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Pulse of Livestock Industry

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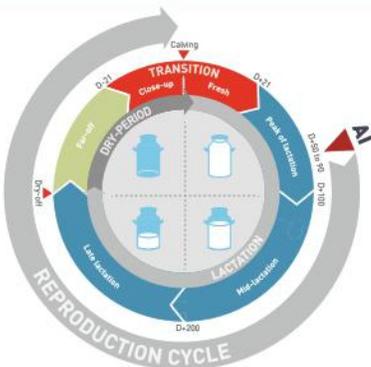


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03

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ICAR and NDDDB to Strengthen Research, Innovation, and Extension

The ICAR has entered into an MoU with NDDDB to enhance collaboration in multidisciplinary research, innovation, and capacity building across the entire dairy sector. The partnership spans key areas including dairy production, processing, and value addition, with a strong emphasis on empowering its primary stakeholders—millions of dairy farmers across the country. The Director General of ICAR highlighted the importance of complementary research by breaking down institutional silos. He emphasised the need for integrated farming systems. He expressed his satisfaction that the MoU would pave the way for a structured partnership to address complex challenges such as climate resilience, low productivity, and value chain development. He also advised adopting gaushalas to curb the menace of stray cattle and to develop sustainable models for manure management and biogas utilisation.

Severe cold and dense fog continue across Punjab, livestock experts from GADVASU have issued urgent guidelines for dairy owners to protect cattle from cold-induced stress and health risks. GADVASU specialists stressed that prolonged exposure to cold and damp conditions can affect milk yields and overall herd health. Dairy owners were advised to take simple but effective measures to mitigate cold stress, including insulating cattle sheds with dry bedding, windbreaks and curtains, ensuring animals have access to dry, clean resting areas, and supplementing with warm water and energy-rich feeds to help maintain body warmth. Experts also recommended timely deworming, vitamin-mineral supplements to support immunity, and regular health monitoring.

India's dairy industry – especially in Bihar and neighbouring regions – saw a significant seasonal surge in demand for milk, curd and related dairy products, driven by the Makar Sankranti festival, traditional food customs and rituals. Local dairy supply chains adjusted inventories and logistics to meet expected demand peaks. In Bihar, curd consumption rose to around 11 lakh kg this year, up from about 8.5 lakh kg last year. Whole milk sales reached 35-36 lakh kg, compared with 33.5 lakh kg previously; tilkut and paneer sales also expanded -20 % year-on-year. The surge highlighted how festive traditions continue to shape dairy consumption cycles in India, giving processors and cooperative unions clear signals for supply planning, stock buildup and distribution strategies to capture peak seasonal demand.

India moves steadily toward Vision 2047; the dairy sector stands at a strategic inflexion point. From being a food security instrument in the decades following Independence, dairy has evolved into the single largest agricultural economic activity, engaging over 8 crore rural households and contributing nearly 5% to India's Gross Value Added (GVA). The real challenge lies in farmer viability, where rising costs of feed, fodder, labour, energy, animal healthcare, and compliance have sharply altered farm economics. Studies indicate that input costs have risen by 40-50% over the last decade, but whole milk procurement prices have not always kept pace on an inflation-adjusted basis. Vision 2047 must address this widening gap through productivity enhancement, genetics, fodder security, and efficient procurement systems. Dairy contributes significantly to rural resilience, but it is also increasingly exposed to climate volatility, water stress, and methane-related scrutiny. India's per-animal productivity remains low—averaging 5-6 litres per day, compared to 25-30 litres in developed dairy economies. Improving productivity per animal is not only an economic imperative but also a sustainability necessity, reducing emissions intensity per litre of milk produced. Another defining element of Vision 2047 is value-led growth. Despite being the largest milk producer, India processes less than 30% of its milk into value-added products, with a heavy dependence on liquid milk and low-margin commodities. By contrast, countries like New Zealand and the EU derive a majority of dairy revenues from cheese, specialised ingredients, and nutrition products. Bridging this gap will require large-scale investments in processing infrastructure, R&D, and skill development—particularly in emerging categories such as protein-rich dairy, functional nutrition, and ethnic dairy with global appeal. Vision 2047 also calls for stronger private sector participation, startups, and public-private partnerships to bring speed, innovation, and global market alignment.

The future roadmap is not cooperative versus private, but cooperative plus private, working toward a common national objective. Vision 2047 ultimately positions dairy as more than a commodity sector—it is a social, economic, and nutritional institution. Achieving this vision will depend on policy coherence, technology adoption, farmer-first economics, and a shift from volume-centric thinking to value-centric dairy development.

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Effect of a Blend of Essential Oils on Dairy Cows Milk Performance, Efficiency and Methane Emissions.

G Forgeard¹, A Lemesle¹, Q Bulcke², PH Pomport², Y Python²;

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INTRODUCTION

Energy efficiency in ruminant is critical to insure optimal performances and profitability. It is important to formulate diet according to the animal needs and secure the quality of energy.

Modulation of rumen fermentation with specific natural active ingredient can participate to improve digestibility and energy efficiency. Among them, essential oils are known to modify rumen microbial activity including the possibility of enhancing or inhibiting specific microbial populations to optimize carbohydrate fermentations (Calsamiglia & al., 2007; Bodas & al., 2012). Different scientific publication have also shown the potential of essentials oils and other natural active ingredients to improve performances in ruminant (Calsamiglia & al, 2021).

OBJECTIVE

The objectives of this experimental design was to determine the effect of feeding a blend of essential oils (Elensis, Techna) to dairy cows on performances and methane emission.

MATERIALS & METHODS

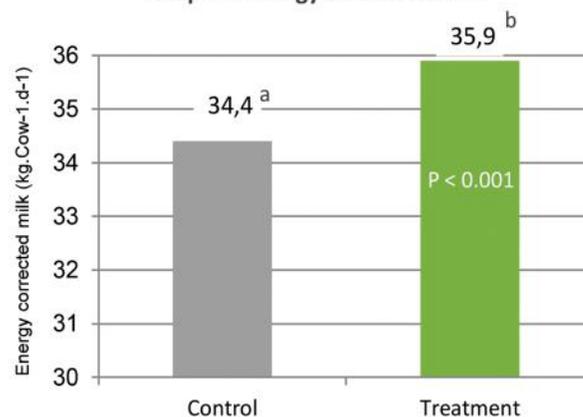
- The trial was carried out in AgroParisTech Research Centre (France) from July to October 2020 for a 12 weeks period.
- 2 similar groups of 18 cows Prim 'Holstein were formed according to their parity, days in milk, milk production, fat and protein content, live weight.
- All the cows received a complete diet (6,8 NeL (0,97 UFL), 15,8% CP, 27 % starch + sugar) based on corn silage, alfalfa silage, corn cob silage, rapeseed meal, beet pulp, concentrate and minerals
- The treatment group received the blend of essential oil of the diet.
- At the same time, in another experimental design, 6 cows were split in two groups to measure methane emissions in a 2*2 Latin square protocol to measure CH₄ (with SF₆ technic). Methane was measured during 5 days after an adaptation period of 3 weeks.
- Statistical analysis: Mixed model with SAS Software

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RESULTS

Graph 1: Energy Corrected Milk



Graph 2: Milk fat content

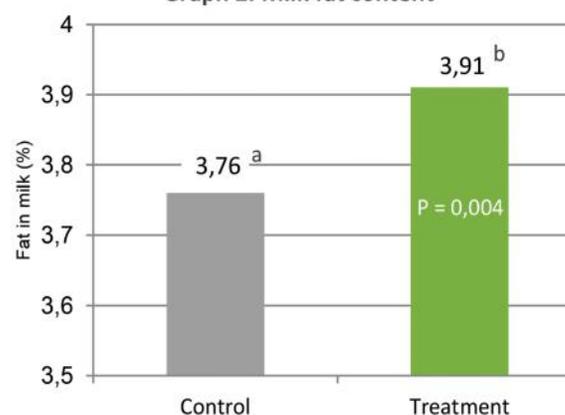


Table 1: Results summary

	P		
	Treatment	Control	Treatment
Milk (kg.d ⁻¹)	0,014	35,6	36,4
ECM Milk (kg.d ⁻¹)	<0,001	34,4	35,9
Fat (%)	0,004	3,76	3,91
Protein (%)	0,003	3,31	3,36
Methane (g. Kg DM-1)	0,01	19,3	18,1
Methane (g. Kg ECM-1)	0,07	12,3	11,7

CONCLUSION

- Milk and energy corrected milk were significantly improved with the blend of essential oils treatment (respectively + 2 and + 4 %).
- Methane emissions per kg of milk were significantly reduced (- 5%).
- Those Results are in line with what we did observe on some other farm trials in term of performances.

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Making Total Mixed Rations Work on Farm: Procedure, Economics, and Practical Feeding Wisdom



Total Mixed Ration (TMR)

feeding is no longer merely a convenient method of delivering feed; it has become a precision management tool that directly influences rumen stability, milk yield consistency, animal health, and overall farm profitability. While formulation software can generate an excellent ration on paper, real success depends on how that ration is prepared, delivered, and managed at the feed bunk. In most commercial dairy systems, failures attributed to “feed quality” are actually failures of execution.

From Raw Material to Mixer: Building the Foundation of a Good TMR

The success of a TMR begins with forage management. Variations in forage dry matter are one of the most common causes of inconsistent milk yield and rumen disturbances. Even small errors in dry matter estimation can significantly alter energy intake. Therefore, frequent dry matter measurement of silage and hay is essential, particularly during seasonal changes or when new silage faces are opened.

Ingredient batching accuracy is equally critical. All ingredients must be weighed precisely using calibrated load cells. The order of ingredient addition influences mixing uniformity. Roughages and forages should enter the mixer first, followed by grains and protein meals. Mineral premixes, buffers, and liquid ingredients should be added last to ensure even distribution and prevent segregation.

Mixing time must be optimised to achieve homogeneity without excessive fibre breakdown. Over-mixing leads to reduced effective fibre and increased risk of sorting and ruminal acidosis, while under-mixing results in inconsistent nutrient intake between cows.



Physical and Sensory Indicators of a Well-Prepared TMR

An ideal TMR should be uniform in appearance, slightly moist, and free from visible streaks of concentrate or mineral pockets. The texture should allow cows to consume the ration without excessive sorting while still stimulating adequate rumination.

Temperature of the TMR is a frequently overlooked indicator. A warm or heating ration suggests active fermentation and reduced palatability. In warm climates, TMR should ideally be delivered within two to four hours of mixing to minimise spoilage and nutrient losses.

Feeding Management: Converting Formulation into Performance

Consistency in feeding time and delivery is essential for stable rumen fermentation. Cows perform best when feed is delivered at the same times every day. Large fluctuations in feeding schedule or skipped feed push-ups disrupt intake patterns and rumen pH.

Refusals should be managed carefully. Ideally, refusals should remain between five and ten percent of offered feed. Excessive refusals increase feed wastage and spoilage, while too little refusal may restrict intake in subordinate cows.

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Recommended Feeding and Feed Push Schedule

Time of Day	Activity
Early morning	Fresh TMR delivery
After morning milking	Feed push-up
Midday	Feed push-up
Evening	Second TMR delivery
Late night	Final feed push-up

Frequent feed push-ups ensure continuous feed access, reduce sorting, and improve dry matter intake.

Why Group TMR Feeding Improves Both Performance and Economics

Group feeding allows nutrient supply to be matched with physiological demand. Feeding a single high-energy ration to all cows often leads to unnecessary feed costs and metabolic stress in low-producing animals while still failing to meet the needs of high producers.

From an economic standpoint, grouping prevents overfeeding of expensive nutrients such as protein and energy. It also enables the strategic use of by-products and alternative ingredients while maintaining performance. Operationally, group TMR feeding simplifies ration management, improves intake uniformity, and reduces variability in production.

Life-Cycle Stage-Wise Priorities for Economically Viable TMRs

Each stage of the animal's life cycle requires a different nutritional focus.

