integrating human, animal, and ecosystem health.

5. Strengthening rural livelihoods and livestock-based economies:

Livestock is a primary livelihood source for millions of Indian households. NBA enhances this sector by:

- Encouraging conservation of local fodder species and grazing ecosystems.
- Supporting sustainable animal husbandry connected to biodiversity.
- Ensuring communities benefit from commercial use of local breeds or knowledge.
- Biodiversity governance thus becomes essential for livestock-dependent rural development.

6. Challenges and future directions:

- Despite its achievements, several challenges limit NBA's potential in the veterinary domain:

- Limited awareness among veterinarians about biodiversity laws.
- Insufficient documentation of animal genetic resources.
- Gaps in coordination between biodiversity boards and veterinary institutions.
- Emerging threats such as climate-driven diseases and habitat loss.

7. Future progress requires:

- Strengthened collaboration between the NBA and veterinary universities.
- Enhanced capacity-building on biodiversity governance.
- Increased research funding for indigenous breed conservation.
- Integration of biodiversity policies into national animal health strategies.

Conclusion

The National Biodiversity Authority plays a pivotal role in advancing veterinary science by regulating biological resource use, conserving indigenous animal breeds, supporting ethnoveterinary knowledge, and enabling ethical research. As veterinary science embraces new challenges climate change, zoonotic diseases, genetic erosion the NBA's role becomes more vital than ever. A stronger connection between biodiversity governance and veterinary practice will contribute to sustainable agriculture, One Health initiatives, and long-term national resilience.

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Plastic Pollution

Turning Deadly for Dairy Animals

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Keywords:

Plastic pollution, Dairy animals, Cattle health, Single-use plastic, Waste management, Milk production, Livestock mortality, Environmental sustainability

Abstract

Plastic pollution has emerged as a significant environmental challenge with far-reaching consequences for ecosystems, animal health, and human well-being. Among the most affected are dairy animals such as cows and buffaloes, which are integral to rural livelihoods and the food supply chain. Improper disposal of plastic waste, particularly single-use plastics mixed with food waste, leads to accidental ingestion by grazing and stray animals. Since plastic is non-biodegradable, it accumulates in the digestive system of these animals, causing digestive blockages, intestinal injuries, bloating, reduced reproductive efficiency, decline in milk production, and, in severe cases, death. Post-mortem studies have revealed alarming quantities of plastic in the stomachs of affected animals. The health deterioration and mortality of dairy animals directly impact farmers' incomes, milk availability, nutritional security, and the rural economy. This paper examines the nature and causes of plastic pollution affecting dairy animals, its physiological and economic impacts, and the associated risks to human society. It also highlights the urgent need for effective waste management systems, strict enforcement of bans on single-use plastics, and widespread public awareness to mitigate this growing threat. Addressing plastic pollution is essential not only for animal welfare but also for environmental sustainability and public health.

Introduction

In today's modern era, plastic is used in almost every sphere of life—whether for household purposes, industrial packaging, or food delivery. However, this very plastic has now become a deadly threat to our environment, birds, animals, and especially dairy animals. Cows and buffaloes, which are an integral part of our food chain, are being severely affected by plastic pollution.

Nature of Plastic Pollution

In a country like India, where thousands of tons of waste are generated daily, a large portion consists of plastic. This plastic waste is often dumped in open areas. In cities, it is scattered in streets, drains, and garbage dumps. Since food waste is thrown away along with plastic, cows, buffaloes, and other stray animals consume it.

They cannot distinguish that the plastic mixed with food is harmful to their bodies. Gradually, this plastic accumulates in their stomachs, initiating a slow and painful process that often leads to death.

Impact on Dairy Animals

- **Effect on the Digestive System**
Plastic is a non-digestible material. When animals ingest it, it accumulates in their stomachs, causing blockage in the digestive system. They face difficulty in digesting food and sometimes die of starvation despite having a stomach that feels full.
- **Intestinal Blockage and Injuries**
Hard plastic and sharp-edged wrappers can cause wounds in the intestines, leading to internal bleeding.

- **Gas Formation and Swelling**

Accumulation of plastic in the stomach leads to excessive gas formation and severe bloating, which is extremely painful for the animal.

- **Reduced Reproductive Capacity**

Studies have shown that plastic consumption adversely affects the reproductive health of animals. They may fail to conceive on time or suffer miscarriages.

- **Decline in Milk Production**

When animals fall sick or become malnourished, their milk production decreases. This directly affects the income of livestock owners and the supply of dairy products.

- **Death**

The most severe outcome occurs when excessive plastic accumulation leads to the animal's death. In many post-mortem examinations, 30–50 kilograms of plastic have been found in the stomachs of animals.

Impact of Plastic Pollution on Human Life

Animals are not just animals—they are a vital part of our economic and nutritional system. When a cow or buffalo falls sick or dies, the impact is felt not only by an individual but by society as a whole:

- Shortage of milk and rising prices
- Financial losses to livestock farmers

- Nutritional deficiencies, especially among children and the elderly
- Setback to the rural economy

What Are the Causes?

- **Indiscriminate Use of Plastic**

Cheap and easily available plastic bags are used at every level. Often, they are used only once and then discarded.

- **Lack of Proper Waste Management**

In India, most municipalities struggle with effective waste management. Open garbage dumps are common, where plastic is mixed with food waste.

- **Lack of Public Awareness**

People often do not realize that careless disposal of waste can be fatal for animals.

Solutions and Suggestions

- 1. Ban on Single-Use Plastic**

The government should strictly enforce a ban on single-use plastic and promote alternatives such as cloth or paper bags.

- 2. Solid Waste Management System**

In every city and village, waste should be scientifically segregated—wet, dry, and biodegradable. Plastic waste should be recycled.

- 3. Restriction on Letting Animals Roam Freely**

Livestock owners should be discouraged from letting animals roam freely on roads. This is dangerous not only for animals but also causes traffic accidents.

- 4. Public Awareness Campaigns**

Awareness should be spread in schools, colleges, and villages about the harmful effects of plastic on animals. Campaigns like “Quit Plastic, Save Animals” should be promoted.

- 5. Accountability of Local Bodies**

Municipal corporations and village councils must ensure proper waste disposal and prevent plastic littering on roads and public places.

Conclusion

Dairy animals form the foundation of our culture, economy, and diet. These voiceless beings provide us with milk, manure, and support without any selfish motive. Yet today, the greatest threat to them is man-made plastic. This is not just an issue of animal welfare, but also of environmental protection and human health.

If we fail to control plastic pollution in time, its consequences will be even more devastating in the coming years. The need of the hour is for all of us to collectively pledge to reduce plastic use, manage waste responsibly, and protect our silent servants—our dairy animals.

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Intellectual Property Disputes in Veterinary Medicine

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Keywords:

Intellectual property, Innovation,
Zoetis, Biologics Merck Animal
Health

Abstract

Intellectual property (IP) disputes are becoming an increasingly influential force in Veterinary Medicine, shaping the availability, cost, and development of animal health products. As pharmaceutical companies compete for patents, trademarks, and trade secrets, veterinarians, livestock producers, and pet owners often feel the impact. This article explores how patent battles over major veterinary drugs, vaccines, biologics, diagnostics, and even pet food formulations affect innovation and access to affordable care. High-profile cases—including conflicts involving Zoetis, Merck Animal Health, and generic manufacturers—highlight the tension between protecting scientific advances and ensuring widespread availability of essential treatments. With rising research costs, evolving regulations, and growing demand for advanced therapies, the veterinary field sits at the crossroads of innovation and accessibility. Understanding these IP disputes is crucial for appreciating how legal decisions can influence animal welfare, drug prices, and the future of veterinary healthcare.

Introduction

The Veterinary Medicine industry faces a growing conflict between innovation and accessibility. As pharmaceutical companies and research institutions battle over patents, trademarks, and trade secrets, the animals—and their owners—often find themselves caught in the crossfire.

The High Stakes of Animal Health Innovation

Developing new veterinary drugs isn't cheap. According to the U.S. Economic Research Service, bringing a single animal drug to market can take 7 to 10 years and cost over \$50 million per new drug.[1] Companion animal studies alone can require \$3-7 million in development costs.[2] To recoup these investments, companies rely heavily on intellectual property protections, particularly patents that grant exclusive rights to manufacture and sell their

innovations for up to 20 years.

But unlike human medicine, the veterinary market is smaller and more fragmented. A drug for dogs might not work for cats, and livestock treatments face entirely different regulatory hurdles than companion animal medications.[3] This complexity makes IP protection even more critical—and disputes even more contentious. The regulatory framework differs between veterinary and human pharmaceuticals, governed by the Generic

Animal Drug and Patent Term Restoration Act rather than the Hatch-Waxman Act that covers human drugs.[4]

Patent Wars Over Blockbuster Pet Drugs

Some of the most heated IP battles involve treatments for common pet ailments. Flea and tick prevention products alone represent a multi-billion dollar global market.

Fluralaner, marketed as Bravecto by Merck Animal Health, exemplifies these high-stakes disputes. Originally discovered by Nissan Chemical Industries and licensed to Merck, fluralaner received FDA approval in 2014 and has been protected by multiple patents.[5] [6] The active ingredient remains patent-protected, with various formulations continuing to receive regulatory approvals, including the recently approved BRAVECTO QUANTUM for year-long flea and tick protection.[7]

These battles typically pit innovator companies against generic manufacturers. The innovators argue they need patent protection to justify their research investments. Generic manufacturers counter that once patents expire, competition drives down prices and makes treatments more accessible to pet owners who might otherwise go without.

The Zoetis Factor: When Big Pharma Goes Veterinary

The 2013 spinoff of Zoetis from Pfizer created the world's largest animal health company, with annual revenues exceeding \$6.3 billion as of 2019 and a massive patent portfolio.[8] Zoetis and competitors like Boehringer Ingelheim, Elanco, and Merck Animal Health now guard their IP as fiercely as any human pharmaceutical giant.

