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- INNOVATION
- KNOWLEDGE
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NATURAL GOODNESS

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From the Pen of Chief Editor

Modern Dairy Processing & Sustainable Packaging

Modern dairy processing and packaging are rapidly evolving to meet two critical demands: longer shelf life and greater sustainability. As consumers and regulators increasingly focus on environmental impact, dairy companies are adopting innovative materials and technologies that protect product quality while reducing packaging waste.

Aluminum-free aseptic cartons are emerging as an important alternative, reducing the environmental footprint of multilayer packaging while maintaining strong barrier properties. At the same time, mono-material plastics, particularly recyclable HDPE and PET, are gaining attention for their compatibility with existing recycling systems. Plant-based and compostable polymers are also being explored for products such as fresh yogurt and other short-shelf-life dairy items.

Processing technologies are advancing alongside packaging innovations. Aseptic processing enables dairy products to remain stable for longer periods without refrigeration, while Modified Atmosphere Packaging (MAP) helps extend the freshness of cheese and other perishables by controlling oxygen levels. Active packaging components, including oxygen and moisture absorbers, provide additional protection against quality deterioration.

The next frontier is intelligent packaging. Time-temperature indicators and dynamic QR codes can provide valuable information about product freshness, handling and supply-chain traceability.

Together, these innovations are creating a smarter, safer and more sustainable dairy supply chain—from processing plant to consumer.

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ARTICLE

Hepatic Biomarkers in Equines

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The liver is one of the most metabolically active organs in the horse and performs a remarkable range of functions essential for life. It is involved in carbohydrate, protein and lipid metabolism, detoxification of endogenous and exogenous substances, synthesis of plasma proteins, storage of vitamins and minerals, production of bile, and regulation of coagulation factors. Because of its substantial functional reserve and regenerative capacity, liver disease in horses often remains clinically silent until a large proportion of hepatic tissue has been damaged. Consequently, laboratory biomarkers are indispensable tools for the early detection, diagnosis and monitoring of equine liver disorders.

Hepatic biomarkers are measurable biochemical indicators that reflect either structural injury to hepatocytes, abnormalities of the biliary system, or impairment of liver function. These are particularly important as clinical manifestations including jaundice, weight loss, hepatic encephalopathy, photosensitization, depression and poor performance may appear as the disease advances.

Equine hepatopathies may arise from infectious, inflammatory, toxic, metabolic, parasitic, vascular and neoplastic causes. Important examples include Theiler's disease, equine parvovirus-associated hepatitis, cholangiohepatitis, hepatic lipidosis, hyperlipemia, pyrrolizidine alkaloid toxicity, mycotoxin exposure, septicemia and chronic fibrosis. As different diseases affect distinct portions of the hepatobiliary system, interpretation of biomarker's pattern provides valuable diagnostic information.

Biomarkers of hepatocellular injury:

Hepatic biomarkers are broadly divided into two categories. The first group includes enzymes released into the bloodstream following hepatocellular or biliary injury. These include sorbitol dehydrogenase (SDH), glutamate dehydrogenase (GLDH), gamma-glutamyl transferase (GGT), aspartate aminotransferase (AST), alkaline phosphatase (ALP) and lactate dehydrogenase (LDH). The second group includes functional biomarkers such as bile acids, bilirubin, albumin, blood ammonia, glucose and coagulation factors. Together, these tests provide a comprehensive assessment of liver health.

Sorbitol dehydrogenase (SDH): Sorbitol dehydrogenase is considered one of the most liver-specific enzymes in horses. Located within the cytoplasm of hepatocytes, SDH is released rapidly following hepatocellular injury. The half-life of SDH is short (<12 hours), therefore, it serves as an excellent indicator of active and acute liver damage. Marked elevations occur in acute hepatitis, toxic hepatopathy, ischemic injury and severe systemic illness associated with hepatic hypoxia.

Glutamate dehydrogenase (GLDH): Glutamate dehydrogenase is a mitochondrial enzyme concentrated within hepatocytes, particularly in centrilobular regions of the liver. GLDH is highly specific for hepatic injury as well as more stable than SDH. Increased GLDH activity reflects deeper cellular damage because mitochondrial disruption generally occurs after more severe injury. Significant elevations are observed in viral hepatitis, hepatic lipidosis, toxic liver injury and ischemic hepatopathy. Because of its stability and specificity, GLDH is widely regarded as one of the best biomarkers for detecting acute hepatocellular disease in horses.