Growing calves should not be introduced prematurely to bulky TMRs. Highly digestible concentrates support rumen development during early growth. Heifers require moderate-energy rations that promote skeletal growth without excessive fat deposition, as overconditioning during this stage reduces lifetime milk potential.

Lactating cows benefit from rations adjusted according to production level rather than blanket feeding. High-yielding cows require greater energy density with balanced effective fibre, while mid- and late-lactation cows can be maintained efficiently on slightly lower-energy rations. Dry cows require high-fibre, controlled-energy rations to maintain body condition and prepare metabolically for the next lactation.



Key Nutritional Focus by Life Stage

Stage	Primary Objective	Key Consideration
Calves	Rumen development	Highly digestible feeds
Heifers	Skeletal growth	Moderate energy, avoid fattening
Fresh / high yield cows	Intake & energy balance	High energy with fibre control
Mid-late lactation	Efficiency	Maintain body condition
Dry cows	Metabolic preparation	High fibre, controlled energy

Ideal TMR Dry Matter Targets by Stage

Animal Category	Recommended TMR DM
Fresh / high yield cows	45-50%
Mid-late lactation	48-55%
Dry cows	50-60%
Heifers	45-55%

Slightly wetter TMRs generally encourage intake in high-producing cows, whereas drier rations are suitable for animals with lower nutrient demands.

Sorting: A Silent Threat to TMR Effectiveness

Sorting allows cows to consume a diet very different from what was formulated. Excessively long forage particles, dry or dusty rations, and infrequent feed push-ups promote selective feeding. Maintaining appropriate forage particle length, adequate moisture, and consistent bunk management are the most effective strategies to minimise sorting.

Monitoring Tools That Separate Good Farms from Excellent Ones

Successful TMR programs rely on routine observation rather than crisis response. Daily evaluation of dung consistency, rumen fill, refusals, and cow behaviour provides immediate feedback on ration effectiveness. Monitoring silage temperature, weighing refusals, and maintaining batch records allow small corrective actions before production losses become evident.

Final Perspective

A successful TMR program is not defined by a single formulation but by the discipline with which it is executed. Precision in raw material handling, accuracy in mixing, consistency in feeding routine, and intelligent grouping together transform TMR from a feeding method into a powerful profit-optimising system. Farms that master these fundamentals consistently outperform those that rely solely on formulation changes.



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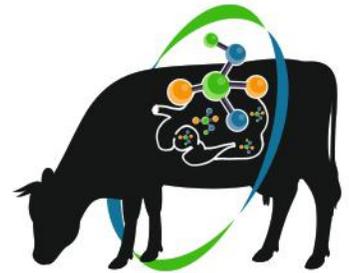
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Climate Resilient Breeds and Adaptation Strategies in Indian Livestock: Securing Productivity in a Warming World

Tanmay Mondal¹, Mokshata Gupta², Rachana Sharma¹, Chetna Mahajan¹, Pallavi Khajuria¹ and Ravindra Kumar¹

Climate change is emerging as a major challenge to livestock production worldwide, with India being particularly vulnerable due to its tropical climate, diverse agro-ecological zones, and high dependence on rain-fed agriculture. Livestock farmers are already witnessing the adverse effects of rising temperatures, erratic rainfall, heatwaves, droughts, and emerging diseases on animal health, productivity, and reproductive performance.

According to the Intergovernmental Panel on Climate Change (IPCC, 2023), a 1°C rise in ambient temperature can reduce milk production in dairy cattle by 10-30% depending on breed and environmental stress. Heat stress disrupts feed intake, hormonal balance, immunity, and metabolic rate, especially in high-yielding exotic breeds such as Holstein Friesians. Therefore, adopting climate-resilient breeds and sustainable adaptation strategies is not just an option but a necessity for safeguarding livestock-based livelihoods in India.

What Makes a Breed “Climate-Resilient”?

Climate-resilient breeds are genetically adapted to survive, grow, and reproduce efficiently under extreme climatic conditions. These animals show:

- **Higher thermo-tolerance**, ability to maintain body temperature
- **Disease resistance**, especially to tick-borne and parasitic infections
- **Efficient feed conversion** even with low-quality roughage
- **Better reproductive efficiency** under heat stress
- **Lower mortality** and longer productive life

Indigenous breeds of cattle, buffaloes, sheep, and goats have evolved over centuries in local climates and thus possess adaptive traits unmatched by exotic breeds.

Promising Indian Breeds for Heat and Drought Tolerance

Physiological and Genetic Markers of Climate Resilience

Now-a-days, the focus has been shifted towards understanding the physiological and molecular mechanisms that enable livestock to adapt to climatic stressors. Several biomarkers have been identified that are associated with heat tolerance and overall climate resilience:

- **Heat Shock Protein 70 (HSP70) gene expression:** These proteins play a crucial role in cellular protection by preventing protein denaturation and assisting in protein repair during heat stress. The indigenous cattle exhibit higher HSP70 expression, contributing to their superior thermotolerance.
- **Rectal temperature and respiratory rate:** These are commonly used physiological indicators to assess an animal's thermoregulatory efficiency. Resilient breeds maintain more stable values even under high environmental temperatures.
- **Slick hair gene:** Present in certain tropical cattle breeds, this gene results in short, sleek hair coats, which enhance heat dissipation and reduce thermal load.
- **Antioxidant enzyme activity:** Enzymes such as superoxide dismutase (SOD) and glutathione peroxidase (GPx) are typically found at higher levels in climate-resilient breeds. These enzymes help neutralize oxidative stress caused by heat exposure.

Adaptation Strategies

In addition to select climate-resilient breeds, livestock farmers can implement several cost-effective and practical adaptation strategies to minimize the negative impacts of heat stress and environmental variability. These strategies include improvements in housing, nutrition, water management, reproductive planning, health care, etc.:

Table: Indian breeds with exceptional climate resilience:

Species	Breed	Adaptive Traits	Region
Cattle	Sahiwal, Tharparkar, Gir	High heat tolerance, good milk yield	North-Western India
Buffalo	Banni, Jaffarabadi, Murrah	Heat and tick resistance	Gujarat, Haryana
Sheep	Deccani, Marwari, Nellore	Tolerant to drought, walk long distances	Maharashtra, Rajasthan, Andhra Pradesh
Goat	Osmanabadi, Barbari, Black Bengal	Thrive on low-quality fodder, high kidding rate	Central & Eastern India

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1. Housing Modifications

- Construct animal shelters with insulated roofs, and install sprinklers to reduce heat load inside sheds.
- Design animal housing in a north-south orientation to minimize direct solar radiation during the hottest parts of the day.

2. Nutritional Interventions

- Provide electrolyte supplements, along with vitamin E, selenium, and trace minerals to support antioxidant defences and maintain body temperature.
- Adopt Total Mixed Ration practices using high-fibre, easily digestible roughages to reduce heat generated during digestion.

3. Water Management

- Ensure round-the-clock access to clean, cool drinking water, as dehydration significantly increases susceptibility to heat stress.
- Increase the frequency of watering during hot and dry periods to maintain hydration and feed intake.

4. Breeding and Reproductive Management

- Avoid performing artificial insemination or natural mating during extreme summer months when conception rates are low.
- Use oestrus synchronization protocols to plan breeding during cooler, more favourable seasons for improved reproductive outcomes.

5. Health Management

- Conduct preventive vaccination before the onset of the monsoon to protect animals from vector-borne diseases such as hemorrhagic septicaemia, black quarter, etc.
- Implement regular deworming and tick control programs to reduce the burden of parasites that can further weaken thermoregulation and productivity.

Conclusion

In India, climate change is no longer a distant threat; it's already impacting farmers' income and food security. The time is now to embrace climate-resilient livestock breeds and scientifically validated adaptation strategies. Empowering farmers with the right knowledge, tools, and technologies can transform vulnerability into opportunity making our livestock sector more productive, profitable, and sustainable in the face of climate adversity.





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The Unbreakable Link in India's Dairy Sector

Dr Chandan Kumar, Dr Ajay, Dr Danish and Dr Charu Singh

For decades, the narrative of Indian dairy has been one of staggering success. From being a milk-deficient nation to the world's largest milk producer, the achievement, famously christened the "White Revolution," is a testament to the millions of smallholder dairy farmers who form the backbone of the sector. Yet, beneath this ocean of white lies a silent, often ignored, crisis: the state of dairy animal welfare. The prevailing view has long been that in a price-sensitive market where margins are thin, welfare is a luxury, a Western concern secondary to productivity. This perspective is not just ethically myopic; it is a fundamental strategic error. Animal welfare is, in fact, the most critical lever for securing the future sustainability, profitability, and global standing of the Indian dairy sector.

The Economic Pragmatism of Welfare

The primary objection to prioritizing welfare is cost. However, this fails to account for the profound economic losses embedded in poor welfare. A stressed, diseased, or malnourished animal is an inefficient production unit. Mastitis, lameness, and metabolic disorders—all directly linked to inadequate housing, flooring, and nutrition—drastically reduce milk yield and quality. India has more dairy cattle than any country, yet average yield per animal remains among the lowest globally. Investing in comfortable resting areas, preventive hoof care, and balanced feed isn't an expense; it's a capital investment with direct returns in higher lifetime yield and reduced veterinary costs. The typical Indian dairy buffalo or cow often faces an early productive burnout. After 3-4 lactations, exhausted and health-compromised, she is sent to the long, perilous trek to slaughter. Improved welfare—especially during the critical dry

period—ensures better body condition, stronger immunity, and the ability to endure more lactation. Extending an animal's productive life from 4 to 6 lactations is an economic game-changer for a farmer, amortizing the cost of rearing and improving overall herd profitability. Poor welfare leads to disease, which leads to rampant, often indiscriminate, antibiotic use. This fuels antimicrobial resistance (AMR), a global health catastrophe in the making. Residues in milk pose a direct consumer health risk and the emergence of superbugs threatens both animal and human populations. Ethical welfare practices that emphasize prevention over cure are the first and most crucial line of defense in protecting the sector from an AMR crisis that could dismantle consumer trust and export potential.

The Ethical Imperative and Social License to Operate

India's cultural fabric is uniquely intertwined with the bovine. The cow is revered, yet its lived experience in industrializing dairy systems often contradicts this spiritual esteem. This creates a "cultural dissonance" that is increasingly difficult to ignore. Perhaps the most visible symptom of poor welfare and poor economics is the proliferation of stray cattle. Unproductive males and "spent" females, rendered valueless by the system, are often abandoned. They become urban and rural nuisances, causing accidents, destroying crops, and suffering immensely. A welfare-centric model that values the *life* of the animal—including male calves and older animals—through integrated rearing, alternative livelihood projects (e.g., draught power, biogas), and humane culling policies, is essential to solving this socio-political nightmare.





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The urban, educated Indian consumer is changing. While price sensitivity remains, there is a growing awareness about food provenance, safety, and ethics. The success of organic and "ahimsa" milk brands, albeit niche, signals a market shift. As purchasing power grows, a segment will increasingly choose products aligned with their values. Brands that can credibly demonstrate ethical welfare standards will command loyalty and premium pricing in the future.

The Strategic Gateway to Global Markets

India harbors ambitions of being a dairy exporter. However, the global market, especially in value-added products, is increasingly governed by non-tariff barriers related to animal welfare and sustainability. The European Union's farm-to-fork strategy and growing legislation on welfare standards are setting the template. To access these lucrative markets, Indian dairy must build systems that are verifiably humane. Proactive adoption of welfare science is not about mimicking the West; it is about building a sophisticated, resilient, and globally competitive sector that can meet the highest standards of the 21st century.

The Path Forward: A Collective "Dairy-Task"

Transforming welfare cannot be the burden of the small farmer alone. It requires a systemic, collaborative "Dairy-Task": Government schemes (like the National Dairy Plan) must pivot from focusing solely on breed improvement and infrastructure to explicitly incentivizing welfare outcomes—comfortable housing, herd health management, and calf-rearing practices. Subsidies could

be linked to welfare audits. Banks and NBFCs must develop "welfare-linked" green-financing products offering lower interest rates for loans used to build better sheds, install cooling systems, or source quality feed. Private dairies and cooperatives must integrate welfare standards into their procurement policies, providing training and premium payments to farmers who adopt better practices, much like fair-trade models. Low-cost IoT sensors for health monitoring, affordable mobile apps for farmer education, and innovations in crop residue processing for feed can democratize access to welfare-enhancing tools.