A landmark case demonstrates the intensity of these battles. In 2024, the Australian Full Federal Court invalidated three Zoetis patent applications for pig vaccines in the case Zoetis Services LLC v. Boehringer Ingelheim Animal Health USA Inc.[9] The court found that Zoetis failed to disclose the "best method" of performing the invention by withholding specific antigen concentrations that were material to achieving the vaccine's

advantages. Justice Rofe determined that Zoetis knew the precise antigen concentrations but only disclosed broad ranges, forcing others to conduct extensive research to discover the optimal formulations.[10] The decision reinforces that patent holders must fully disclose critical information, not just provide ranges that leave competitors "having to confront the blind alleys and pitfalls already overcome by the patentee." [11]

In another dispute, Epiteopix LLC (doing business as Vaxxinova) sued Zoetis in 2023 for patent infringement, alleging Zoetis used its siderophore receptor protein technology in livestock and poultry vaccines beyond the scope of licensing agreements that had terminated in 2021. Meanwhile, Zoetis has pursued its own patent enforcement actions, including litigation in Brazil over its swine respiratory disease treatment Draxxin against generic competitors.

Trade Secrets in Veterinary Nutrition

Beyond pharmaceuticals, the pet food industry Harbers its own IP disputes. Premium and prescription diet formulations often rely on trade secret protection rather than patents. Companies like Hill's Pet Nutrition, Royal Canin, and Purina invest heavily in research but keep their exact formulations closely guarded.

When employees move between competitors or attempt to launch rival products, accusations of trade secret theft regularly follow. These cases can be particularly messy because, unlike patents which are publicly disclosed, trade secrets remain hidden—making infringement harder to prove but also more damaging when it occurs.

The Generic Medicine Dilemma

Here's where things get ethically complicated. When a patent expires on a veterinary drug, generic versions can enter the market at a fraction of the original cost. Currently, only five active ingredients used in dogs and cats for flea and tick prevention remain patent-protected: afoxolaner, fluralaner, lotilaner, pyriprole, sarolaner, and spinetoram.[14] All other antiparasitic ingredients, including those for treating worms in companion animals and parasites in livestock, are now generic.

For pet owners, generic availability brings welcome relief. However, innovator companies argue that widespread generics discourage investment in veterinary research. Industry data shows that new animal drug approvals have declined over recent decades, with generic versions representing an increasing share of approvals, particularly for food-animal antibiotics.[1]

The situation becomes more acute in livestock medicine, where thin profit margins mean farmers often can't afford premium treatments. Disputes over antibiotic patents, for instance, directly impact food security and animal welfare on a global scale.

Biologics: The New Frontier

The latest battleground involves biologics—complex biological products like vaccines and monoclonal antibodies. Unlike traditional chemical drugs, biologics can't be exactly copied. Instead, competitors create "biosimilars" that are highly similar but not identical.

Regulatory pathways for veterinary biosimilars are still evolving, creating legal uncertainty.[15] Cross-species patent issues present

unique challenges in veterinary medicine. For instance, in *Amgen v. Hoechst*, claims for "vertebrate" and "mammalian" host cells were upheld despite examples limited to monkey and Chinese hamster ovary cells.[4] However, in other cases involving antibodies, courts have required full characterization of antigens before allowing broad claims across species.[4] These precedents create ongoing debates about how broadly veterinary patents can reach when exemplified in only one or a few animal species.

Technology and Diagnostic Tools

IP disputes aren't limited to medications. Veterinary diagnostic equipment, telemedicine platforms, and genetic testing services face patent challenges. In 2023, VetStem Biopharma settled a patent infringement suit against a stem cell clinic just days before trial, involving patents for methods of preparing and using stem cell compositions.

As technology integrates more deeply into veterinary practice, these disputes intensify. The FDA's Veterinary Innovation Program, launched in 2019, has enrolled over 50 products including cell-based

therapies and intentionally genomically altered animals, creating new frontiers for both innovation and IP protection.

The Access Problem

All these legal battles have real-world consequences. When companies fight over patents, prices stay high. Rural veterinary practices may lack access to cutting-edge treatments. According to industry experts, the economic incentive for developing veterinary drugs is significantly lower than for human pharmaceuticals, leading to fewer treatment options—particularly for rare conditions where development costs cannot be recovered due to limited demand.

Pet owners spend an average of over \$700 annually on their pet's healthcare, yet still face difficult choices when brand-name medications remain prohibitively expensive. The situation becomes even more acute in livestock medicine, where thin profit margins mean farmers often can't afford premium treatments.

Looking Ahead

The tension between protecting innovation and ensuring access

won't disappear. As veterinary medicine advances—with gene therapies, personalized medicine, and revolutionary treatments on the horizon—IP disputes will likely become more complex and more consequential.

The question facing the industry is whether the current IP framework adequately serves all stakeholders: the companies investing in research, the veterinarians delivering care, the pet owners seeking affordable treatment, and most importantly, the animals whose wellbeing depends on continued innovation.

Finding that balance may require rethinking how we incentivize veterinary research, regulate generic competition, and value animal health in the broader pharmaceutical ecosystem. Until then, the courtroom battles will continue, with animal welfare hanging in the balance.

As intellectual property law continues to evolve, staying informed about these disputes helps pet owners, veterinarians, and policymakers understand the forces shaping the future of animal healthcare.

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Protecting the Golden Gateway: A Guide to Teat and Udder Affections in Bovines

Introduction

According to Animal Husbandry Statistics 2025 by Govt. of India, total milk production during 2024-2025 was 247.87 million tonnes. India ranks first in the world in terms of total milk production with roughly 96.68% being contributed by cattle and buffalo and remaining by sheep and goat. Mastitis is the most commonly occurring infectious disease in dairy cattle with worldwide economic losses up to 40 billion USD (Azooz et al., 2020). Highly emphasis should be laid on the problems which can be avoided by practicing proper farm management. And surgical teat affections can be easily avoided.

Occurrence of teat affections

In study conducted by Abd-El-Hady 2015 on 275 cattle and 85 buffaloes, the major udder affections included Deep wounds (5(1.4%), 1(0.28%)); Hematoma (20(5.6%),7(1.9%)); Abscesses (21(5.83%),0); Gangrenous mastitis (36(10%), 0) and ruptured suspensory ligaments (10(2.8%), 0), while the teat lesions included: Anomalies (50(13.9%), 5(1.4%)); Wounds (18(5%), 0); Stenosis

(50(13.9%), 15); Obstructions (70, 15); Ulcerative thelitis (0, 33(9.5%)) and teat cistern dilatation (3, 9) in cattle and buffaloes, respectively.

135 cattle (5.96%) of the 2,265 bovine cases that were reported to the large animal surgical outpatient unit, VCRI, Namakkal, had teat affections. Teat blockage (62.22%), teat laceration (13.33%), teat fistula (2.96%), thelitis (12.60%), teat papilloma (4.44%), foreign body in the teat (2.22%), lactolith (0.74%), and supernumerary teat (1.48%) were among the 135 instances that were reported. The major cause for traumatic injury was self-infliction (Swetha et al., 2025).

Cattle outperform buffaloes in viral teat pox and supernumerary difficulties due to thinner skin and more outbreak exposure; buffaloes lead in cistern dilatation (39.8%) (Misk et al., 2018). Trauma spikes around calving from edema fissures or overcrowding, while poor machine fit grinds teat ends raw. Genetic flops like hypermastia dodge surgery but flag culls.

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Abstract

Dairy producers throughout the globe are terrified by teat and udder issues, which often reduce milk output and force difficult culls. Surgical treatments may reverse the situation and restore production in cows and buffaloes when illnesses, injuries, or birth deformities need the scalpel. Critical problems that endanger dairy production, such as imperforate teats, supernumerary structures, fistulas, lacerations, and severe mastitis, are addressed surgically in bovines with teat and udder diseases. Based on veterinary frontline reports, this article explores the most typical surgical situations, tried-and-true methods and preventative advice. Prevalence data highlight trauma (majority of teat lesions), viral factors, and genetic risks, alongside prevention strategies like hygiene, equipment maintenance, and culling to minimize surgical needs.

Innate immunity of mammary gland

As the main physical and immunological barriers against microbial invasion, the teat sphincter and teat canal are crucial parts of the mammary gland's innate defence mechanism (Rainard and Riollet, 2006). Teat canal is sealed by keratin plug between milkings and dry period which acts as a physical barrier. Additionally, keratin contains microbicidal activity against mastitis causing organisms. After milking, it takes two hours for sphincter to contract and close the teat canal. Because it lessens the colonization of the teat skin by bacteria like *Staphylococcus aureus*, which puts the cow at risk for new intramammary infections, a good teat skin condition lowers the danger of contamination. The mammary epithelium is not often activated by bacteria, unlike the intestinal, buccal, or upper respiratory epithelia. Bacteria must be considered an invader. The aseptic nature of normal milk may influence the immune system of the mammary gland, including sub- and intra-

epithelial leucocytes and sensor receptors on MEC.

Field ready Surgical techniques

Most of the teat affections can be managed under field conditions as they include surface lesions. The expertise and OR is needed for major surgical conditions such as gangrenous mastitis which require mastectomy as treatment option. Most of the affections such as teat polyp, supernumerary teat, teat fistula, etc. can be operated under Ring Block anaesthesia which has an almost 73% success rate (Misk et al., 2018).

An elliptical incision properly separates webbed or conjoined teats, which are then sutured inverted to avoid scarring and leakage. Udder lacerations have their edges cut and then repaired in layers: mucosa first, then skin with mattress stitches.

For the treatment of teat canal stenosis, a novel technique of Argon Plasma Coagulation device has shown successful rates of 90% after 30 days which is better as compared to surgical method using scalpels (Risvanli

et al., 2023).