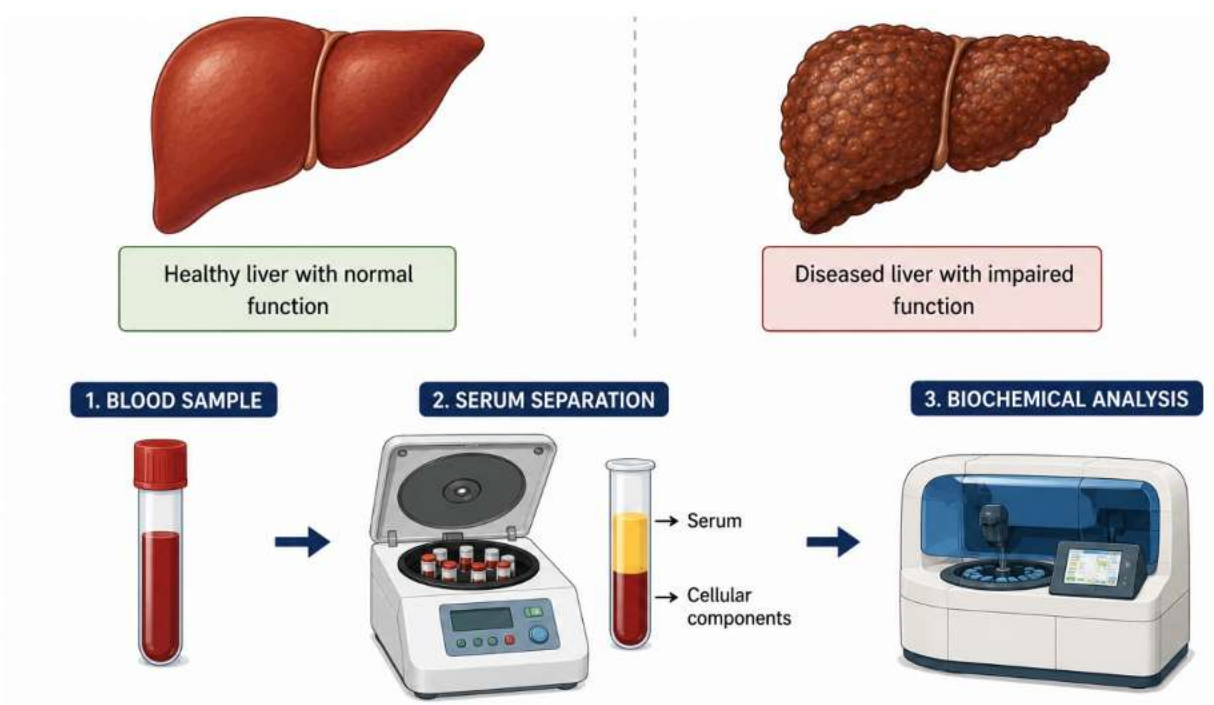
Aspartate aminotransferase (AST): Aspartate aminotransferase is found in hepatocytes, skeletal muscle, cardiac muscle and several other tissues. Although elevated AST activity frequently accompanies liver disease, however, it lacks specificity as muscle injury can produce similar changes. Therefore, simultaneous evaluation of liver-specific enzymes such as SDH or GLDH and muscle enzymes such as creatine kinase (CK) is also required. AST has a relatively long half-life and may remain elevated after acute injury, making it useful for monitoring ongoing or recent liver injury.

Lactate dehydrogenase (LDH): Lactate dehydrogenase is a non-specific enzyme present in numerous tissues including liver, muscle, kidney and erythrocytes. Measurement of the LDH-5 isoenzyme can improve diagnostic specificity because this fraction is more closely associated with hepatic tissue.

Biomarkers of hepatobiliary diseases:

Gamma-glutamyl transferase (GGT): Gamma-glutamyl transferase is the most frequently used biomarker of hepatobiliary disease in equines. GGT is primarily associated with biliary epithelial cells and canalicular membranes. Increased activity is associated with cholestasis, bile duct inflammation, biliary hyperplasia and obstruction of bile flow. Cholelithiasis,cholangiohepatitis , hepatic lipidosis and toxic hepatopathies commonly produce substantial increases in GGT. The enzyme may remain elevated for days or weeks after clinical recovery, reflecting ongoing biliary remodeling rather than active hepatocellular destruction.

Alkaline phosphatase (ALP): Alkaline phosphatase is associated with biliary canalicular membranes and is considered as a marker of cholestasis. However, it is also produced by bone, intestine and other tissues. In growing foals, ALP activity may be naturally higher because of active bone metabolism. Although ALP is less sensitive than GGT for equine hepatobiliary disease,



elevated ALP provides supportive evidence of impaired bile flow, biliary obstruction and inflammatory biliary disorders.