Conclusion: From Revolution to Evolution

The White Revolution was about quantity. The next evolution must be about quality, resilience, and integrity. The well-being of the dairy animal is the nexus where economics, ethics, and sustainability converge. It is the key to unlocking higher productivity from within, restoring cultural consonance, building consumer trust, and accessing global opportunity. Treating the dairy animal not as a milk machine, but as a sentient stakeholder in the dairy ecosystem is the profound shift in mindset required. For India's dairy sector, animal welfare is no longer a question of "why," but of "how soon." The nation that showed the world how to produce milk in a decentralized, farmer-centric model now has the chance to pioneer a new paradigm: one where compassion and competitiveness are not at odds, but are the twin engines of a truly sustainable dairy future.



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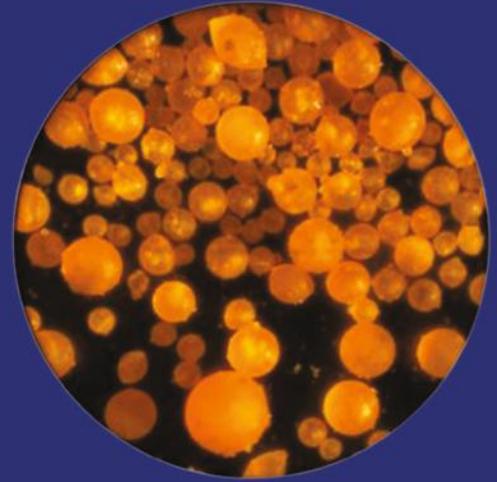
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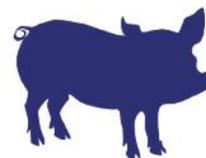


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New Wave of Feed Leaders Emerges from SEC India's Chennai Training



The Soy Excellence Center (SEC) India successfully concluded its third Advanced Feed Mill Module in Chennai, reaffirming its commitment to strengthening technical talent in the country's feed industry. The intensive two-day training brought together 65 high-performing SEC community members, all of whom had completed the Basic SEC Course and demonstrated consistent engagement on the community learning platform.

The training atmosphere was marked by curiosity, active questioning, and deep technical exchange reflecting the drive and leadership potential of this highly motivated group.

All participants were awarded certificates of completion, which were presented by SEC Regional Advisory Council member Mr. D. Ramraj, who encouraged the young professionals to continue contributing to the future of India's rapidly expanding feed sector.



Industry experts Mr. M. Kanakaraj and Mr. V. P. Saktivel led the sessions, delivering hands-on instruction and facilitating high-value technical discussions.

Adding to the learning impact, Center Lead Dr. P. E. Vijay Anand delivered a special session addressing misconceptions about GM and non-GM soy. He decoded relevant data and clarified the long-term implications for raw material sourcing, planning, and feed security equipping participants with fact-based, science-based insights essential for informed decision-making.

The curriculum encompassed an extensive set of advanced topics vital to modern feed mill operations, including:

SEC India's feed milling program continues to gain traction nationwide, driven by its unique design philosophy: global expertise from the U.S. combined with applied, hands-on guidance from leading Indian experts. This blend has positioned the course as a premier learning opportunity offering practical, technical knowledge not found in textbooks.

- Quality assurance and control in feed manufacturing
- Storage and grain quality management
- Batching and mixing systems
- Premix application in feed production
- Pellet cooling and crumbling management
- Particle size reduction
- Liquid applications in pelleting
- Extrusion processing
- Drying and cooling systems
- Feed processing and performance optimisation
- Fundamentals of feed mill design

As India ranks 4th globally in animal feed production, the SEC remains focused on empowering the next generation of skilled professionals. With their renewed technical strength and leadership mindset, the participants of this advanced module are poised to play an important role in shaping the future of the industry.



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





What SEC Members Have to Say

Vishal Sachdeva
Technical Manager, Intracare SEA Pvt. Ltd.



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

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

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

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

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

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



I joined the India SEC Poultry Production & Management Course to strengthen my practical and technical knowledge of modern poultry management and nutrition. The course offered clear and learning with real field experiences, which helped me a lot in my day-to-day work.

The interactive sessions, expert faculty, and especially the question-and-answer sessions were good and very helpful. Overall, this course has improved my confidence, technical clarity, and decision-making skills.

Thank you SEC India Team.

ਸੂਰਾਂ ਵਿੱਚ ਅਫਰੀਕੀ ਸਵਾਈਨ ਬੁਖਾਰ ਦੀ ਬਿਮਾਰੀ

ਪਵਿਤਰ ਕੌਰ¹, ਮੋਨੂ ਕਾਰਕੀ¹,
ਸਸਮਿਤਾ ਬਾਰਿਕ² ਅਤੇ ਮਨਜਿੰਦਰ ਸ਼ਰਮਾ²

ਅਫਰੀਕੀ ਸਵਾਈਨ ਬੁਖਾਰ (ASF) ਇੱਕ ਛੂਤ ਵਾਲੀ ਵਾਇਰਲ ਬਿਮਾਰੀ ਹੈ ਜੋ ਘਰੇਲੂ ਅਤੇ ਜੰਗਲੀ ਸੂਰਾਂ ਨੂੰ ਪ੍ਰਭਾਵਿਤ ਕਰਦੀ ਹੈ। ਇਹ ਇੱਕ ਗੰਭੀਰ ਬਿਮਾਰੀ ਹੈ ਅਤੇ ਇਸ ਵਿੱਚ ਮੌਤ ਦਰ ਬਹੁਤ ਜ਼ਿਆਦਾ ਹੁੰਦੀ ਹੈ। ਇਹ ਸੰਕਰਮਿਤ ਸੂਰਾਂ, ਦੂਸ਼ਿਤ ਫੀਡ, ਦੂਸ਼ਿਤ ਉਪਕਰਣ ਜਾਂ ਦੂਸ਼ਿਤ ਕੱਪੜਿਆਂ ਦੇ ਸਿੱਧੇ ਸੰਪਰਕ ਰਾਹੀਂ ਫੈਲਦੀ ਹੈ। ASF ਸੂਰ ਪਾਲਣ ਲਈ ਇੱਕ ਵੱਡਾ ਖਤਰਾ ਹੈ ਕਿਉਂਕਿ ਇਸਦਾ ਕੋਈ ਟੀਕਾ ਜਾਂ ਇਲਾਜ ਨਹੀਂ ਹੈ।

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ਪ੍ਰਭਾਵਿਤ ਜਾਨਵਰ: ਅਫਰੀਕੀ ਸਵਾਈਨ ਬੁਖਾਰ ਵਾਇਰਸ (ASFV) ਸਿਰਫ ਸੂਰਾਂ (ਘਰੇਲੂ ਸੂਰ, ਜੰਗਲੀ ਸੂਰ) ਨੂੰ ਪ੍ਰਭਾਵਿਤ ਕਰਦੀ ਹੈ। ASFV ਮਨੁੱਖਾਂ ਜਾਂ ਹੋਰ ਪਸ਼ੂਆਂ ਦੀਆਂ ਕਿਸਮਾਂ ਨੂੰ ਸੰਕਰਮਿਤ ਨਹੀਂ ਕਰਦੀ।

ਸੰਚਾਰ ਅਤੇ ਫੈਲਾਅ: ਅਫਰੀਕੀ ਸਵਾਈਨ ਬੁਖਾਰ (ASF) ਤੇਜ਼ੀ ਨਾਲ ਫੈਲਦਾ ਹੈ ਅਤੇ ਬਹੁਤ ਜ਼ਿਆਦਾ ਮੌਤ ਦਰ ਦਾ ਕਾਰਨ ਬਣਦਾ ਹੈ। ਬਿਮਾਰੀ ਮੁੱਖ ਤੌਰ 'ਤੇ ਸੰਕਰਮਿਤ ਅਤੇ ਸਿਹਤਮੰਦ ਸੂਰਾਂ ਦੇ ਸਿੱਧੇ ਸੰਪਰਕ ਰਾਹੀਂ ਫੈਲਦੀ ਹੈ, ਕਿਉਂਕਿ ਵਾਇਰਸ ਖੂਨ, ਲਾਰ, ਪਿਸ਼ਾਬ ਅਤੇ ਮਲ ਵਿੱਚ ਮੌਜੂਦ ਹੁੰਦਾ ਹੈ। ASFV ਦੂਸ਼ਿਤ ਫੀਡ, ਪਾਣੀ, ਖੇਤੀ ਉਪਕਰਣਾਂ, ਵਾਹਨਾਂ, ਕੱਪੜਿਆਂ ਅਤੇ ਜੁੱਤੀਆਂ ਵਿੱਚ ਲੰਬੇ ਸਮੇਂ ਤੱਕ ਜਿਉਂਦਾ ਰਹਿ ਸਕਦਾ ਹੈ ਅਤੇ ਗੰਦੇ ਕੱਪੜਿਆਂ, ਜੁੱਤੀਆਂ, ਔਜ਼ਾਰਾਂ, ਵਾਹਨਾਂ ਜਾਂ ਫੀਡ ਰਾਹੀਂ ਫੈਲ ਸਕਦਾ ਹੈ ਜੋ ਸੰਕਰਮਿਤ ਸੂਰਾਂ ਨੂੰ ਛੂਹਿਆ ਹੈ। ਸੂਰਾਂ ਨੂੰ ਬਚਿਆ ਹੋਇਆ ਭੋਜਨ ਜਿਸ ਵਿੱਚ ਸੰਕਰਮਿਤ ਸੂਰ ਦਾ ਮਾਸ ਹੋਵੇ, ਦੇਣ ਨਾਲ ਬਿਮਾਰੀ ਜਲਦੀ ਹੀ ਫਾਰਮ ਵਿੱਚ ਆ ਸਕਦੀ ਹੈ। ਜੰਗਲੀ ਸੂਰ ਅਤੇ ਨਰਮ ਚਿੱਚੜ (ਜੀਨਸ ਓਰਨੀਥੋਡੋਰੋਸ) ਵਾਹਕ ਵਜੋਂ ਕੰਮ ਕਰ ਸਕਦੇ ਹਨ ਅਤੇ ਵਾਇਰਸ ਨੂੰ ਫੈਲਾਉਣ ਵਿੱਚ ਮਦਦ ਕਰ ਸਕਦੇ ਹਨ। ਕਿਉਂਕਿ ASFV ਵਾਤਾਵਰਣ ਅਤੇ ਸੂਰ ਦੇ ਉਤਪਾਦਾਂ ਵਿੱਚ ਜਿਉਂਦਾ ਰਹਿੰਦਾ ਹੈ, ਇਸ ਲਈ ਥੋੜ੍ਹੀ ਮਾਤਰਾ ਵਿੱਚ ਦੂਸ਼ਿਤ ਸਮੱਗਰੀ ਵੀ ਬਿਮਾਰੀ ਦਾ ਕਾਰਨ ਬਣ ਸਕਦੀ ਹੈ। ਇਸ ਲਈ ਇਸਦੇ ਫੈਲਣ ਨੂੰ ਰੋਕਣ ਅਤੇ ਸੂਰਾਂ ਦੀ ਰੱਖਿਆ ਲਈ ਸਖ਼ਤ ਜੈਵਿਕ ਸੁਰੱਖਿਆ ਉਪਾਅ ਜ਼ਰੂਰੀ ਹਨ।

ਲੱਛਣ: ਅਫਰੀਕੀ ਸਵਾਈਨ ਬੁਖਾਰ (ASF) ਸੂਰਾਂ ਵਿੱਚ ਕਈ ਤਰ੍ਹਾਂ ਦੇ ਗੰਭੀਰ ਲੱਛਣਾਂ ਦਾ ਕਾਰਨ ਬਣਦਾ ਹੈ, ਜੋ ਅਕਸਰ ਅਚਾਨਕ ਦਿਖਾਈ ਦਿੰਦੇ ਹਨ ਅਤੇ ਤੇਜ਼ੀ ਨਾਲ ਫੈਲਦੇ ਹਨ। ਸੰਕਰਮਿਤ ਸੂਰ