Dodge the knife with smarts

Prevention of surgical teat and udder affections focuses on measures of farm management to reduce trauma, infections and congenital risks.

Dry sawdust bedding surface is helpful in least exposure of dairy cows to microbial contaminations as compared to no bedding material system. Also the appropriate ventilation must be maintained in housing which prevents from LSD during monsoon period. Soft floor of design reduces injury related to edema fissures.

Screen heifers for supernumerary teats (up to 37% prevalence) and cull carriers to dilute genetic polythelia; select for strong udder ligaments in buffaloes and crossbreds. Vaccinate against FMD and LSD to slash viral papillomas and erosions by 70% in endemic zones like Punjab and Tamil Nadu.

Teat dipping in iodine-based solutions reduces mastitis-related fistulas. Avoid use of barbed wire fence in open pastures boundaries.

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Emerging Trend in IPR & Animal Husbandry

Introduction

The livestock sector has undergone a technological revolution in the last two decades. Scientific interventions such as CRISPR-Cas9 gene editing, in vitro fertilization (IVF), embryo transfer, sexed semen, molecular diagnostics, AI-based milk yield prediction, wearable livestock sensors, and genomic selection have reshaped traditional animal husbandry practices. These innovations generate knowledge, biological materials, and digital assets that require formal IPR protection. Historically, livestock production in India thrived on indigenous knowledge and diverse native breeds. However, globalization and increasing private investment have shifted the focus toward commercial biotechnology, patented processes, and proprietary genetic resources. Consequently, IPR mechanisms—patents, copyrights, trademarks, geographical indications, trade secrets, and ABS regulations—are now central to safeguarding both innovations and heritage. The major challenge is balancing innovation with equity: protecting scientific advancements while ensuring farmers' access to technologies, conserving indigenous breeds, and preventing bio piracy. India's compliance with the TRIPS Agreement, the Biological Diversity Act (2002), and global IPR frameworks makes this balancing act even more critical.

Patent Trends in Animal Biotechnology:

Patents on Gene Editing and Transgenic Animals: Gene editing tools such as CRISPR-Cas9 are widely used to create animals resistant to important diseases (PRRS in pigs, mastitis in cattle, and Newcastle disease in poultry). Transgenic goats producing therapeutic proteins ("pharming") are protected by process patents. Patents ensure

exclusive rights over genetic modification procedures, vectors, and resulting biological materials.

Implications: Promotes innovation but may restrict farmers' access to advanced genetics.

Patents on Vaccines, Diagnostics and Therapeutics:

- (a) Recombinant, DNA, and subunit vaccines for FMD, LSD, and avian influenza.
- (b) LAMP and PCR-based diagnostic kits for brucellosis and mastitis.
- (c) Nanotechnology-based drug delivery systems and feed additives.

Implications: Enhances disease management but increases dependence on private biotech companies.

Patents on Feed and Nutrition Innovations:

Methane-reducing feed additives (e.g., red-seaweed formulations).

Rumen-protected amino acids, bypass fat, encapsulated micronutrients.

Probiotic and enzyme-based feed formulations.

Impact: Supports climate-smart livestock farming and improved feed efficiency.

IPR in Reproductive Technologies:

Sexed semen sorting techniques.

- IVF, ICSI, and embryo washing protocols.
- Patented cryoprotectants for embryo freezing.
- Cloning technology for elite bulls and buffaloes.

Genomic IPR and Data Ownership:

- (a) Proprietary SNP Chips and Genomic Panels: Genomic selection relies on thousands of DNA markers, many of which are owned by private

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Abstract

Intellectual Property Rights (IPR) have become increasingly significant in the animal husbandry sector due to rapid advancements in biotechnology, reproductive engineering, genomics, precision livestock farming, and digital agriculture. The commercialization of genetic resources, bio-engineered vaccines, diagnostic kits, reproductive materials, and value-added animal products demands a robust IPR framework. Newer trends such as gene-editing patents, protection of indigenous breeds through Geographical Indications (GI), safeguarding of Traditional Knowledge (TK), big-data ownership in genomic selection, and Access-and-Benefit Sharing (ABS) under biodiversity legislation demonstrate the multidimensional evolution of IPR in livestock sciences. This article provides an in-depth analysis of emerging IPR trends and their implications for innovation, farmers' rights, breed conservation, and global competitiveness.

breeding corporations.

- (b) Genomic Databases as Intellectual Assets: Large databases containing genotype–phenotype relationships are treated as trade secrets.
- (c) AI-Based Genetic Prediction Model: Machine learning models used to predict milk yield, fertility, feed efficiency, and disease resistance are protected through a mix of copyright and algorithmic IP.

Geographical Indications (GI) in

Animal Husbandry: GI protection is emerging as an important tool for safeguarding indigenous breeds and animal-based products.

Examples of GI-eligible or GI-recognized livestock resources:

- Bannur Sheep (Karnataka) – superior mutton quality.
- Kangayam Cattle (Tamil Nadu) – draft ability
- Beetal Goat (Punjab) – high-quality meat and skin.
- Surti Buffalo (Gujarat) – high-fat milk.

GI tags prevent name misuse, promote breed conservation, and enhance farmers' income.

Traditional Knowledge and TKDL:

Ethno-veterinary knowledge has historically supported livestock rearing.

Examples:

- Herbal mastitis treatments
- Indigenous deworming mixtures
- Traditional feeding systems
- Community-based grazing and breeding practices

The Traditional Knowledge Digital Library (TKDL) documents such knowledge to prevent bio piracy and unethical patenting abroad.

Trademarks and Branding in

Livestock Products: As consumer preferences shift toward quality and traceability, branding becomes critical.

Popular trademark trends:

- A2 milk brands
- Organic & free-range eggs
- Breed-specific ghee (Gir, Tharparkar)
- Antibiotic-free chicken
- Ultra-filtered or probiotic milk

Trademarks protect brand identity and foster market differentiation.

IPR in Precision Livestock Farming:

Digitization of animal husbandry has introduced new IP challenges.

Devices & Technologies:

- Wearable sensors for heat, rumination, body temperature
- Robotic milking systems

AI-enabled disease prediction apps.

Drones for pasture monitoring.

IP protection includes hardware patents, software copyright, and data-ownership agreements.

Biodiversity, ABS, and Protection

from Bio piracy: The Biological Diversity Act (2002) ensures regulated access to Indian genetic resources.

Key points:

- Foreign entities must seek approval to use indigenous breed germplasm.
- Benefit-sharing mechanisms ensure compensation to breeder communities.
- Maintains sovereignty over native livestock biodiversity.

International IPR Compliance: Global frameworks shape India's IPR system.

Major Influences:

- TRIPS (WTO): Minimum standards for patent protection.
- CBD & Nagoya Protocol: ABS provisions for genetic resources.
- OIE & FAO guidelines: Ethical considerations in genetic resource use.

Ethical and Socioeconomic

Challenges: Patenting of life forms raises ethical questions.

- High cost of patented technologies limits farmer access.
- Risk of monopolization by private breeding companies.
- Data privacy concerns in digital livestock farming.
- Threat to indigenous breeds due to commercial crossbreeding.

Future Prospects: Block chain-based traceability for milk and meat products.

- Growth in climate-resilient breed development.
- More GI-protected indigenous breeds.
- Expansion of digital livestock platforms with strong data protection rules.
- Greater use of AI and genomics under regulated IP frameworks.

Conclusion: IPR is now a fundamental pillar of modern livestock development. It protects innovations in biotechnology, genomics, digital technology, and value-added livestock products while safeguarding indigenous breeds and traditional knowledge. A balanced IPR system—one that encourages research but ensures accessibility and fair benefit-sharing—will be essential for sustainable growth in the animal husbandry sector, especially in biodiversity-rich countries like India.

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For a nation that aspires to lead the world, a protein-deficient population is a challenge we can no longer ignore.

HELLO PROTEIN is a public awareness nationwide initiative movement born for this urgency. Our mission is simple yet transformative: to reshape India's relationship with protein and to strengthen the industry perspective towards protein awareness.

HELLO PROTEIN purpose is not to preach, but to educate, to simplify complex science, debunk long-held myths, & empower individuals with practical, everyday guidance.

Become an advocate for better nutrition; make protein a priority – not occasionally, but consciously, consistently, and proudly.

Let's join hands & make our nation protein deficit free with **HELLO PROTEIN**.

If this mission resonates with you, do drop your ideas/comments/suggestions at :
helloproteins25@gmail.com


Mr. O. P. Singh
Founder



Symptoms, Prevention and Treatment of CRD in Poultry



Mr. Rakesh Kumar
Founder, Growel Agroveter Private Limited
www.growelagroveter.com



Chronic Respiratory Disease (CRD) in chickens is primarily a respiratory illness caused by the bacterium *Mycoplasma gallisepticum*. CRD affects broilers, layers, breeders, and other birds such as pigeons, ducks, and quails. If not treated promptly, CRD can lead to increased mortality and other serious illnesses.

Key Symptoms of CRD in Chickens

- Wheezing or coughing sounds while breathing
- Watery or foamy discharge from eyes and nostrils
- Swollen eyes

- Weight loss, despite looking full-bodied
- Excessive lethargy
- Decline in egg production
- Stunted growth
- Loss of appetite
- Lameness
- Thin, green or red colored droppings

How to Prevent CRD

Preventing CRD in poultry requires a continuous and well-planned approach. With timely measures, much of the disease impact can be avoided. Here are effective prevention steps:

1. Start with High-Quality

Chicks

Purchase chicks from reputable, certified hatcheries. Healthy breeds strengthen your flock's disease resistance and improve overall productivity.

2. Isolate Sick Birds

CRD is contagious. Immediately separate any bird showing CRD symptoms to prevent spreading to healthy birds.