ਆਮ ਤੌਰ 'ਤੇ ਤੇਜ਼ ਬੁਖਾਰ ਦਾ ਸ਼ਿਕਾਰ ਹੁੰਦੇ ਹਨ ਅਤੇ ਬਹੁਤ ਕਮਜ਼ੋਰ ਹੋ ਜਾਂਦੇ ਹਨ, ਖਾਣ ਤੋਂ ਇਨਕਾਰ ਕਰਦੇ ਹਨ ਅਤੇ ਲੇਟਣਾ ਪਸੰਦ ਕਰਦੇ ਹਨ। ਉਨ੍ਹਾਂ ਦੀ ਚਮੜੀ 'ਤੇ ਲਾਲ, ਨੀਲੇ ਜਾਂ ਗੂੜ੍ਹੇ ਧੱਬੇ ਦਿਖਾਈ ਦੇ ਸਕਦੇ ਹਨ, ਖਾਸ ਕਰਕੇ ਕੰਨਾਂ, ਨੱਕ, ਢਿੱਡ ਅਤੇ ਲੱਤਾਂ 'ਤੇ। ਬਹੁਤ ਸਾਰੇ ਸੂਰਾਂ ਨੂੰ ਉਲਟੀਆਂ ਅਤੇ ਗੰਭੀਰ ਦਸਤ ਲੱਗ ਸਕਦੇ ਹਨ, ਜਿਸ ਵਿੱਚ ਖੂਨ ਹੋ ਸਕਦਾ ਹੈ। ਸਾਹ ਲੈਣਾ ਮੁਸ਼ਕਲ ਹੋ ਜਾਂਦਾ ਹੈ, ਅਤੇ ਨੱਕ ਅਤੇ ਅੱਖਾਂ ਵਿੱਚੋਂ ਖੰਘ ਜਾਂ ਝੱਗ ਵਾਲਾ ਡਿਸਚਾਰਜ ਹੋ ਸਕਦਾ ਹੈ। ਗਰਭਵਤੀ ਸੂਰੀਆਂ ਵਿੱਚ ਗਰਭਪਾਤ ਹੋ ਸਕਦਾ ਹੈ। ਕੁਝ ਮਾਮਲਿਆਂ ਵਿੱਚ, ਸੂਰ ਪਹਿਲਾਂ ਤੋਂ ਸਪੱਸ਼ਟ ਸੰਕੇਤ ਦਿਖਾਏ ਬਿਨਾਂ ਅਚਾਨਕ ਮਰ ਸਕਦੇ ਹਨ। ਕਿਉਂਕਿ ASF ਬਹੁਤ ਜ਼ਿਆਦਾ ਮੌਤ ਦਰ ਦਾ ਕਾਰਨ ਬਣਦਾ ਹੈ ਅਤੇ ਸੂਰਾਂ ਦੀਆਂ ਹੋਰ ਬਿਮਾਰੀਆਂ ਵਰਗਾ ਹੋ ਸਕਦਾ ਹੈ, ਕਿਸੇ ਵੀ ਅਸਾਧਾਰਨ ਬਿਮਾਰੀ ਜਾਂ ਅਚਾਨਕ ਮੌਤ ਦੀ ਸੂਚਨਾ ਤੁਰੰਤ ਪਸ਼ੂਆਂ ਦੇ ਅਧਿਕਾਰੀਆਂ ਨੂੰ ਦਿੱਤੀ ਜਾਣੀ ਚਾਹੀਦੀ ਹੈ।

ਇਲਾਜ: ਅਫਰੀਕੀ ਸਵਾਈਨ ਬੁਖਾਰ (ASF) ਦਾ ਕੋਈ ਇਲਾਜ ਨਹੀਂ ਹੈ। ਸੰਕਰਮਿਤ ਸੂਰ ਆਮ ਤੌਰ 'ਤੇ ਮਰ ਜਾਂਦੇ ਹਨ, ਅਤੇ ਐਂਟੀਬਾਇਓਟਿਕਸ ਜਾਂ ਦਵਾਈਆਂ ਵਾਇਰਸ ਦੇ ਵਿਰੁੱਧ ਕੰਮ ਨਹੀਂ ਕਰਦੀਆਂ।

ਰੋਕਥਾਮ ਅਤੇ ਨਿਯੰਤਰਣ: ਅਫਰੀਕੀ ਸਵਾਈਨ ਬੁਖਾਰ (ASF) ਦੀ ਰੋਕਥਾਮ ਅਤੇ ਨਿਯੰਤਰਣ ਬਹੁਤ ਮਹੱਤਵਪੂਰਨ ਹੈ ਕਿਉਂਕਿ ਇਸਦਾ ਕੋਈ ਇਲਾਜ ਜਾਂ ਟੀਕਾ ਨਹੀਂ ਹੈ। ਫਾਰਮ ਵਿੱਚ ਵਾਇਰਸ ਨੂੰ ਦਾਖਲ ਹੋਣ ਜਾਂ ਫੈਲਣ ਤੋਂ ਰੋਕਣ ਲਈ ਸਖ਼ਤ ਜੈਵਿਕ ਸੁਰੱਖਿਆ, ਸਫਾਈ ਅਤੇ ਪ੍ਰਬੰਧਨ ਮਹੱਤਵਪੂਰਨ ਹਨ। ਸੂਰ ਫਾਰਮਾਂ ਵਿੱਚ ਲੋਕਾਂ, ਵਾਹਨਾਂ ਅਤੇ ਉਪਕਰਣਾਂ ਦੇ ਦਾਖਲੇ ਨੂੰ ਸੀਮਤ ਕਰੋ। ਸਿਰਫ ਜ਼ਰੂਰੀ ਕਰਮਚਾਰੀਆਂ ਨੂੰ ਹੀ ਅੰਦਰ ਜਾਣਾ ਚਾਹੀਦਾ ਹੈ, ਅਤੇ ਉਨ੍ਹਾਂ ਨੂੰ ਸਾਫ ਕੱਪੜੇ ਪਹਿਨਣੇ ਚਾਹੀਦੇ ਹਨ ਅਤੇ ਜੁੱਤੀਆਂ ਨੂੰ ਰੋਗਾਣੂ ਮੁਕਤ ਕਰਨਾ ਚਾਹੀਦਾ ਹੈ। ਫਾਰਮ 'ਤੇ ਲੋਕਾਂ ਦੀ ਆਵਾਜਾਈ ਨੂੰ ਸਖ਼ਤੀ ਨਾਲ ਨਿਯੰਤਰਿਤ ਕੀਤਾ ਜਾਣਾ ਚਾਹੀਦਾ ਹੈ। ਫਾਰਮ ਵਿੱਚ ਲਿਆਂਦੇ ਗਏ ਨਵੇਂ ਸੂਰਾਂ ਨੂੰ ਘੱਟੋ-ਘੱਟ 2-3 ਹਫ਼ਤਿਆਂ ਲਈ ਅਲੱਗ ਰੱਖਿਆ ਜਾਣਾ ਚਾਹੀਦਾ ਹੈ ਅਤੇ ਮੌਜੂਦਾ ਸੂਰਾਂ ਨਾਲ ਰਲਣ ਤੋਂ ਪਹਿਲਾਂ ਬਿਮਾਰੀ ਦੇ ਕਿਸੇ ਵੀ ਲੱਛਣ ਲਈ ਨਿਗਰਾਨੀ ਕੀਤੀ ਜਾਣੀ ਚਾਹੀਦੀ ਹੈ। ਸੂਰਾਂ ਨੂੰ ਬਚਿਆ ਹੋਇਆ ਖਾਣਾ ਜਾਂ ਕੱਚਾ ਸੂਰ ਦਾ ਮਾਸ ਨਾ ਖੁਆਓ, ਕਿਉਂਕਿ ਇਹਨਾਂ ਵਿੱਚ ਵਾਇਰਸ ਹੋ ਸਕਦਾ ਹੈ। ਹਮੇਸ਼ਾ ਸੁਰੱਖਿਅਤ, ਪ੍ਰੋਸੈਸਡ ਫੀਡ ਦੀ ਵਰਤੋਂ ਕਰਨੀ ਚਾਹੀਦੀ ਹੈ।

ਘਰੇਲੂ ਸੂਰਾਂ ਨੂੰ ਜੰਗਲੀ ਸੂਰਾਂ ਤੋਂ ਦੂਰ ਰੱਖਣਾ ਚਾਹੀਦਾ ਹੈ, ਕਿਉਂਕਿ ਉਹ ASF ਲੈ ਕੇ ਜਾ ਸਕਦੇ ਹਨ ਅਤੇ ਇਸਨੂੰ ਦੂਜੇ ਸੂਰ ਫਾਰਮਾਂ ਵਿੱਚ ਸੰਚਾਰਿਤ ਕਰ ਸਕਦੇ ਹਨ। ਸੰਪਰਕ ਨੂੰ ਵਾੜ ਲਗਾ ਕੇ ਅਤੇ ਚਰਾਗਾਹ ਖੇਤਰਾਂ ਤੱਕ ਨਿਯੰਤਰਿਤ ਪਹੁੰਚ ਦੁਆਰਾ ਘਟਾਇਆ ਜਾ ਸਕਦਾ ਹੈ। ਸੂਰਾਂ ਦੇ ਵਾੜਿਆਂ, ਉਪਕਰਣਾਂ, ਵਾਹਨਾਂ ਅਤੇ ਔਜ਼ਾਰਾਂ ਦੀ ਨਿਯਮਤ ਸਫਾਈ ਬਿਮਾਰੀ ਦੇ ਫੈਲਣ ਨੂੰ ਰੋਕਣ ਵਿੱਚ ਮਦਦ ਕਰਦੀ ਹੈ। ਸਤ੍ਹਾ ਅਤੇ ਵਾਤਾਵਰਣ ਵਿੱਚ ਵਾਇਰਸ ਨੂੰ ਮਾਰਨ ਲਈ ਪ੍ਰਵਾਨਿਤ ਕੀਟਾਣੂਨਾਸ਼ਕਾਂ ਦੀ ਵਰਤੋਂ ਕੀਤੀ ਜਾਣੀ ਚਾਹੀਦੀ ਹੈ। ਵਾਇਰਸ ਨੂੰ ਫੈਲਣ ਤੋਂ ਰੋਕਣ ਲਈ ਕਿਸੇ ਵੀ ਮਰੇ ਹੋਏ ਸੂਰ ਨੂੰ ਸੁਰੱਖਿਅਤ ਢੰਗ ਨਾਲ ਦੱਬ ਦਿੱਤਾ ਜਾਣਾ ਚਾਹੀਦਾ ਹੈ ਜਾਂ ਸਾੜ ਦਿੱਤਾ ਜਾਣਾ ਚਾਹੀਦਾ ਹੈ ਅਤੇ ਲਾਸ਼ਾਂ ਨੂੰ ਖੁੱਲ੍ਹੇ ਖੇਤਰਾਂ ਵਿੱਚ ਨਹੀਂ ਸੁਟਣਾ ਚਾਹੀਦਾ। ਕਿਸਾਨਾਂ ਨੂੰ ਸੂਰਾਂ ਵਿੱਚ ਬਿਮਾਰੀ ਦੇ ਲੱਛਣ ਜਿਵੇਂ ਕਿ ਬੁਖਾਰ, ਕਮਜ਼ੋਰੀ, ਚਮੜੀ ਦਾ ਰੰਗ ਬਦਲਣਾ, ਜਾਂ ਅਚਾਨਕ ਮੌਤਾਂ ਦੀ ਨਿਯਮਿਤ ਤੌਰ 'ਤੇ ਨਿਗਰਾਨੀ ਕਰਨੀ ਚਾਹੀਦੀ ਹੈ। ਪਸ਼ੂਆਂ ਦੇ ਡਾਕਟਰ ਨੂੰ ਤੁਰੰਤ ਅਤੇ ਸਮੇਂ ਸਿਰ ਰਿਪੋਰਟ ਕਰਨ ਨਾਲ ਬਿਮਾਰੀ ਦੇ ਫੈਲਣ ਨੂੰ ਕੰਟਰੋਲ ਕਰਨ ਵਿੱਚ ਮਦਦ ਮਿਲਦੀ ਹੈ। ਸੂਰ, ਸੂਰ ਦੇ ਮਾਸ ਦੇ ਉਤਪਾਦਾਂ, ਜਾਂ ਉਪਕਰਣਾਂ ਨੂੰ ਸੰਕਰਮਿਤ ਖੇਤਰਾਂ ਤੋਂ ਦੂਜੇ ਫਾਰਮਾਂ ਜਾਂ ਬਾਜ਼ਾਰਾਂ ਵਿੱਚ ਲਿਜਾਣ ਤੋਂ ਪਰਹੇਜ਼ ਕਰਨਾ ਚਾਹੀਦਾ ਹੈ।