3. Regular Farm Cleaning and Viraclean Spraying

- Thoroughly clean the farm 3–4 days before bringing in chicks and spray Viraclean during this time.
- Spray Viraclean at least three times weekly.
- Clean feeders and drinkers with Viraclean solution.

This keeps the farm bacteria-free and prevents CRD and other infections.

4. 'Follow Growels Medicine Chart

Use Growel's scientifically developed medicine chart—advised by veterinarians—to prevent disease, support faster weight gain, and improve feed conversion ratio (FCR).

5. Strict Biosafety Measures

- Restrict farm access to outsiders and animals.
- Require handwashing, mask-wearing, and dedicated footwear at the entry point.

6. Maintain a Well-Ventilated, Dust-Free Farm

- Keep bedding dry and

prevent excessive moisture or dirt. Good ventilation helps reduce CRD symptoms.

7. Improve Water Quality with Aquacure

Aquacure is a powerful water sanitizer:

- Removes bacteria, parasites, and hardness from water.
- Enhances digestion and reduces disease risk.
- Add the recommended dose to drinking water daily.

8. Use Respiratory Herbs if Birds Fall Ill

At the first sign of CRD:

- Administer 5 mL Respiratory Herbs per 100 birds in their drinking water
- Continue until full recovery of the flock

9. Preventive Dose in Early Life

- From day 3 to day 6 of chicks' life:
- Give 1 mL Respiratory Herbs per 100 birds in water

This helps prevent the onset of disease.

Quick Summary of Best Practices

- Use high-quality chicks
- Isolate sick birds immediately
- Clean the farm regularly with Viraclean
- Adhere to Growel's medicine schedule
- Implement strict biosafety at farm entry

- Ensure clean, well-sanitized water (Aquacure)

What If CRD Affects Your Birds?

If birds show CRD symptoms, start treatment right away to prevent disease spread and mortality. A combination of Respiratory Herbs, Amino Power, and Aquacure is highly effective.

Here's a more detailed and engaging version, with expanded descriptions for each product and step for clarity and impact:

1. Respiratory Herbs — Your Herbal Weapon Against CRD

A powerful botanical blend explicitly designed for poultry respiratory health.

- Dosage: 5–10 mL per 100 birds
- When to Use: Administer in the morning, mixed into their drinking water
- Tip: Offer only as much medicated water as the flock will consume within an hour—this ensures they receive the full dose
- Continue Treatment Until: All birds show clear, full recovery from CRD

Key Benefits:

- Targets and soothes major CRD symptoms—coughing, nasal discharge, wheezing, lethargy, and slowed growth
- Demonstrates broad-spectrum support across various livestock, effective

against CRD, E. coli, viral coughs, and colds

2. Amino Power — Immunity & Growth Boost

- A premium supplement packed with 46 essential amino acids, vitamins, and minerals—ideal for evening fortification.
- Dosage: 5 mL per 100 birds
- Administer: Mix into the evening drinking water

Why It Matters:

- Strengthens the immune system, helping birds resist infections including respiratory illnesses
- Promotes faster respiratory recovery post-CRD
- Supports weight gain and energy maintenance, crucial for production efficiency
- Aids in healthier feather growth and resilience under stress

3. Aquacure — Clean Water for Healthy Birds

A powerful water sanitizer that ensures your flock drinks only pure, invigorating water.

- Usage: Add the recommended dosage to drinking water daily

Core Benefits:

- Disinfects water by removing chlorine, bacteria, viruses, parasites, and hardness
- Enhances digestion and gut health, accelerating recovery
- Simple daily maintenance prevents water-borne

illnesses and improves overall well-being

4. Viraclean — Farm Sanitizer and Disinfectant to Prevent Recurrence

A robust, broad-spectrum disinfectant for maintaining farm hygiene and disease prevention.

- Spray Schedule: Apply three times weekly around the farm
- Cleaning Routine: Clean feeders & drinkers—then rinse with a Viraclean solution

Safety Advantages:

- Keeps farm surfaces disinfected and limits contamination risks
- Forms a protective barrier against CRD-causing pathogens and other infections

Treatment & Prevention

Step	Product	Purpose
Morning water	Respiratory Herbs	Treat present CRD symptoms
Evening water	Amino Power	Build immunity, support recovery
Daily water sanitation	Aquacure	Ensure clean, disease-free hydration
Weekly farm sanitizing	Viraclean	Prevent pathogen build-up

Protocol

Routine for Chicks (Prevention):

- Day 3–6 : Give 1 mL Respiratory Herbs per 100 chicks daily in drinking water
- This early dosing helps

prevent disease onset, building a strong immune foundation.

- If CRD symptoms appear later, increase to 5–10 mL Respiratory Herbs and continue full protocol.

Why This Combo Works

1. Respiratory Herbs rapidly eliminate current symptoms
2. Amino Power supports immune resilience and healthy growth
3. Aquacure maintains clean water—minimizing disease stress
4. Viraclean keeps the physical environment sanitized—blocking reinfection

Bottom Line :

By combining these four products—Respiratory Herbs, Amino Power, Aquacure, and Viraclean—you create a

comprehensive defence, treatment, and recovery system. Acting early and consistently builds up flock health, boosts productivity, cuts disease losses, and enhances your farm's overall growth and profitability.



Trademark Protection for Veterinary Products and Animal Feeds

Introduction

The animal health sector- including veterinary pharmaceuticals, nutritional supplements, livestock feed concentrates and pet food products- relies heavily on brand recognition. Farmers, veterinarians and livestock producers associate product names with reliability, safety and efficacy. The growing presence of counterfeit veterinary medicines and duplicate feed brands makes trademark protection a critical tool for safeguarding both public and animal health. This article is about how trademarks function as intellectual property assets in this domain and evaluates the challenges and opportunities inherent in protecting them.

Understanding Trademarks in the Veterinary and Feed Industry

A trademark is a legally protected signifier—such as a word, symbol, color combination, shape, or packaging design—that distinguishes one manufacturer's goods from another's. In the veterinary

sector, trademarks are used for- Vaccines and biologics, Feed additives and mineral mixtures, Dewormers, antibiotics and nutraceuticals, Pet foods and specialty diets, Diagnostic kits and veterinary equipment. Distinctive branding not only differentiates products but also helps maintain consumer trust, particularly in rural markets where buying decisions rely heavily on brand familiarity.

Importance of Trademark Protection

- a) Ensuring Product Authenticity- Counterfeit veterinary medicines and adulterated feed supplements are pervasive in developing markets. Trademarks help companies identify infringements and initiate legal action against counterfeiters.
- b) Reducing Consumer Confusion- Veterinarians and livestock owners depend on trusted brands because product quality directly impacts animal health and farm productivity. Trademark protection prevents misleadingly similar brand

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names from entering the market.

- c) Enhancing Brand Value- As companies expand to new regions, trademarks become valuable intangible assets that support partnerships, licensing, and international trade.
- d) Regulatory Compliance- Many jurisdictions require distinct branding for veterinary pharmaceuticals to avoid medication errors.

Legal Framework for Trademark Protection

(a) Indian Legal Framework-

- In India, trademarks are regulated under:
 - The Trade Marks Act, 1999
 - Trade Marks Rules, 2017
 - Administered by the Controller General of Patents, Designs and Trade Marks (CGPDTM).
- Veterinary medicines are classified under:
 - Nice Class 5: Pharmaceuticals and veterinary preparations
 - Nice Class 31: Agricultural and animal feeds
 - Trademark validity extends for 10 years and is renewable indefinitely.

(b) International Framework-

- TRIPS Agreement (WTO) - Sets minimum standards for trademark protection and enforcement globally.
- Madrid Protocol (WIPO)-

Allows companies to seek international trademark protection using a single application.

- National Drug Regulations- Many countries require distinctive branding for veterinary medicinal products to prevent confusion with human drugs.

Trademark Registration and Protection Process

- I. Trademark Search- Before filing, companies must ensure the proposed brand name does not resemble an existing trademark, especially in the veterinary or pharmaceutical categories.
- ii. Filing an Application- Applications typically cover- Word marks, Logo designs, Packaging trade dress, Taglines, Non-traditional marks (color, shape, holograms)
- iii. Examination and Publication- The trademark office examines the application for distinctiveness and conflict with existing marks. Accepted marks are published for public objection.
- iv. Registration and Renewal- Upon successful registration, the owner gains exclusive rights and can renew the trademark every 10 years.

Challenges in Trademark

Protection for Veterinary Products and Feeds

- a) Generic or Descriptive Branding- Brands such as "High Protein Feed" or "Mineral Mix" are often rejected due to lack of distinctiveness.
- b) Counterfeiting in Rural Supply Chains- Loose packaging and repacking practices allow fake products to infiltrate markets.
- c) Similarity to Human Medicine Brands- Some veterinary drug names may approach the phonetic similarity of human pharmaceutical brands, leading to rejection during examination.
- d) Market Fragmentation- Multiple regional feed manufacturers create an environment where local duplications are common.
- e) Limited Awareness Among Small Manufacturers- Many small-scale feed producers remain unaware of trademark laws and fail to protect their brand identity.

Enforcement Mechanisms

- a) Civil Remedies- Permanent or interim injunctions, Damages, Seizure and destruction of infringing goods.
- b) Criminal Prosecution- In cases of counterfeiting or intentional infringement, authorities may initiate

criminal actions under trademark law.

- c) Administrative Actions- Market surveillance and raids in cooperation with veterinary drug inspectors and food/feed regulators.

Strategies for Effective Trademark Protection

- a) Developing Unique Brand Names- Arbitrary or coined words (e.g., “Nutrivex,” “Vetorin”) offer stronger legal protection.
- b) Protecting Packaging and Trade Dress- Distinctive bottle shapes, color schemes, or pack designs prevent competitors from

creating look-alike products.

- c) Use of Anti-Counterfeit Technologies- QR codes, Hologram stickers, Blockchain-based supply tracking.
- d) Regular Market Monitoring- Large companies maintain surveillance networks to detect counterfeit products early.
- e) International Registration- Export-oriented veterinary companies use the Madrid System to safeguard brands globally.

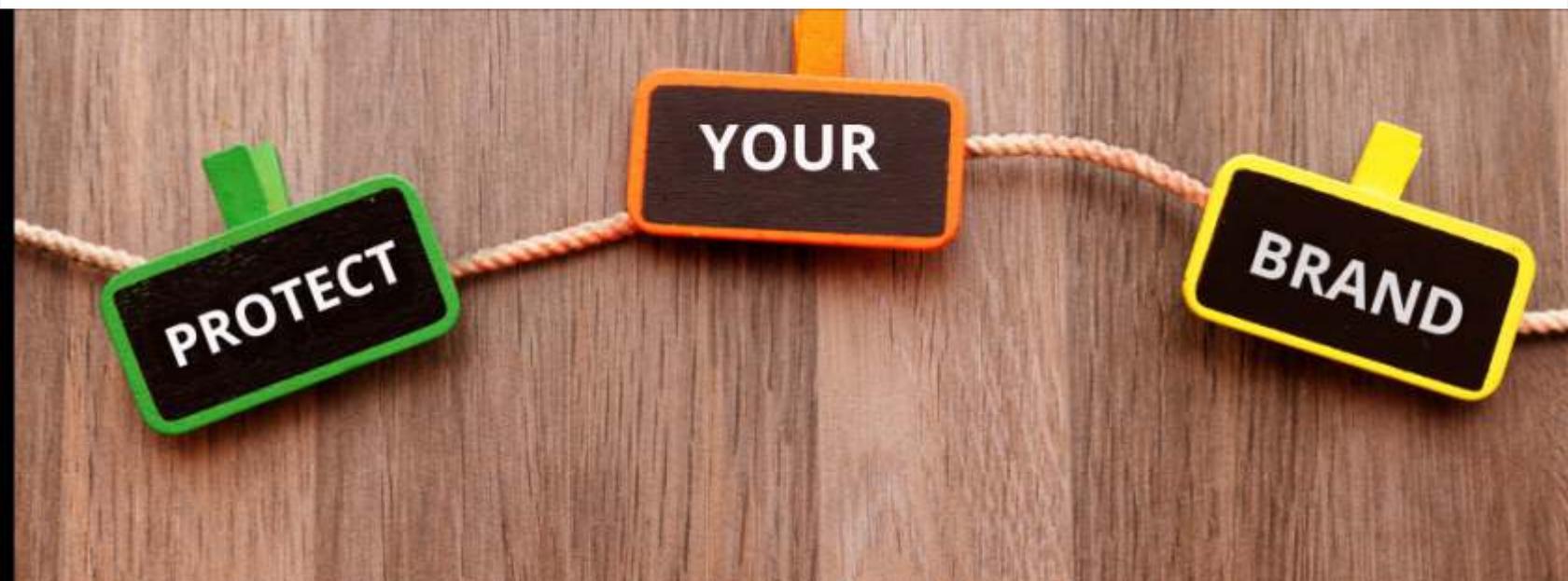
Conclusion

Trademark protection is a vital

component of brand strategy in the veterinary and animal-feed industries. The increasing sophistication of counterfeiters, along with the rapid growth of livestock and pet-care sectors, demands robust legal protection and proactive enforcement. A strong trademark not only distinguishes a product in a saturated market but also safeguards animal health, secures consumer trust, and enhances business value. For companies engaged in veterinary and feed production, investment in trademark protection is no longer optional—it is a necessity.

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India–EU Free Trade Agreement Concluded: A Strategic Breakthrough in India's Global Trade Engagement

Historic Milestone Announced at the 16th India–EU Summit by Hon'ble Prime Minister Shri Narendra Modi and European Commission President H.E. Ms. Ursula von der Leyen

India, 4th largest economy, and the European Union, 2nd largest economy, comprising 25% of Global GDP, Forge a Trusted Partnership,

Unprecedented Market Access: Over 99% of Indian exports gain preferential entry into the EU, unlocking massive growth potential

The FTA will open new opportunities for MSMEs and create jobs for women, artisans, youth and professionals

INR 6.41 Lakh Crore (USD 75 Billion) exports poised for take-off, 33 bn USD of exports in labour-intensive sectors like textiles, leather, marine products, gems and jewellery set to gain immensely from preferential access under the FTA

Carefully calibrated auto liberalisation with reciprocal market access to propel Make in India

Favourable Market Access Opens Doors for India's Agricultural and Processed Food Exports

India Safeguards sensitive Agricultural products and Dairy Sector: no market access.

Ambitious and Commercially Meaningful Market Access in Services

Future-Ready Mobility Framework Expands Global Opportunities for Skilled and Semi-Skilled Indian Professionals

Forward looking CBAM provisions Secure constructive engagement, dialogue and support India–EU FTA Lays the Foundation for Inclusive, Resilient, and Future-Ready Growth

Hon'ble Prime Minister Shri Narendra Modi and European Commission President H.E Ms. Ursula von der Leyen, today jointly announced the conclusion of the India–European Union Free Trade Agreement (India–EU FTA) at the 16th India–EU Summit, held during the visit of the European leaders to India. This announcement marks a historic milestone in India–EU economic relations and trade engagement with key global partners.

The conclusion of this FTA positions India and the European Union as trusted partners committed to open markets, predictability, and inclusive growth.

The FTA comes after intense

negotiations since the re-launch of negotiations in 2022. The announcement of the FTA today marks the culmination of years of sustained dialogue and cooperation, between India and the EU, demonstrating the political will and shared vision to deliver a balanced, modern, and rules-based economic and trade partnership.

The European Union is India's one of the largest trading partner, with bilateral trade in goods and services growing steadily over the years. In 2024–25, India's bilateral trade in goods with the EU stood at INR 11.5 Lakh Crore (USD 136.54 billion) with exports worth INR 6.4 Lakh Crore (USD 75.85 billion) and imports amounting to INR 5.1 Lakh Crore (USD 60.68 billion). India-EU

trade in services reached INR 7.2 Lakh Crore (USD 83.10 billion) in 2024.

India and EU are 4th and 2nd largest economies, comprising 25% of Global GDP and account for one third of global trade. Integration of the two large diverse and complementary economies will create unprecedented trade and investment opportunities.

Union Minister for Commerce and Industry, Shri Piyush Goyal, lauded the strategic vision and steadfast leadership of Hon'ble Prime Minister Shri Narendra Modi. He stated:

“The conclusion of the India–European Union Free Trade Agreement represents a defining



achievement in India's economic engagement and global outlook. This supports India's approach to secure trusted, mutually beneficial and balanced partnerships.

Beyond a conventional trade deal, it represents a comprehensive partnership with strategic dimensions and is one of the most consequential FTA. India has secured unprecedented market access for more than 99% of Indian exports by trade value to the EU that also bolsters the 'Make in India' initiative. Beyond goods, it unlocks high-value commitments in services complemented by a comprehensive mobility framework enabling seamless movement of skilled Indian professionals.

India, powered by a young and dynamic workforce and one of the fastest-growing major economies, stands poised to leverage this FTA to create jobs, spur innovation, unlock opportunities across sectors, and enhance its competitiveness on the global stage."

The India-EU trade pact covers conventional areas such as trade in goods, services, trade remedies, rules of origin, customs and trade facilitation, as well as emerging areas such as SMEs and digital trade, amongst others.

The India-EU FTA gives a decisive boost to its labour-intensive sectors

such as textiles, apparel, leather, footwear, marine products, gems and jewellery, handicrafts, engineering goods, and automobiles bringing down tariffs up to 10% on almost 33 bn USD of exports to zero on entry into force of the Agreement. Beyond enhancing competitiveness, it empowers workers, artisans, women, youth, and MSMEs, while integrating Indian businesses more deeply into global value chains and reinforcing India's role as a key player and supplier in global trade.

On automobiles, calibrated and carefully crafted quota based auto liberalisation package will not only allow EU auto makers to introduce their models in India in higher price bands but also open the possibilities for Make in India and exports from India in future. Indian consumers to benefit from high tech products and greater competition. The reciprocal market access in EU market will also open up opportunities for India made automobiles to access EU market.

India's agricultural and processed food sectors are poised for a transformative boost under the India-EU FTA, creating a level playing field for Indian farmers and agrarian enterprises. Key commodities such as tea, coffee, spices, fresh fruits and vegetables, and processed foods will gain

enhanced competitiveness, strengthening rural livelihoods, promoting inclusive growth, and reinforcing India's position as a trusted global supplier. India has prudently safeguarded sensitive sectors, including dairy, cereals, poultry, soymeal, certain fruits and vegetables, balancing export growth with domestic priorities.

Beyond tariff liberalisation, the FTA provides measures to tackle non-tariff barriers through strengthened regulatory cooperation, greater transparency, and streamlined customs, Sanitary and Phytosanitary (SPS) procedures, and Technical Barriers to Trade disciplines.

Through CBAM provisions, commitments have been secured including a forward-looking most-favoured nation assurance extending flexibilities if any granted to third countries under the regulation, enhanced technical cooperation on recognition of carbon prices, recognition of verifiers, as well as financial assistance and targeted support to reduce greenhouse gas emissions and comply with emerging carbon requirements.

Services being dominant and faster-growing part of both economies will trade more in future. Certainty of market access,

non-discriminatory treatment, focus on digitally delivered services, ease of mobility will provide boost to India's services exports.

The FTA secures expanded and commercially significant commitments from the EU across key sectors of Indian strength, including IT and IT-enabled services, professional services, education, financial services, tourism, construction, and other business sectors.