ਅਫਰੀਕੀ ਸਵਾਈਨ ਫੀਵਰ (ASF) ਸੂਰਾਂ ਵਿੱਚ ਇੱਕ ਬਹੁਤ ਹੀ ਗੰਭੀਰ ਬਿਮਾਰੀ ਹੈ ਜੋ ਤੇਜ਼ੀ ਨਾਲ ਫੈਲਦੀ ਹੈ ਅਤੇ ਇਸਦਾ ਕੋਈ ਇਲਾਜ ਜਾਂ ਟੀਕਾ ਨਹੀਂ ਹੈ। ਇਸ ਨਾਲ ਬਹੁਤ ਸਾਰੇ ਸੂਰ ਮਰ ਸਕਦੇ ਹਨ ਅਤੇ ਕਿਸਾਨਾਂ ਲਈ ਵੱਡਾ ਨੁਕਸਾਨ ਹੋ ਸਕਦਾ ਹੈ। ਸੂਰਾਂ ਦੀ ਰੱਖਿਆ ਕਰਨ ਦਾ ਸਭ ਤੋਂ ਵਧੀਆ ਤਰੀਕਾ ਹੈ ਉਨ੍ਹਾਂ ਨੂੰ ਬਿਮਾਰ ਜਾਨਵਰਾਂ ਤੋਂ ਦੂਰ ਰੱਖਣਾ, ਫਾਰਮ ਨੂੰ ਸਾਫ਼ ਰੱਖਣਾ, ਸੁਰੱਖਿਅਤ ਭੋਜਨ ਖੁਆਉਣਾ, ਅਤੇ ਜੰਗਲੀ ਸੂਰਾਂ ਨੂੰ ਨੇੜੇ ਨਾ ਆਉਣ ਦੇਣਾ। ਕਿਸਾਨਾਂ ਨੂੰ ਆਪਣੇ ਸੂਰਾਂ 'ਤੇ ਧਿਆਨ ਨਾਲ ਨਜ਼ਰ ਰੱਖਣੀ ਚਾਹੀਦੀ ਹੈ ਅਤੇ ਕਿਸੇ ਵੀ ਬਿਮਾਰੀ ਜਾਂ ਅਚਾਨਕ ਮੌਤ ਦੀ ਰਿਪੋਰਟ ਵੈਟਰਨਰੀ ਅਧਿਕਾਰੀਆਂ ਨੂੰ ਕਰਨੀ ਚਾਹੀਦੀ ਹੈ। ਇਨ੍ਹਾਂ ਕਦਮਾਂ ਦੀ ਪਾਲਣਾ ਕਰਨ ਨਾਲ ਸੂਰਾਂ ਨੂੰ ਸਿਹਤਮੰਦ ਰੱਖਣ ਅਤੇ ਫਾਰਮ ਦੀ ਰੱਖਿਆ ਕਰਨ ਵਿੱਚ ਮਦਦ ਮਿਲ ਸਕਦੀ ਹੈ।

**ਪਵਿਤਰ ਕੌਰ¹, ਮੋਨੂੰ ਕਾਰਕੀ¹,
ਸਸਮਿਤਾ ਬਾਰਿਕ² ਅਤੇ ਮਨਜਿੰਦਰ ਸ਼ਰਮਾ²**

¹ਵੈਟਰਨਰੀ ਮਾਈਕ੍ਰੋਬਾਇਓਲੋਜੀ ਵਿਭਾਗ
²ਵੈਟਰਨਰੀ ਫਿਜ਼ੀਓਲੋਜੀ ਅਤੇ ਬਾਇਓਕੈਮਿਸਟਰੀ ਵਿਭਾਗ
ਗੁਰੂ ਅੰਗਦ ਦੇਵ ਵੈਟਰਨਰੀ ਅਤੇ ਐਨੀਮਲ ਸਾਇੰਸਜ਼
ਯੂਨੀਵਰਸਿਟੀ, ਲੁਧਿਆਣਾ।

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- Better ruminal health & microbial balance
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Skin Diseases in Livestock

Diagnostic Challenges, Emerging Threats and the Havoc of Lumpy Skin Disease

Dr. Sanmeet Kour

Skin diseases are among the most frequently encountered health problems in livestock and remain a major concern for veterinarians, farmers, and animal health authorities. The skin, being the largest organ of the body, serves as a protective barrier against environmental hazards, pathogens, and physical injuries, while also reflecting the internal health status of the animal. Any disruption in skin integrity not only compromises animal welfare but also directly affects productivity, reproductive efficiency, and market value. In livestock-based economies, skin diseases contribute substantially to economic losses through decreased milk yield, reduced weight gain, infertility, hide damage, treatment expenses, and restrictions on animal movement and trade.

Despite being readily visible, skin diseases often present diagnostic challenges due to their multifactorial nature and overlapping clinical manifestations. Parasitic, bacterial, fungal, viral, nutritional, allergic, and environmental factors may produce similar dermatological signs, making accurate diagnosis difficult without systematic investigation. Traditionally, diagnosis relied heavily on clinical observation, herd history, seasonal occurrence, and experience of the veterinarian. Lesion characteristics such as alopecia, pruritus, erythema, nodules, crusts, ulcers, and thickening of skin provided initial diagnostic clues. While clinical examination remains the cornerstone of dermatological assessment, it is increasingly recognized that visual diagnosis alone is insufficient, particularly in the context of emerging and transboundary diseases.

Conventional diagnostic methods continue to hold immense value, especially under field conditions. Skin scraping is one of the simplest and most cost-effective techniques used for diagnosing ectoparasitic infestations. Microscopic examination of superficial and deep skin scrapings enables detection of mites such as *Sarcoptes*, *Psoroptes*, *Chorioptes*, and *Demodex*, which are responsible for mange and other parasitic dermatoses. The accuracy of this technique depends largely on proper sampling from active lesions and correct interpretation. Similarly, direct microscopic examination of hair and skin debris using potassium hydroxide preparation is commonly employed for preliminary diagnosis of dermatophytosis. Although rapid and economical, this method is often complemented by fungal culture on selective media for definitive identification and epidemiological studies.

Bacterial skin infections represent a significant proportion of dermatological cases in livestock, often occurring secondary to trauma, parasitic damage, or

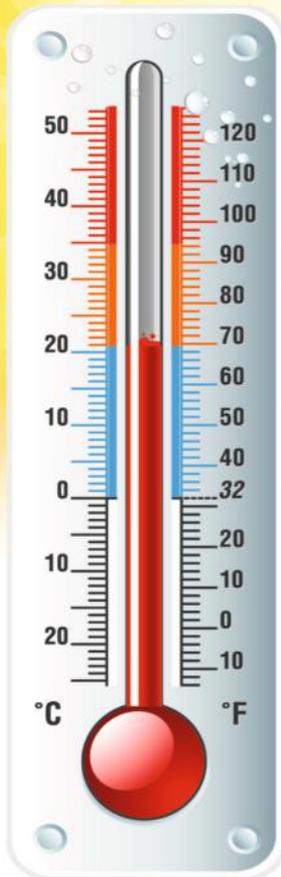
immunosuppression. Conditions such as pyoderma and dermatophilosis can severely affect animal health and productivity if left untreated. Laboratory techniques including smear examination, bacterial culture, and antimicrobial sensitivity testing are essential for confirming diagnosis and guiding rational therapy. In the era of rising antimicrobial resistance, laboratory-supported diagnosis is crucial to prevent indiscriminate antibiotic use and to promote responsible antimicrobial stewardship.

Histopathology has emerged as an important diagnostic tool in veterinary dermatology, particularly for chronic, atypical, or treatment-resistant skin lesions. Examination of skin biopsies provides valuable insights into the nature and depth of lesions, inflammatory patterns, and cellular changes, helping differentiate infectious diseases from immune-mediated or neoplastic conditions. Although biopsy is not routinely practiced in field conditions, its role in referral diagnostics and research settings is invaluable. Immunohistochemical techniques further enhance diagnostic accuracy by enabling localization of specific pathogens or immune markers within tissue sections.

Serological and molecular diagnostic techniques have significantly transformed the landscape of skin disease diagnostics in livestock. Serological assays such as enzyme-linked immunosorbent assays are useful for herd-level surveillance and epidemiological investigations, particularly for viral diseases with skin manifestations. However, serology often reflects exposure rather than active infection and must therefore be interpreted carefully. Molecular diagnostics, especially polymerase chain reaction and real-time PCR, offer rapid, sensitive, and specific detection of pathogens directly from clinical samples. These techniques have proven indispensable for the diagnosis of viral skin diseases and have played a critical role in outbreak investigation and control.

Among viral skin diseases, Lumpy Skin Disease has emerged as one of the most devastating threats to cattle and buffalo populations in recent years. Caused by the Lumpy Skin Disease Virus, a member of the genus *Capripoxvirus*, the disease is characterized by fever, enlargement of superficial lymph nodes, and the appearance of multiple firm nodules on the skin and mucous membranes. These nodules may extend deep into the dermis and underlying tissues, often undergoing necrosis and ulceration, which predisposes animals to secondary bacterial infections. The disease leads to sharp declines in milk production, infertility, abortions, emaciation, damage to hides, and in severe cases, death.

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1 Saint Pierre et al., 2003 - 2 Burgos & Collier, 2011.

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*Marfola, et al, ADSA 2010.

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The havoc caused by Lumpy Skin Disease extends beyond individual animals to entire farming systems and national economies. The disease spreads primarily through blood-sucking insect vectors such as mosquitoes, biting flies, and ticks, making its control particularly challenging in tropical and subtropical regions. Favorable climatic conditions, dense animal populations, and unrestricted animal movement contribute to rapid disease dissemination. Outbreaks often result in movement restrictions, trade losses, and increased financial burden on farmers, highlighting the transboundary nature of the disease.

Accurate diagnosis of Lumpy Skin Disease is essential for effective control. Although the presence of characteristic skin nodules raises strong clinical suspicion, laboratory confirmation is necessary to differentiate LSD from other dermatological conditions such as pseudo-lumpy skin disease, dermatophilosis, insect bite hypersensitivity, and other poxvirus infections. Molecular detection of viral DNA using PCR from skin nodules, scabs, blood, or nasal secretions is considered the diagnostic method of choice due to its high sensitivity and specificity. Early laboratory confirmation enables timely implementation of control measures and prevents further spread.

Control and prevention of Lumpy Skin Disease require a multifaceted and integrated approach. Vaccination remains the most effective preventive strategy and forms the backbone of disease control programs. Live attenuated capripoxvirus vaccines have shown good efficacy in reducing disease incidence and severity when administered through well-planned mass vaccination campaigns. Achieving adequate vaccine coverage, maintaining cold chain integrity, and ensuring farmer participation are critical determinants of success. Regular monitoring of vaccine performance and adverse reactions is essential to sustain confidence in vaccination programs.