India's predictable access to EU's 144 subsectors (which includes IT/ITeS, Professional Services, Other Business Services and Education Services) will provide boost to Indian service providers and enable them to provide competitive world class Indian services to EU's consumers while EU's access to 102 subsectors offered by India will bring in high tech services, investment into India from EU resulting in a mutually beneficial arrangement.

On mobility, the India-EU FTA provides a facilitative and predictable framework for business mobility covering short-term, temporary and business travel in both directions. These enable professionals to travel between the two economies to provide services under different scenarios. EU and India is providing mobility commitments to each other for Intra-Corporate Transferees (ICT) and Business Visitors, along with entry and working rights for dependents and family members of ICTs. The EU has also offered commitments in 37 sectors/sub-sectors for Contractual Service Suppliers (CSS) and 17 sectors/sub-sectors for Independent Professionals (IP), many of which are sectors of interest to India, including Professional Services, Computer and related Services,

Research and Development Services, and Education Services.

India also secured a framework to constructively engage on Social Security Agreements over a five-year horizon, together with framework supporting student mobility and post-study work opportunities.

Additionally, India has also secured access for practitioners of Indian Traditional Medicine to work under home title in EU Member States where traditional medical practices are not regulated.

In financial services, the FTA promotes cooperation to advance innovation and secure cross-border electronic payments, while providing India with enhanced market access across several major EU member states. These provisions are expected to deepen financial integration and support the growth of financial services trade.

These commitments not only unlock high-value employment opportunities but also reinforce India's position as a global hub for talent, innovation, and sustainable economic growth.

The FTA reinforces intellectual property protections provided under TRIPS relating to copyright, trademarks, designs, trade secrets, plant varieties, enforcement of IPRs, affirms Doha Declaration and recognises the importance of digital libraries, specifically the Traditional Knowledge Digital Library (TKDL) project initiated by India.

The FTA is expected to facilitate cooperation in critical areas like Artificial Intelligence, clean technologies, and semiconductors, supporting India's technological advancement.

The FTA is expected to substantially scale up trade, enhance export

competitiveness, and integrate Indian businesses more deeply into the European and global value chains.

The India-EU FTA marks a new chapter in bilateral economic engagement, strengthening trade, and strategic cooperation between India and the 27-member EU bloc. Cognizant of multifarious objectives placed on trade, dynamic nature of trade, fast evolving technologies and increasing regulatory complexities, the Agreement embeds multiple review, consultation and response mechanisms to deal with new, sudden challenges which emerge in future. The Agreement relies on strong stewardship and trust to deliver gains for both sides.

EU becomes India's 22nd FTA partner. The Government since 2014 has signed trade deals with Mauritius, UAE, UK, EFTA, Oman and Australia, and announced trade deal with New Zealand. In 2025, India signed trade deal with Oman and UK and announced conclusion of trade deal with NZ.

The India-EU trade deal, along with India's FTA with the UK and the EFTA effectively opens up the entire European market for Indian businesses, exporters and entrepreneurs.

Beyond boosting commerce, it reinforces shared values, fosters innovation, and creates opportunities across sectors and stakeholders from MSMEs, women and skilled professionals to farmers and exporters. Aligned with India's vision of "Viksit Bharat 2047," the FTA positions India as a dynamic, trusted, and forward-looking partner on the global stage, setting the foundation for inclusive, resilient, and future-ready growth for both regions.

IPPE 2026: Setting New Global Benchmarks for the Poultry, Meat & Animal Food Industry



The **International Production & Processing Expo (IPPE) 2026** has once again reaffirmed its stature as the world's most influential and comprehensive event for the global poultry, meat, and animal food industries. Held from **January 27–29, 2026**, at the **Georgia World Congress Center, Atlanta, USA**, IPPE 2026 emerged as a truly landmark edition—setting new milestones in scale, participation, innovation, and knowledge exchange.

Organised through the collaboration of three leading trade shows— **International Poultry**

Expo, International Feed Expo, and International Meat Expo—IPPE 2026 is jointly hosted by the **U.S. Poultry & Egg Association**, the **American Feed Industry Association (AFIA)**, and the **North American Meat Institute**. This powerful alliance once again delivered a world-class platform that brought together the entire value chain of animal agriculture under one roof.

A Truly Global Industry Gathering
IPPE 2026 attracted industry professionals from **more than 130 countries**, reinforcing its reputation as the largest annual global

gathering for poultry, egg, meat, and animal food professionals. The diverse international attendance reflected the increasing interconnectedness of global food systems and the growing demand for collaborative solutions to shared industry challenges.

Strong participation was witnessed from **North America, Latin America, Europe, the Middle East, Africa, South Asia, and Southeast Asia**, enabling meaningful cross-border interactions and opening new avenues for trade, technology transfer, and strategic partnerships. The expo floor was vibrant with



discussions on emerging markets, evolving consumer preferences, regulatory frameworks, and sustainable growth strategies.

Unmatched Scale and Industry Representation

With **more than 1,380 exhibitors** spread across an impressive **6,65,000 square feet of exhibit space**, IPPE 2026 showcased the most comprehensive range of products, technologies, and services ever seen at the event. The sheer scale of participation clearly

demonstrated the industry's confidence in IPPE as the premier global platform for business development and innovation.

Exhibitors represented every segment of the poultry, meat, and animal food industries—ranging from breeding and genetics, feed manufacturing, nutrition, animal health, and processing equipment, to automation, packaging, cold chain logistics, and sustainability solutions. This integrated representation allowed visitors to

explore end-to-end solutions that address the complete lifecycle of animal protein production.

Spotlight on Innovation and Technology

One of the defining highlights of IPPE 2026 was its strong emphasis on **cutting-edge technological advancements** shaping the future of animal agriculture. The exhibition floor featured state-of-the-art developments in:

- Poultry and meat processing equipment





- Automation and robotics
- Smart farming and precision production technologies
- Artificial intelligence and data-driven decision-making tools
- Advanced animal health and biosecurity solutions
- Innovative feed ingredients and nutrition technologies
- Sustainable and energy-efficient production systems

These innovations underscored the industry's shift toward **efficiency, sustainability, traceability, and resilience**, while also addressing rising global demand for safe, high-quality animal protein.

Education at the Core of IPPE 2026

Beyond its massive exhibition, IPPE 2026 stood out as a premier knowledge-sharing platform, hosting **more than 80 high-quality educational sessions** throughout the event. These sessions were thoughtfully designed to address the most pressing challenges and emerging opportunities facing the global poultry, meat, and animal food industries.

Key focus areas included:

- Poultry health management and

disease prevention

- Biosecurity and risk mitigation strategies
- Sustainability and environmental stewardship
- Artificial intelligence and digital transformation
- Plant efficiency and operational excellence
- Market intelligence and global trade trends
- Innovation in product development and processing

Renowned experts, researchers, industry leaders, and policymakers shared valuable insights, case studies, and research findings, equipping participants with practical, future-ready strategies.

Prestigious Knowledge Platforms

Several flagship educational forums further enhanced the intellectual value of IPPE 2026:

- **International Poultry Scientific Forum (IPSF):** A globally respected platform where researchers and scientists presented the latest findings in poultry nutrition, genetics, health, and management. The forum bridged the gap between academic research and commercial application.

- **Tech Talks:**

These concise, technology-focused sessions highlighted real-world applications of automation, AI, data analytics, and smart manufacturing, offering actionable insights for processors and producers.

- **Industry-Focused Summits:**

Specialized summits addressed sector-specific challenges, encouraging in-depth discussions on policy, sustainability, innovation, and future market dynamics.

Together, these platforms reinforced IPPE's role not only as a trade show but also as a hub of thought leadership and innovation.

Sustainability and Future-Ready Solutions

Sustainability remained a central theme at IPPE 2026, reflecting the industry's commitment to responsible production and long-term growth. Exhibitors and speakers showcased solutions aimed at reducing environmental impact, improving resource efficiency, and enhancing animal welfare.

From alternative feed ingredients and waste reduction technologies to renewable energy solutions and



water management systems, IPPE 2026 highlighted how sustainability is increasingly integrated into business strategies rather than treated as a standalone objective.

Business, Networking, and Global Collaboration

IPPE 2026 once again proved to be an unmatched platform for **business networking and relationship building**. The event facilitated countless meetings between manufacturers, suppliers, buyers, researchers, and policymakers, fostering collaborations that extend well beyond the three-day expo.

The strong international presence enabled companies to explore new markets, identify distributors and partners, and gain firsthand insights into regional production trends and consumer demands. For many participants, IPPE 2026 served as a launchpad for long-term strategic alliances and commercial opportunities.

Personal Engagement and Industry Interactions

Being present at **IPPE 2026**, I had the opportunity to engage in meaningful interactions with poultry industry leaders, technology providers, and professionals from across the



globe. These discussions provided valuable perspectives on the challenges and opportunities shaping the future of animal agriculture.

Conversations ranged from advancements in breeding and nutrition to the role of digital technologies, sustainability imperatives, and evolving global trade dynamics. Such interactions reaffirmed IPPE's unique ability to bring together diverse voices and ideas, creating a collaborative environment that drives industry progress.

Reaffirming IPPE's Global Leadership

With its unmatched scale, international participation, technological depth, and



educational excellence, **IPPE 2026 once again proved why it is regarded as the world's largest and most influential annual event for the poultry, egg, meat, and animal food industries.**

As the global demand for animal protein continues to rise, IPPE remains a vital platform for addressing shared challenges, showcasing innovation, and shaping the future direction of the industry. The 2026 edition not only met expectations but set new benchmarks, reinforcing IPPE's position at the forefront of global animal agriculture events.

Looking Ahead

IPPE 2026 has clearly demonstrated that the future of the poultry, meat, and animal food industries lies in **innovation, collaboration, and sustainability**. By bringing together the world's best minds, technologies, and businesses, IPPE continues to play a pivotal role in driving progress and ensuring a resilient, efficient, and responsible global food system.