Vector control measures play a supportive yet important role in reducing transmission. Application of insecticides, elimination of stagnant water, improvement of animal housing, and environmental sanitation help lower vector density. While complete elimination of vectors is

impractical, integrated vector management can significantly reduce disease pressure. Movement control, quarantine of affected and in-contact animals, and strict biosecurity practices are indispensable during outbreaks. Proper disposal of carcasses and contaminated materials, along with disinfection of equipment, further reduces the risk of environmental contamination.

As no specific antiviral treatment is currently available for Lumpy Skin Disease, management of affected animals focuses on supportive care. This includes control of fever and pain, treatment of secondary bacterial infections, wound management, and provision of adequate nutrition to enhance recovery. Early veterinary intervention and farmer awareness play a crucial role in minimizing disease impact and improving outcomes.

In addition to Lumpy Skin Disease, livestock continue to face a wide range of skin disorders caused by parasites, bacteria, fungi, nutritional deficiencies, and environmental stressors. Changing climatic conditions, intensification of farming practices, and increased animal movement have altered disease patterns, emphasizing the need for continuous surveillance and updated diagnostic strategies. Early and accurate diagnosis not only improves treatment success but also reduces economic losses and prevents unnecessary drug use.

In conclusion, the diagnosis of skin diseases in livestock has evolved from reliance on clinical observation to the incorporation of advanced laboratory and molecular techniques. The recent emergence and spread of Lumpy Skin Disease underscore the vulnerability of livestock systems to infectious dermatological diseases and highlight the importance of early diagnosis, vaccination, and integrated control measures. Strengthening veterinary diagnostic infrastructure, enhancing field-level awareness, and fostering collaboration among veterinarians, researchers, and farmers are essential for reducing the burden of skin diseases and ensuring sustainable livestock production.

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उमा कांत वर्मा¹, स्वरूप देबरॉय², हंसमीत कौर³ और अवंतिका श्रीवास्तव⁴

जीवाणुजनित रोग जीवाणुओं के कारण होने वाले संक्रमण होते हैं, जो संक्रमित पशु, उसके पर्यावरण, या पिस्सू और किलनी जैसे वाहकों के प्रत्यक्ष या अप्रत्यक्ष संपर्क से फैल सकते हैं। ये रोग विभिन्न प्रकार के पशुओं को प्रभावित करते हैं और बुखार, दस्त, श्वसन संबंधी समस्याओं और त्वचा संक्रमण सहित कई प्रकार के लक्षणों के साथ प्रकट होते हैं। ये संक्रमण विभिन्न पशु प्रजातियों और अंगों को प्रभावित कर सकते हैं, जिससे बुखार, दस्त, श्वसन संबंधी समस्याएं, त्वचा संबंधी समस्याएं या प्रजनन संबंधी समस्याएं जैसे लक्षण हो सकते हैं। गायों और भैंसों में होने वाली कुछ महत्वपूर्ण जीवाणुजनित बीमारियों में एंथ्रेक्स, ब्लैक क्वार्टर, ब्रुसेल्लोसिस, हेमोरेजिक सेप्टिसीमिया, जॉन्स रोग, मैस्टाइटिस और टीबी शामिल हैं।

एंथ्रेक्स:

यह एक जूनोटिक बीमारी है। यह पशुओं का एक तीव्र संक्रामक रोग है जो पूरे विश्व में होता है। इस बीमारी को प्लीहा ज्वर के नाम से भी जाना जाता है। यह बीमारी बैसिलस एन्थ्रेसिस नामक बैक्टीरिया के कारण होती है। इस बीमारी के संक्रमण के कारण हो सकते हैं, दूषित पशु उत्पादों जैसे अस्थि चूर्ण, उर्वरक, खाल, बाल, ऊन, अनाज या चारा इत्यादि। इस बीमारी में शरीर का तापमान बढ़ जाता है (104° से 108° C)। पशु खाना खाने से मना कर देता है और पेट फूल जाता है। पशु को सांस लेने में तकलीफ होती है। अत्यधिक श्वास कष्ट के कारण ऑक्सीजन की कमी के कारण मुंह से सांस लेनी पड़ती है। पशु की बीमारी के 48 घंटों के भीतर अचानक मृत्यु के बाद प्राकृतिक छिद्रों से रक्त का रिसाव होता है। एडिमा मुख्य रूप से गर्दन, छाती क्षेत्र, वक्ष, पेट और पार्श्व भाग के नीचे दिखाई दे सकता है। प्रारंभिक रूप में पशु बिना किसी पूर्व संकेत के मृत पाया जा सकता है। इस बीमारी का प्रभाव कम करने के लिए समय-समय पर नियमित टीकाकरण करें। शवों को नहीं खोले क्योंकि इससे चारागाह दूषित हो सकता है। शव को चूने के साथ गहराई से दफनाना चाहिए। एंथ्रेक्स संक्रमित पशुओं को रख रखाव करने वाले व्यक्तियों को पर्याप्त स्वच्छता का ध्यान रखना चाहिए। मृत और संक्रमित पशुओं के आस-पास के क्षेत्रों को 3% एसिटिक एसिड या 10% कास्टिक सोडा या 10% फॉर्मलिन से अच्छी तरह से कीटाणुरहित किया जाना चाहिए। संक्रमित चारागाह से प्राप्त चारा



चित्र 1: एंथ्रेक्स से संक्रमित गाय

नष्ट कर दे और अन्य पशुओं को नहीं दिया जाना चाहिए। सबसे अधिक संवेदनशील पशु मवेशी और भेड़ हैं।

ब्लैक क्वार्टर:

लंगडा बुखार (Blackleg या 'ब्लैक क्वार्टर' या BQ) साधारण भाषा में जहरबाद, फडसूजन, काला बाय, कृष्णजंघा, लंगड़िया, एकटंगा आदि नामों से भी जाना जाता है। यह रोग प्रायः नमी वाले क्षेत्रों में व्यापक रूप से फैलता है। इस रोग में पशु को तेज बुखार आता है तथा उसका तापमान 106°F से 107°F तक पहुंच जाता है। पशु के पिछली व अगली टांगों के ऊपरी भाग में भारी सूजन आ जाती है, जिससे पशु लंगड़ा कर चलने लगता है तथा सूजन वाले स्थान को दबाने पर कड़-कड़ की आवाज आती है। पशु चलने में असमर्थ होता है। यह रोग प्रायः पिछले पैरों को अधिक प्रभावित करता है एवं सूजन घुटने से ऊपर वाले हिस्से में होती है। वर्षा ऋतु से पूर्व इस रोग का टीका लगवा लेना चाहिए। यह टीका पशु को 6 माह की आयु पर भी लगाया जाता है। भेड़ों में ऊन कतरने से तीन माह पूर्व टीकाकरण करवा लेना चाहिये क्योंकि ऊन कतरने के समय घाव होने पर जीवाणु घाव से शरीर में प्रवेश कर जाता है जिससे रोग की संभावना बढ़ जाती है। सूजन वाले भाग में चीरा लगाकर 2 प्रतिशत हाइड्रोजन पेरोक्साइड तथा पोटेशियम परमैंगनेट से ड्रेसिंग किया जाना लाभकारी है। मुख्य रूप से इस रोग से गाय, भैंस एवं भेड़ प्रभावित होती है। यह रोग छह माह से दो साल तक की आयु वाले पशुओं में अधिक पाया जाता है। इस बीमारी में प्रोकेन पेनिसिलीन काफी प्रभावशाली है। इस बीमारी के रोग निरोधक टीके लगाए जाते हैं। पशुओं की मृत्यु दर 80-100 प्रतिशत तक होती है।



चित्र 2: प्रारंभिक लक्षण: जांघ में सूजन, पैर ऊपर और पूंछ ऊपर उठी हुई (तीर)

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चित्र 3: गोजातीय ब्रसेलोसिस के परिणामय चित्र (3.1 और 3.2): भ्रूण झिल्लियों का अवधारणय चित्र (3.3 और 3.4): गायों में गर्भपातय चित्र (3.5 और 3.6): घुटने का हाइग्रोमा

हेमोरेजिक सेप्टिसीमिया:

हेमोरेजिक सेप्टिसीमिया, जिसे गलघोटू या घुरका रोग भी कहा जाता है, मवेशियों और भैंसों में होने वाली एक गंभीर और तेजी से फैलने वाली बीमारी है। यह रोग मुख्य रूप से पाश्चुरेला मल्टोसिडा नामक बैक्टीरिया के कारण होता है, बैक्टीरिया का संक्रमण, विशेष रूप से तनाव, खराब पोषण या अन्य बीमारियों के साथ जलवायु परिवर्तन, जैसे कि उच्च तापमान और आर्द्रता के कारण हो सकता है। इस बीमारी के लक्षण हो सकते हैं, तेज बुखार, गर्दन और गले में सूजन (जिससे सांस लेने में तकलीफ और घरघराहट हो सकती है), सुस्ती और खाने-पीने में अरुचि, नाक से स्राव, दस्त या पेचिश (कभी-कभी), अतिसार और

सेप्टिक शॉक इत्यादि। यदि पशु संक्रमित हो जाता है, तो पशु चिकित्सक से सलाह लें और एंटीबायोटिक्स और सहायक देखभाल (जैसे IV तरल पदार्थ) का उपयोग करें। समय पर उपचार न मिलने पर पशु की मृत्यु हो सकती है। गलघोटू रोग के खिलाफ टीकाकरण एक प्रभावी निवारक उपाय है।



चित्र 4: प्रारंभिक लक्षण: गर्दन और गले में सूजन

मैस्टाइटिस:

मैस्टाइटिस, जिसे थनेला रोग भी कहा जाता है, जानवरों में स्तन ग्रंथियों की सूजन के कारण होता है। यह आमतौर पर बैक्टीरिया के संक्रमण के कारण होता है, लेकिन यह शारीरिक कारकों (जैसे चोट) के कारण भी हो सकता है। मैस्टाइटिस डेयरी मवेशियों में एक आम और आर्थिक रूप से महत्वपूर्ण बीमारी है। स्टैफिलोकोकस ऑरियस, स्ट्रेप्टोकोकस एगलेक्टिया, और ई. कोली जैसे बैक्टीरिया स्तन में प्रवेश करके संक्रमण फैलाते हैं। क्लिनिकल मैस्टाइटिस लक्षण दिखाई देते जैसे, स्तन में सूजन, लालिमा, गर्मी, दूध में परिवर्तन (रंग, बनावट, और थक्के), बुखार, सुस्ती, भूख न लगना और स्तन में दर्द। सबक्लिनिकल मैस्टाइटिस में कोई स्पष्ट लक्षण नहीं देता, लेकिन दूध में बैक्टीरिया की संख्या और सोमैटिक सेल काउंट (एससीसी) में वृद्धि होती है। मैस्टाइटिस का उपचार, एंटीबायोटिक्स, सहायक देखभाल एवं पशु को अच्छी तरह से खिलाना और पानी पिलाना है। मैस्टाइटिस की रोकथाम, खलिहान और उपकरणों को साफ रखें, संक्रमित जानवरों को अलग करना। कुछ मामलों में, टीकाकरण प्रभावी हो सकता है। मैस्टाइटिस का आर्थिक प्रभाव पड़ता है जैसे, दूध उत्पादन में कमी, दूध की गुणवत्ता में गिरावट, पशु चिकित्सा लागत, पशुधन की मृत्यु, मैस्टाइटिस डेयरी उद्योग के लिए एक महत्वपूर्ण समस्या है, लेकिन उचित प्रबंधन और रोकथाम के उपायों से इसे नियंत्रित किया जा सकता है।



चित्र 5: गायों में थनेला रोग

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ट्यूबरकुलोसिस (तपेदिक):

पशुओं में टीबी (तपेदिक) एक संक्रामक रोग है जो माइकोबैक्टीरियम ट्यूबरकुलोसिस नामक बैक्टीरिया के कारण होता है। यह रोग आमतौर पर फेफड़ों को प्रभावित करता है, लेकिन शरीर के अन्य हिस्सों में भी फैल सकता है। पशुओं में टीबी, मनुष्यों में होने वाले टीबी के समान ही है और यह एक जूनोटिक रोग है, यह रोग मुख्य रूप से माइकोबैक्टीरियम ट्यूबरकुलोसिस नामक बैक्टीरिया के कारण होता है। संक्रमित पशुओं के दूध, लार, मल या नाक के स्राव से, दूषित भोजन या पानी के सेवन से भी टीबी से संक्रमित हो सकते हैं। संक्रमित पशुओं द्वारा छोड़ी गई बूंदों को सांस के माध्यम से लेने से भी टीबी फैल सकती है। खांसी, बुखार, वजन घटना, भूख न लगना, सांस लेने में कठिनाई पशुओं में टीबी के लक्षण हो सकते हैं। रक्त परीक्षण से टीबी बैक्टीरिया की उपस्थिति का पता लगाया जा सकता है। प्रभावित ऊतकों का एक छोटा सा नमूना लेकर टीबी बैक्टीरिया की पहचान की जाती है। टीबी का उपचार एंटीबायोटिक दवाओं के साथ किया जाता है। पशुओं में टीबी की रोकथाम, टीबी से संक्रमित पशुओं को स्वस्थ पशुओं से अलग रखना, दूषित भोजन और पानी से परहेज। टीबी से संक्रमित पशुओं के दूध का सेवन न करना। पशुओं के संपर्क में आने से पहले और बाद में हाथ धोना।



चित्र 6: मवेशी में क्षय रोग

जॉन्स रोग:

जॉन्स रोग जिसे पैराट्यूबरकुलोसिस भी कहा जाता है, मवेशियों, भेड़ों, बकरियों और अन्य जुगाली करने वाले जानवरों को प्रभावित करने वाली एक पुरानी, संक्रामक बीमारी है। यह माइकोबैक्टीरियम एवियम उप-प्रजाति पैराट्यूबरकुलोसिस (MAP) नामक बैक्टीरिया के कारण होता है। इस बीमारी का संक्रमण आमतौर पर दूषित भोजन या पानी के सेवन से या संक्रमित जानवरों के संपर्क में आने से फैलता है। यह बीमारी धीरे-धीरे बढ़ती है और जानवरों में वजन कम होना, दस्त और अंततः मृत्यु का कारण बन सकती है। बीमारी के लक्षण धीरे-धीरे विकसित होते हैं और इसमें वजन कम होना, दस्त, भूख में कमी, और प्शोतल जबड़ा (जबड़े के नीचे तरल पदार्थ का जमा होना) शामिल हो सकते हैं। जॉन्स रोग का निदान रक्त परीक्षण, मल परीक्षण और ऊतक बायोप्सी सहित विभिन्न तरीकों से किया जा सकता है। जॉन्स रोग का कोई प्रभावी उपचार नहीं है, लेकिन कुछ प्रबंधन रणनीतियों का उपयोग

बीमारी के प्रसार को कम करने और जानवरों के स्वास्थ्य में सुधार करने के लिए किया जा सकता है। जॉन्स रोग को रोकने के लिए, पशुपालकों को अपने झुंड में संक्रमित जानवरों के प्रवेश को रोकने, स्वच्छता प्रथाओं में सुधार करने और संक्रमित जानवरों को अलग करने जैसे उपाय करने चाहिए।



चित्र 7: गाय में जॉन्स रोग

निष्कर्ष:

गायों और भैंसों में जीवाणुजनित रोग पशुपालन क्षेत्र की एक गंभीर चुनौती हैं, क्योंकि ये रोग न केवल पशुओं के स्वास्थ्य को प्रभावित करते हैं बल्कि दूध उत्पादन, प्रजनन क्षमता और किसान की आर्थिक स्थिति पर भी गहरा असर डालते हैं। इन रोगों की समय पर पहचान, सही निदान, उचित एंटीबायोटिक उपचार और नियमित टीकाकरण ही इनके नियंत्रण की सबसे प्रभावी रणनीति है। स्वच्छता, बाड़े का अच्छा प्रबंधन, साफ पानीदृचारा और जैव-सुरक्षा उपाय अपनाकर इन संक्रमणों की संभावना को काफी हद तक कम किया जा सकता है। अंततः, जागरूक पशुपालक, वैज्ञानिक प्रबंधन और पशु चिकित्सकों के सहयोग से जीवाणुजनित रोगों को नियंत्रित कर स्वस्थ, उत्पादक और लाभदायक पशुपालन सुनिश्चित किया जा सकता है।

उमा कांत वर्मा¹, स्वरूप देबरॉय²,

हंसमीत कौर³ और अवंतिका श्रीवास्तव⁴

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पशु चिकित्सा के रूप में तब की सफलता फल शब्द रूप ग्रामीणों का स्नेह, मान, सम्मान की यादें आज भी रोम रोम को प्रचलित कर जाता है। पशु चिकित्सा के रूप में सेवाकाल का वह शुरुआती काल। बेगूसराय जिला का खोदावनपुर प्रखंड, गैर चिकित्सक पद पर पदस्थापन, विभागीय कार्यों के प्रति समर्पण का भाग आज भी जस का तस याद है। प्रखंड का एक गांव "तेताराही" घनी आबादी यातायात सुविधा से विहीन। पैदल गांव आने-जाने की बाध्यता। और तब तो मेरे पास एक साइकिल भी नहीं थी। बाद नामक एक गांव में किराए का एक छोटा सा कमरा, मेरा बसेरा था। मित्रों की कमी नहीं थी सो मन लग जाता था। चिकित्सीय व्यस्तता नहीं थी जिसकी मुझे इच्छा थी तेताराही गांव का लगभग हर परिवार पशुपालन पर आश्रित था। उसी गांव का एक पशुपालक शिवनारायण यादव भोला भाला निश्चल स्वाभाव का लगभग युवा शिवनारायण की भैंस को टेटनस ने पकड़ लिया। इलाके के चिकित्सारत पशुचिकित्सक टेटनस से ग्रसित उस भैंस की चिकित्सा करने से मुकर गये। थका-हारा बेचारा पशुपालक मेरे पास अपनी भैंस को चिकित्सा का अनुरोध के साथ आया। मैंने चुनौती स्वीकार, पूरी निष्ठा और मनोयोग से अपनी अर्जित ज्ञान के साथ पशु की चिकित्सा में लग गया। अपने गांव से दो-तीन किलोमीटर की दूरी पर स्थित तेताराही गांव तक पैदल जाना आना और उसे बीमार पशु की चिकित्सा करना, मेरी दिनचर्या में शामिल हो गया। कभी-कभी स्थानीय मित्र भी साथ हो लेते सो दूरी मजे से कट जाती। अर्थ की कामना नहीं, बस यही कामना की किसी तरह

भैंस बीमार रोग मुक्त हो जाए। कभी आशा तो कभी निराश के गहरे गहबर में डूबता उतलाता दिन गुजरता गया। अंत में प्रयास ने रंग लाया और 15 20 दिनों बाद पशु भला चंगा होने लगा। पशु के स्वस्थ होने पर उसे समय जो खुशी हुई, उसे शब्दों में बांध पाना मुश्किल है। उस पशुपालक सहित ग्रामीणों ने जो मेरे प्रति आदर भाव देखने को मिला, उसके लिए मेरे पास शब्दों का अभाव है। उस समाज में गुलाबी रंग से रंगी धोती किसी को पहनना सम्मान प्रदर्शन का परंपरागत सामाजिक परिपाटी थी। सो मुझे भी ग्रामीणों के अनुरोध पर गुलाबी रंग की रंगीन धोती स्वीकार करना पड़ा। गुलाबी धोती से मैं आगे आगे, 10 15 गांववासियों का झुंड पीछे-पीछे। सबों ने बाड़ा गांव स्थित मेरे आवास तक मुझे छोड़कर ही दम लिया।

दूसरी बार मुझे उसे गांव में दो-तीन वर्ष बाद उसी पशुपालक की पुत्री की शादी में शरीक होने का मौका मिला। तब मुझे प्रखंड मुख्यालय में सरकारी आवास की सुविधा प्राप्त हो गई थी। उस समय गांववासी अपने यहां किसी समारोह में सरकारी पदाधिकारी को शामिल होने पर बहुत गर्व महसूस करते थे। पूरे प्रखंड में मैं इकलौता पदाधिकारी था जिसे उस शादी में शरीक होने का आमंत्रण मिला था। दोपहर का समय गर्मी का मौसम गांव का वातावरण समियाने में "अल्ला उदल" का नाच। मैं भी पहुंच गया काफी भीड़ पूरा समियाना खचाखच भरा पड़ा। जिसे जहां जगह मिली बैठ गया मैं भी कहीं अपनी जगह की तलाश में था एक युवक की मुझ पर नजर पड़ी गई। उसकी चमकती आंखों में स्पष्ट देख रहा था कि मेरे आने की काफी खुशी थी। आनन-फानन में वह मंच पर गया और जिस कुर्सी पर 'राजा' का रोल करने वाला कलाकार बैठा था, उसे उठा लाया। मेरे बार-बार इनकार करने के बावजूद भी उसने मुझे कुर्सी पर बैठा दिया यह कहते हुए की राजा है तो क्या हुआ डॉक्टर साहब से बड़ा थोड़ी ही है। आस-पास बैठे ग्रामीण दर्शक भी उस युवक की बात में हां में हां मिल रहे थे। सो मैं इनकार नहीं कर पाया और कुर्सी को कष्ट दे ही डाला।

बात छोटी है पर गौर करने वाली है। यह सम्मान, स्नेह मुझे इसलिए प्राप्त हुआ कि मैं पशु चिकित्सा था-हूँ। पशुचिकित्सकों को ग्रामीण समाज में आज भी सम्मान वही है। कुछ नहीं बदला, बदले हैं तो हम। आज भी जो पशु चिकित्सा अपनी इथिक्स की आवाज पर गरीब पशु पालक की सेवा करते हैं, ग्रामीण उन्हें तलहथी पर बिठाने से पीछे नहीं है। इसलिए कहता हूँ पशु चिकित्सक होने का गर्व करो।



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Tech-Driven Climate Control: Improving Livestock Production through Temperature and Humidity Management

Sapna Nath¹ and Satish Kumar Illa²

Introduction

The integration of technology in agriculture has revolutionized livestock production, particularly through advancements in climate control systems that manage temperature and humidity. These environmental factors are critical for maintaining animal health, enhancing productivity, and optimizing welfare. As livestock are particularly sensitive to climatic conditions, effective management of these variables is essential for maximizing growth rates, reproductive success, and overall productivity.

Importance of Temperature and Humidity in Livestock Production

Livestock species exhibit varying degrees of thermal comfort, which directly influences their physiological functions. High temperatures can lead to heat stress, resulting in decreased feed intake, lower weight gain, reduced reproductive efficiency, and increased mortality rates. Similarly, inadequate humidity control can exacerbate respiratory issues and increase the prevalence of pathogens, negatively impacting animal health. Therefore, a comprehensive understanding of the effects of temperature and humidity is crucial for effective livestock management. The **Temperature-Humidity Index (THI)** in livestock is a bioclimatic index that combines air temperature and relative humidity to estimate the level of **heat stress** experienced by animals. It is one of the most widely used indicators in animal agriculture (especially for dairy and beef cattle, pigs, and poultry) to assess thermal comfort and predict the negative effects of hot weather on production, health, and reproduction.

Basic Concept

Animals lose heat primarily through evaporation (panting, sweating). When humidity is high, evaporation becomes less effective, so the animal feels hotter than the actual air temperature would suggest. The THI reflects this combined effect.