As the industry looks ahead, the insights, connections, and innovations emerging from IPPE 2026 will undoubtedly influence strategies and investments across the global animal agriculture landscape for years to come.

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



Raipur, Chhattisgarh | January 15, 2025

Bhuvana Nutribio Sciences, India & Andres Pentaluba S.A. (APSA) Spain, successfully organized its 2nd **Technical Seminar under the Bhuvana – Pentaluba Tech Series on 15th January 2025 at Hotel Sayaji**. The event marked an important milestone in Bhuvana - Pentaluba'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 Pentaluba 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.

Key protein producers in attendance included:

Mr. S. S. Brahmanekar, Mr. Achin Banarjee, Mr. Dhanraj Banarjee, Mr. Mukesh Brahmanekar, 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 Pentaluba S.A. (APSA) Spain, while opening new business opportunities across the eastern and central regions of India. **Bhuvana - Pentaluba 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.**





Alltech South Asia hosts Poultry Nutrition Summit 2025

[COLOMBO, Sri Lanka] —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.

Along with sessions led by Alltech leaders, 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. For more information, visit www.alltech.com

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About Alltech:

Founded in 1980 by Irish entrepreneur and scientist Dr. Pearse Lyons, Alltech delivers smarter, more sustainable solutions for agriculture. Our diverse portfolio of products and services improves the health and performance of animals and plants, resulting in better nutrition for all and a decreased environmental impact.

We are a global leader in the agriculture industry. Our team produces specialty ingredients, premix, supplements, feed and biologicals, backed by science and an unparalleled platform of services.

Strengthened by more than 40 years of scientific research, we carry forward a legacy of innovation and a unique culture that views challenges through an entrepreneurial lens. As a private, family-owned company, we adapt quickly to our customers' needs and focus on advanced innovation.

We believe agriculture has the greatest potential to shape the future of our planet. Our more than 5,000 talented team members worldwide share our purpose of Working Together for a Planet of Plenty®. Together, we can provide nutrition for all, revitalize local economies and replenish the planet's natural resources.

Headquartered just outside of Lexington, Kentucky, USA, Alltech serves customers in more than 140 countries, has five bioscience centers, and operates more than 75 manufacturing facilities across the globe.

For more information, visit alltech.com, or join the conversation on Facebook, X and LinkedIn.





22 Poultry Farmers on Hunger Strike Near Tirupur Detained Amid Protests Over Low Rearing Rates



Tensions escalated in Tamil Nadu's poultry belt on Monday as **22 poultry farmers**, including **eight women**, who were on a hunger strike near **Tirupur**, were detained by the **Avinashpalayam police**. The farmers had been protesting against what they described as **unviably low chicken-rearing (foster care) rates** offered by poultry integrator companies. The detentions come amid a prolonged agitation by contract poultry farmers demanding a substantial revision in wages to offset rising operational costs.

The detained farmers were later released, but the incident has intensified calls for government intervention, with farmer unions, political leaders, and industry stakeholders urging the state to step in and resolve the dispute through structured negotiations.

Background of the Protest

The hunger strike began on **Sunday**, following weeks of unrest among poultry farmers who rear chickens on a **contractual basis** for large broiler companies. These farmers have been on strike since **January 1**, halting production across several poultry clusters in western Tamil Nadu, including Tirupur, Coimbatore, Erode, and

Namakkal districts.

Farmers say the current **foster care rate of ₹6.50 per kg for broiler chicken** is no longer viable, given the sharp rise in input costs such as electricity, labour, litter material, water, biosecurity measures, and farm maintenance. Many argue that they are operating at losses and accumulating debt, pushing small and medium farmers to the brink of collapse.

Earlier Arrests Trigger Fresh Anger

Monday's detentions follow the **arrest of nine farmers on January 13**, including **Eesan Murugasamy**, founder of the **Tamil Nadu Farmers Protection Association**. The arrested farmers were later remanded to **judicial custody**, a move that triggered widespread outrage among farmer groups and led to the hunger strike.

Farmer leaders described the arrests as an attempt to suppress legitimate protests and warned that continued police action would only deepen the crisis.

Attempted Talks Fail

On Monday, **Avinashpalayam police** and **Tirupur South Tahsildar Saravanan** attempted to hold talks with the protesting farmers in an effort to defuse tensions. However, farmers reportedly refused to enter negotiations unless their core demands were acknowledged and the arrested leaders were released unconditionally.

As the protesters continued their hunger strike and refused to disperse, the police detained **22 farmers**, including women participants. Officials later clarified that the detainees were released after preliminary questioning, but the protestors insisted that their agitation would continue.

Core Demands of the Poultry Farmers

The protesting farmers have placed three key demands before the state government:

- **Revision of foster care rates for broiler chicken from the current ₹6.50 per kg to ₹20 per kg**
- **Increase in rates for farm-reared country chicken to ₹25 per kg**
- **Increase in rates for quail farming to ₹7 per kg**

Farmers argue that these rates are essential to ensure economic sustainability, particularly for smallholders who lack bargaining power against large integrator companies.

"The wage for broiler chicken farming should be increased from ₹6.50 to ₹20. Similarly, nine people, including Eesan Murugasamy, should be released without any conditions. The hunger strike will continue until these demands are met," said one of the protesting farmers.

Rising Operational Costs Fuel the Crisis

According to farmers, operational costs have increased dramatically over the past few years. Electricity tariffs, labour wages, water expenses, and compliance with biosecurity protocols have significantly raised the cost of rearing birds. Additionally, farmers bear the risk of disease outbreaks, heat stress mortality, and infrastructure maintenance, while receiving fixed and often non-negotiable rearing charges from integrators.

Many farmers say that while poultry companies pass on market risks to growers, compensation levels have not been revised in line with inflation or cost escalation.

"We are expected to maintain international-level biosecurity and animal welfare standards, but the wages we receive are lower than daily wages in other rural jobs," a farmer from Tirupur district said.

Contract Farming Model Under Scrutiny

Tamil Nadu's broiler poultry industry largely operates on a contract farming model, where integrator companies supply chicks, feed, medicines, and technical support, while farmers provide sheds, labour, electricity, water, and farm management.

While this model initially helped expand poultry production rapidly, farmers allege that it has become imbalanced, with integrators exercising disproportionate control over pricing and contracts.

Farmer unions are demanding government-regulated minimum foster care rates and transparent dispute resolution mechanisms to protect growers' interests.

Political Support and Calls for Government Action

The detentions have drawn political attention, with **Tirupur MP K Subbarayan** demanding the immediate release of the arrested farmers and withdrawal of cases filed against protesters.

"Cases filed against the protesters should be withdrawn, and everyone should be released. Chief Minister M K Stalin should take appropriate action in this regard," Subbarayan said.

His intervention has added pressure on the state government to engage directly with farmer representatives and poultry industry stakeholders.

Demand for Tripartite Talks

Sami Natarajan, General Secretary of the **Tamil Nadu Farmers' Association**, called on the state

government to convene a **tripartite meeting** involving the government, poultry integrators, and farmer representatives.

"The state government should hold a tripartite talk to increase the wages for broiler chicken farming. Action should be taken to fulfil the demands of the farmers who are legitimately protesting for a wage increase," he said.

Farmer unions believe that without government mediation, power imbalances between integrators and growers will continue to disadvantage farmers.

Impact on Poultry Production and Supply Chain

The ongoing strike has already begun to impact poultry production in parts of western Tamil Nadu, a key broiler-producing region. With farmers halting production since January 1, industry observers warn of potential supply disruptions if the standoff continues.

Any prolonged reduction in production could lead to volatility in chicken prices, affecting consumers, traders, and allied sectors such as feed manufacturing, transport, and processing.

Women Farmers Join the Protest

The participation of **women farmers** in the hunger strike has highlighted the social dimension of the crisis. Many women manage day-to-day farm operations and household finances and say declining incomes have made it difficult to sustain families, repay loans, and educate children.

"Our families depend entirely on poultry farming. When wages do not even cover electricity and labour costs, survival becomes impossible," said one woman protester.

Law and Order vs Livelihood Concerns

Police officials maintained that the detentions were carried out to maintain law and order and prevent public inconvenience. However, farmer leaders argue that peaceful protests should not be criminalised and that arrests only deepen mistrust between farmers and authorities.

Civil society groups have also urged the government to prioritise dialogue over enforcement.

A Wider Poultry Policy Debate

The Tirupur protests have reignited broader debates about **fair pricing, contract transparency, and farmer protection** in India's poultry sector. Experts note that while poultry integrators have grown into large corporate entities, small and medium farmers remain vulnerable to cost shocks and market fluctuations.

Many observers believe that the current crisis presents an opportunity for the Tamil Nadu government to review contract farming norms and establish minimum wage benchmarks for poultry growers.

The Road Ahead

As the hunger strike continues and farmer unions escalate pressure, all eyes are now on the state government's response. Industry stakeholders warn that failure to address the issue could result in long-term damage to farmer confidence and poultry production capacity.

For now, farmers remain firm in their demands, insisting that they will continue their protest until rearing charges are revised and arrested leaders are released unconditionally.