Most Common THI Formulas for Livestock

1. Original THI (for dairy cattle - NRC, 1971)

Used widely in older literature:

$$\text{THI} = (1.8 \times \text{Tdb} + 32) - [(0.55 - 0.0055 \times \text{RH}) \times (1.8 \times \text{Tdb} - 26.8)]$$

Where:

- Tdb = dry-bulb temperature (°C)
- RH = relative humidity (%)

A simplified version often used:

$$\text{THI} = \text{Tdb} + 0.36 \times \text{Tdp} + 41.2 \quad (\text{Tdp} = \text{dew-point temperature in } ^\circ\text{C})$$

2. Most frequently cited modern formula (for cattle)

Published by various authors and used in most current research (e.g., Hahn et al., 1992; LCI, 1970 adjusted):

$$\text{THI} = (1.8 \times \text{T} + 32) - (0.55 - 0.0055 \times \text{RH}) \times (1.8 \times \text{T} - 26)$$

or more commonly the simplified equation:

$$\text{THI} = 0.8 \times \text{Tdb} + (\text{RH}/100) \times (\text{Tdb} - 14.4) + 46.4$$

(Tdb in °C, RH in %)

An even more widely used version (especially in U.S. dairy research):

$$\text{THI} = \text{Tdb} (^\circ\text{F}) + (0.36 \times \text{Tdp} (^\circ\text{F})) + 41.2 \quad (\text{when temperature is in Fahrenheit})$$

Heat Stress Thresholds for Dairy Cattle (common interpretation using the 72+ scale)

THI Range	Stress Category	Typical Effects on High-Producing Dairy Cows
< 68	No stress	Normal
68–71	Mild stress	Slight decrease in feed intake
72–79	Moderate stress	Significant drop in milk yield, reduced reproduction
80–89	Severe stress	High respiration rate, major milk loss, fertility problems
≥ 90	Extreme/Danger	Risk of death without intervention

(Note: Exact thresholds vary slightly depending on the THI equation used and breed/acclimatization.)

THI Thresholds for Other Species (approximate)

- Beef cattle: Slightly more tolerant than dairy (stress often starts ~75-78)
- Pigs: Stress begins around THI 72-75; severe above 84
- Poultry (broilers): Critical above THI 78-82

The **Temperature-Humidity Index (THI)** is a single number that integrates air temperature and humidity to quantify heat stress in livestock. Values typically range from <70 (comfort) to >90 (life-threatening). It is used worldwide to trigger cooling measures (fans, misters, shade), adjust feeding, or predict drops in milk production, growth rate, or fertility during hot-humid conditions.

Recent Technological Advances use for control of Temperature-Humidity Index (THI)

1. Automated Climate Control Systems:

Modern livestock facilities are increasingly equipped with automated climate control systems that utilize sensors and real-time data analytics. These systems continuously monitor environmental parameters, adjusting ventilation, heating, and cooling mechanisms to maintain optimal conditions. By employing programmable logic controllers (PLCs) and IoT devices, farmers can achieve precise control over barn environments, minimizing fluctuations that can stress animals. Automated climate control systems can help improve the health and productivity of livestock by regulating temperature, humidity, and ventilation:

- a. **Improved animal welfare:** Automated systems can help reduce stress and promote better health by maintaining optimal living conditions.
- b. **Reduced labor costs:** Automated systems can reduce the need for frequent human-animal interactions.
- c. **Improved sustainability:** Automated systems can help reduce waste and lower the environmental footprint of farming operations.
- d. **Improved feed efficiency:** Automated systems can help improve feed efficiency.
- e. **Reduced methane emissions:** Automated systems can help reduce methane emissions from livestock.

Some examples of automated climate control systems for livestock include:

- a. **Electric actuators:** These can help adjust inlet valves and ventilation dampers, and provide feedback to the climate control system.
- b. **Air curtains:** These can help reduce the consumption of thermal energy needed to maintain an optimal microclimate.
- c. **Lumina climate control systems:** These systems are designed specifically for poultry farming and can regulate temperature, humidity, ventilation, and other factors.
- d. **Fortica system:** This system can be used to control all turkey house processes, such as climate, animal weighing, feed and water.

2. Data Analytics and Predictive Modeling

- Advances in data analytics have enabled farmers to leverage large datasets for predictive modeling of climate conditions. Machine learning algorithms analyze historical weather patterns and current environmental data to forecast temperature and humidity changes. This proactive approach allows for preemptive adjustments to climate control systems, ensuring that livestock remain within their comfort zones even during extreme weather events.

3. Smart Ventilation Technologies

- Innovations in ventilation technology, such as dynamic airflow systems, facilitate the management of air quality and temperature. These systems utilize variable-speed fans and automated louvers to optimize airflow based on real-time indoor and outdoor conditions. Enhanced ventilation not only helps regulate temperature but also reduces humidity levels, thereby decreasing the risk of respiratory diseases in livestock.

4. Microclimate Management

- The concept of microclimate management involves creating localized environmental conditions tailored to the needs of different species or age groups within a livestock facility. Technologies such as radiant heating systems and localized cooling units allow for targeted climate control, enhancing comfort and productivity for specific groups of animals.

5. Renewable Energy Integration

- The incorporation of renewable energy sources, such as solar panels and wind turbines, in climate control systems can enhance sustainability in livestock production. By powering climate management technologies with renewable energy, farms can reduce operational costs while minimizing their environmental impact. This approach is particularly beneficial in remote areas where access to conventional energy sources may be limited.

Impact on Livestock Welfare and Productivity

Implementing tech-driven climate control systems has significant implications for livestock welfare and productivity. Research indicates that maintaining optimal temperature and humidity levels can lead to increased feed efficiency, higher daily weight gains, and improved reproductive performance. Furthermore, enhanced animal welfare translates to better product quality, including meat and dairy products, ultimately benefiting consumers.

Conclusion: The adoption of advanced technologies for temperature and humidity management represents a paradigm shift in livestock production. By leveraging automated systems, data analytics, and renewable energy, farmers can create optimal living conditions for their animals, promoting health and productivity. As the demand for sustainable and efficient livestock production continues to grow, ongoing research and development in climate control technologies will play a pivotal role in shaping the future of agriculture.

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Silage Additives

Types and Evaluation Criteria

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Introduction

Silage is a fermented feed produced by preserving high-moisture crops such as grasses, green fodder, and crop residues under anaerobic conditions in a structure called a silo. The process, known as ensiling, involves tightly packing green fodder to exclude air and prevent aerobic spoilage. Under air tight conditions, beneficial microorganisms ferment the fodder, producing organic acids mainly lactic acid along with acetic and formic acids which lower the pH and inhibit the growth of undesirable spoilage organisms, thereby ensuring effective preservation.

Silage Additives

Silage additives are natural or industrial substances applied to forage at the time of ensiling to improve fermentation efficiency and preservation quality. Their primary role is to support rapid lactic acid production, minimize nutrient losses, enhance aerobic stability, and ensure that the silage retains as much nutritional value as possible from the fresh forage.

Silage additives are especially useful under unfavorable ensiling conditions, such as:

- Wet or unpredictable weather
- Low sugar content in forage
- High residual fertilizer levels
- Risk of soil contamination

Even under ideal conditions, the use of additives can further improve silage quality, leading to higher feed intake, better animal performance, and improved farm profitability (Merry, 1993). An ideal silage additive should be safe to use, cost-effective, nutritionally beneficial, and capable of improving animal productivity (Yitbarek and Tamir, 2014).

Types of Silage Additives (Based on Mode of Action)

Evaluation of Silage Additives

1. **FITNESS VALUE** - Fitness value is used to assess the effect

Type of Additive	Mode of Action	Examples
Fermentation Stimulants	Promote rapid dominance of homofermentative lactic acid bacteria, resulting in faster pH decline and stable fermentation	Microbial inoculants: Lactic acid-producing bacteria Enzymes: Cellulases, amylases, pectinases, proteases Sugars: Molasses, glucose, sucrose, citrus pulp
Fermentation Inhibitors	Increase silage acidity directly, suppress undesirable microorganisms, and limit excessive fermentation	Aerobic preservatives: Acetic acid, propionic acid, sorbic acid, caproic acid Anaerobic acids: Formic acid, mineral acids, lactic acid, benzoic acid.
Nutrient Additives	Supply additional nutrients or nitrogen and inhibit spoilage microorganisms	Non-protein nitrogen sources: Urea, ammonia

of different silage additives on silage quality as compared to control (silage with no additives). Different silage additives were selected by screening them for desirable

characteristics in the laboratory and then small scale; full term ensilage experiments were performed. The main disadvantage of these experiments was that they are labor intensive and only a few additives can be tested in each experiment. To avoid this, the silage fermentation with additives was determined using a fitness value relative to control silage (without any additives).

The best samples were selected with the help of fitness equation on the basis of following parameters:

- 1) Minimum dry matter loss
- 2) Low Ammonia Nitrogen
- 3) Low pH and higher LA content

Fitness=

$$\frac{1}{1 + [\text{pH wtg} \times (\text{pH}/\text{ctrl pH})] + [\text{lac wtg}/(\text{lac}/\text{ctrl lac})] + [\text{aa wtg} \times (\text{aa}/\text{ctrl aa})] + (\text{cost}/20)}$$

Where wtg is weighting, ctrl is control silage, lac is lactate content, and aa is amino acid content.

Changes in these three parameters were expressed as ratios relative to the control silage. The fitness parameters have sufficient interactions in between; lactic acid level is closely related to the decrease in pH, influencing the extent of protein breakdown. Lactate accumulation can be measured accurately and the parameter shows greatest change. Therefore, the weighting given to the lactate level was 4, the weighting given to the decrease in pH was 2.5 and weighting given to the free amino acid level was 3.5.

MODIFIED FITNESS VALUE - The fitness value was modified to remove the cost parameter and weighting was adjusted accordingly for different parameters.

Modified Fitness

$$= \frac{1}{1 + \left[\text{pHwtg} \times \left(\frac{\text{pH}}{\text{Ctrl pH}} \right) \right] + \left[\text{DMlosswtg} \times \left(\frac{\text{DMloss}}{\text{Ctrl DMloss}} \right) \right] + \left[\text{Ammonia-Nwtg} \times \left(\frac{\text{ammonia-N}}{\text{Ctrl ammonia-N}} \right) \right]}$$

where wtg is weighting and ctrl is control. The weighting for different parameters is pH: 4; DM loss: 3 and Ammonia-N: 3.

CONCLUSION:

Silage additives are valuable tools for improving the efficiency of the ensiling process by promoting desirable fermentation, minimizing nutrient losses, and enhancing aerobic stability. Their judicious use, particularly under challenging ensiling conditions, helps produce high-quality silage that supports higher feed intake, better nutrient utilization, and improved livestock productivity.



ICAR-NDDDB Strategic Alliance to Transform India's Dairy Sector

The Indian Council of Agricultural Research (ICAR) and the National Dairy Development Board (NDDDB) have signed a landmark Memorandum of Understanding to strengthen multidisciplinary research, innovation, and extension across the dairy value chain—from production and processing to value addition—benefiting millions of dairy farmers.

The MoU was signed by Dr. Raghavendra Bhatta, DDG (Animal Science), ICAR, and Shri S. Regupathi, ED (Operations), NDDDB, in the presence of Dr M. L. Jat, Secretary (DARE) & Director General, ICAR, and Dr Meenesh Shah, Chairman, NDDDB.

Speaking on the occasion, Dr Jat emphasized breaking institutional silos through complementary research and integrated farming systems. He highlighted challenges such as climate resilience, low livestock productivity, fodder scarcity, and value chain development. He also underlined sustainable solutions including gaushala-based models for managing stray cattle, manure management, and biogas utilization, driven by innovations from ICAR institutes.

Dr Shah noted that the collaboration could evolve into one of the world's largest platforms for integrated scientific cooperation in support of Viksit Bharat. He recalled successful ICAR-NDDDB initiatives in ration balancing, mineral mapping, and total mixed ration programmes, and highlighted opportunities in ethno-veterinary medicine and the development of scalable, replicable models across diverse agro-climatic regions and agri-dairy value chains.

The MoU aims to synergize ICAR's scientific expertise with NDDDB's field-level experience to promote knowledge sharing, technology development, capacity building, and joint training for scientists, professionals, and farmers. By translating research into field-level solutions, the partnership seeks to enhance productivity, profitability, and sustainability across India's dairy sector.

Senior officials from both ICAR and NDDDB attended the event, marking a significant step towards a resilient, innovative, and farmer-centric dairy ecosystem in India.





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