Editorial Calendar 2026

Publishing Month: January Article Deadline : 18th, Dec. 2025 Advertising Deadline : 20th, Dec. 2025 Focus : Opportunities and Challenges	Publishing Month: February Article Deadline : 18th, Jan. 2026 Advertising Deadline : 20th, Jan. 2026 Focus : Budget	Publishing Month: March Article Deadline : 18th, Feb. 2026 Advertising Deadline : 20th, Feb. 2026 Focus : Disease Prevention	Publishing Month: April Article Deadline : 18th, March 2026 Advertising Deadline : 20th, March 2026 Focus : Summer Stress Management
Publishing Month: May Article Deadline : 18th, April 2026 Advertising Deadline : 20th, April 2026 Focus : Cold Chain	Publishing Month: June Article Deadline : 18th, May 2026 Advertising Deadline : 20th, May 2026 Focus : Nutrition	Publishing Month: July Article Deadline : 18th, June 2026 Advertising Deadline : 20th, June 2026 Focus : Biosecurity	Publishing Month: August Article Deadline : 18th, July 2026 Advertising Deadline : 20th, July 2026 Focus : Sustainability
Publishing Month: September Article Deadline : 18th, August 2026 Advertising Deadline : 20th, August 2026 Focus : Egg Production & Processing	Publishing Month: October Article Deadline : 18th, September 2026 Advertising Deadline : 20th, September 2026 Focus : Processing & Packaging	Publishing Month: November Article Deadline : 18th, October 2026 Advertising Deadline : 20th, October 2026 Focus : Winter Stress	Publishing Month: December Article Deadline : 18th, November 2026 Advertising Deadline : 20th, November 2026 Focus : Food Safety

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3 Year	INR 6500	USD 650
5 Year	INR 10000	USD 1000

*18% GST Extra

Contact Name : _____

Company Name : _____

Postal Address : _____

City : _____ State : _____ Mob. No. _____

Postal Code : _____ Country : _____

For more detail, contact:



Pixie Expomedia Pvt. Ltd.
 C/o OmAng Hotel, Namaste Chowk, Near Janta Petrol Pump, KARNAL - 132001 (Haryana) INDIA

We wish to subscribe the following

Poultry Planner

1 Year 3 Year 5 Year
 from _____ to _____

Dairy Planner

1 Year 3 Year 5 Year
 from _____ to _____

Poultry Times of India

1 Year 3 Year 5 Year
 from _____ to _____

Grand Total: _____

Payment Details:

Send DD or Cheque in favour of Pixie Expomedia Pvt. Ltd. payable at Karnal
 Address: C/o OmAng Hotel, Namaste Chowk, Near Janta Petrol Pump,
 KARNAL - 132001 (Haryana) INDIA or Transfer money to Canara Bank
 Bank address: Sector 12; U Estate Karnal
 Account Type: Current
 Account Name: Pixie Expomedia Pvt. Ltd.
 Account Number: 120000991579
 IFSC Code: CNRB0003264 | Swift Code: CNRBINBBBFD | PAN No. AAMCP6787A

Date: _____ Company's Stamp & Signature

By signing this form I acknowledge that I have read and agree to the quoted cost above

*5% GST Extra **Advertisement Tariffs**

Advertisement Type	Single Issue (INR)	Single Issue (USD)		Advertisement Type	Single Issue (INR)	Single Issue (USD)		Advertisement Type	Single Issue (INR)	Single Issue (USD)	
Front Cover	30,000	500	<input type="checkbox"/>	Back Cover	20,000	300	<input type="checkbox"/>	Centre Spread	25,000	400	<input type="checkbox"/>
Front Gate Fold 1A	25,000	400	<input type="checkbox"/>	Back Gate Fold 1A	20,000	300	<input type="checkbox"/>	Full Page Random	10,000	200	<input type="checkbox"/>
Front Gate Fold 2A	25,000	400	<input type="checkbox"/>	Back Gate Fold 2A	20,000	300	<input type="checkbox"/>	Up to Page 9	15,000	250	<input type="checkbox"/>
Front Inside	20,000	300	<input type="checkbox"/>	Back Inside	18,000	275	<input type="checkbox"/>				
Front Opening	20,000	300	<input type="checkbox"/>	Back Opening	18,000	275	<input type="checkbox"/>				



EGG

Daily and Monthly

Prices of January 2026

Name Of Zone / Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Average
NECC SUGGESTED EGG PRICES																																
Ahmedabad	680	680	680	660	660	640	640	640	640	640	640	640	640	640	610	580	550	550	550	550	530	530	530	535	540	545	550	555	555	530	530	597.74
Ajmer	640	640	640	615	605	605	595	595	595	595	595	595	595	570	540	522	522	507	490	490	470	470	480	490	501	505	505	490	475	450	547.81	
Barwala	630	630	630	630	585	585	585	585	565	560	560	560	560	536	530	517	517	517	485	485	485	485	485	485	492	495	495	462	444	438	534.77	
Bengaluru (CC)	705	705	685	685	665	665	645	625	605	605	605	605	605	605	605	605	575	550	550	550	550	550	555	560	565	570	570	575	575	575	603.06	
Brahmapur (OD)	640	640	630	630	620	610	610	590	590	590	570	570	570	560	560	560	550	530	520	515	500	500	480	480	490	515	525	525	525	500	500	554.68
Chennai (CC)	710	710	700	690	690	670	650	630	610	610	610	610	590	590	590	590	590	570	550	530	530	530	530	550	570	580	580	580	580	580	602.90	
Chittoor	703	703	693	683	683	663	643	623	603	603	603	603	583	583	583	583	583	563	543	523	523	523	523	543	563	573	573	573	573	573	595.90	
Delhi (CC)	680	680	660	650	650	650	625	625	625	625	625	600	600	600	595	580	580	560	550	540	540	520	520	520	520	520	520	520	520	520	520	581.94
E.Godavari	620	625	625	625	625	585	585	585	585	585	585	550	550	550	550	550	515	515	495	495	475	475	475	480	490	505	515	515	515	515	545.48	
Hospet	645	645	625	625	605	605	585	565	545	545	545	545	545	545	545	545	515	490	490	490	490	490	495	500	505	510	510	515	515	515	543.06	
Hyderabad	630	630	630	610	600	580	580	580	560	560	560	540	540	540	540	540	510	500	500	500	470	470	475	485	495	505	510	515	515	515	539.52	
Jabalpur	645	645	645	625	625	625	600	600	600	600	580	580	580	580	570	555	555	535	535	510	510	500	500	500	505	520	525	525	525	505	562.26	
Kolkata (WB)	685	675	675	675	650	650	650	635	635	635	615	615	600	600	600	600	580	580	560	560	540	540	540	540	545	555	575	580	580	530	530	597.74
Ludhiana	630	630	630	630	602	602	585	585	585	585	565	565	565	565	565	550	530	520	520	520	500	485	485	485	485	485	492	493	493	493	493	545.74
Mumbai (CC)	700	690	685	685	670	660	645	635	635	625	625	615	610	605	605	600	600	590	580	570	560	545	545	545	545	555	565	575	580	580	580	606.61
Mysuru	706	706	706	706	675	670	645	625	603	603	603	603	605	605	605	605	605	575	550	550	550	550	555	560	567	572	572	577	577	577	605.10	
Namakkal	640	640	640	640	620	620	600	580	560	560	560	560	560	560	560	560	530	500	500	500	500	500	505	510	515	520	520	525	525	525	554.68	
Pune	695	695	690	685	675	665	645	645	635	635	635	625	620	615	615	610	605	600	590	580	570	560	550	550	555	560	565	570	575	575	611.77	
Raipur	620	620	620	620	620	610	595	600	600	570	570	560	555	555	555	550	545	545	520	515	495	495	547	495	505	515	527	535	535	527	507	555.74
Surat	690	690	680	680	660	640	640	640	640	640	640	640	640	625	610	590	570	560	560	540	530	530	530	530	535	545	555	555	555	545	600.81	
Vijayawada	660	660	640	620	620	620	610	610	600	600	600	575	575	575	575	550	525	510	500	500	500	500	505	510	525	550	550	550	550	550	567.42	
Vizag	660	635	610	610	610	585	585	585	585	585	585	550	550	550	550	550	515	515	500	500	475	475	475	480	490	510	515	515	515	515	546.13	
W.Godavari	620	625	625	625	625	585	585	585	585	585	585	550	550	550	550	550	515	515	495	495	475	475	475	480	490	505	515	515	515	515	545.48	
Warangal	632	632	632	612	602	582	582	582	562	562	562	542	542	542	542	542	512	502	502	502	472	472	477	487	497	507	512	517	517	517	541.52	
Prevailing Prices																																
Allahabad (CC)	695	686	676	667	657	648	638	629	619	610	610	600	595	595	590	581	571	571	562	547	538	524	514	524	529	538	538	538	538	529	524	586.48
Bhopal	640	620	620	620	620	620	600	600	600	600	580	580	580	580	570	550	550	530	530	510	510	500	500	500	510	525	530	540	540	525	525	561.45
Indore (CC)	650	640	640	640	630	610	600	590	590	585	585	575	575	575	560	550	550	530	520	510	510	500	490	495	510	520	525	525	515	500	490	557.58
Kanpur (CC)	681	681	667	667	667	643	629	614	614	614	614	600	600	600	590	571	571	557	548	548	524	500	500	505	510	514	519	519	519	519	490	577.26
Luknow (CC)	700	700	686	686	686	667	652	638	638	638	638	619	619	619	610	600	600	581	571	562	552	552	552	552	550	557	557	557	557	557	538	606.16
Muzaffarpur (CC)	700	700	690	690	690	645	645	645	645	625	625	625	625	625	620	600	580	580	580	560	545	520	525	525	530	545	545	550	540	530	500	598.39
Nagpur	650	650	650	645	645	615	600	600	590	590	580	580	560	560	560	560	550	540	540	530	520	500	490	490	500	490	510	530	530	530	530	561.77
Patna	700	700	690	690	690	645	645	645	645	625	625	625	625	625	620	600	580	580	580	560	545	520	525	525	530	545	545	550	540	530	500	598.39
Ranchi (CC)	695	695	667	667	667	657	667	647	647	619	619	619	609	600	600	600	595	572	572	572	562	571	495	548	548	548	571	571	586	548	548	602.65
Varanasi (CC)	707	683	677	667	667	650	650	650	633	633	623	617	617	610	610	600	590	583	573	567	557	540	533	533	540	543	547	547	533	533	517	597.74

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