Functional biomarkers:

Bile acids: Bile acids are synthesized by hepatocytes, secreted into bile and recycled through enterohepatic circulation. Elevated concentrations indicate impaired hepatic uptake, metabolism or excretion. Persistently increased bile acid concentrations are strongly associated with significant hepatic dysfunction.

Bilirubin: Bilirubin metabolism provides additional insight into liver function. Total bilirubin consists of direct (conjugated) and indirect (unconjugated) fractions. Hyperbilirubinemia may result from impaired hepatic uptake, defective conjugation, cholestasis, hemolysis or prolonged anorexia. Horses frequently develop mild unconjugated hyperbilirubinemia after fasting. Elevated direct bilirubin concentrations generally indicate impaired biliary excretion or obstruction.

Ammonia: Hyperammonemia results when ammonia from portal circulation is not metabolized to blood urea nitrogen (BUN) within the liver and enters the systemic circulation. Increased plasma ammonia affects gluconeogenesis, causing the utilization of branched chain amino acids. The resultant decrease in the ratio of branched chain to aromatic amino acids, affects neurotransmission and may give rise to hepatic encephalopathy or very rarely peripheral neuropathy which can lead to unusual complications such as gastric impaction, colic or laryngeal paralysis. However, hyperammonemia can also be caused by gastrointestinal disorders, poisoning or inborn metabolic defects.

Albumin and Globulin: Albumin is synthesized exclusively by the liver and serves as an indicator of hepatic synthetic capacity. Albumin has a relatively long half-life (19-20 days) and liver possesses substantial reserve function, therefore, hypoalbuminemia generally develops only in

Table 1: Characteristics of hepatic enzymes in horses.

Origin	Type	Location	Function
Hepatocellular	SDH	Cytoplasmic	Conversion of fructose to sorbitol
	GLDH	Mitochondrial, in the centrilobular areas of the liver	Conversion of glutamate to 2-oxoglutarate
	AST	Cytoplasmatic of hepatocytes and other tissues, including skeletal muscle	Conversion of aspartate and alpha-ketoglutarate to oxaloacetate and glutamate
	LDH-5	Cytoplasmic	Reversible transformation of pyruvate to lactate
Biliary	GGT	Microsomal membranes in the biliary epithelium and also on the canalicular surfaces of hepatocytes; <5% is found in the cytoplasm.	Cleaves C-terminal glutamyl groups from amino acids and transfers them to another peptide or amino acid. GGTis important in glutathione metabolism (reduced and oxidized GSH are the main targets) and amino acid absorption (cysteine in the kidney)
	ALP	Epithelium of biliary canalicular membrane, and sinusoidal membrane of hepatocytes	Non-specific metalloenzyme which hydrolyzes many types of phosphate esters at an alkaline pH in the presence of zinc and magnesium ion

advanced or chronic liver disease. Consequently, low albumin concentrations often signify substantial functional impairment rather than early hepatic injury. Albumin concentration is higher in the neonatal foals. Increased globulin concentrations may accompany chronic inflammatory liver disorders.

Multifaceted role of liver:

The liver also plays an essential role in nitrogen metabolism and glucose homeostasis and hemostasis. Blood urea nitrogen may decrease when hepatic capacity to convert ammonia into urea becomes compromised. Advanced liver failure may cause hypoglycemia because of impaired gluconeogenesis and glycogen metabolism. As most coagulation factors are synthesized within the liver, prolonged clotting times may indicate impaired hepatic synthetic function.

The patterns of biomarker abnormalities often provide important diagnostic clues. Predominantly hepatocellular injury is characterized by marked increases in SDH, GLDH and AST with comparatively minor increases in GGT and ALP. This pattern is typical of acute viral hepatitis, toxic injury and ischemic hepatopathy. In contrast, predominantly cholestatic disease is characterized by marked increases in GGT and ALP with relatively modest increases in hepatocellular enzymes. Mixed patterns occur when both hepatocytes and biliary structures are significantly affected.

Hepatic biomarkers are particularly valuable in horses, particularly in animals presented with nonspecific signs such as poor performance, recurrent colic, weight loss, anorexia or intermittent fever.SDH and GLDH are highly specific indicators of hepatocellular injury, whereas GGT remains the most sensitive marker of hepatobiliary disease. AST, ALP and LDH provide supportive diagnostic information, while bile acids, bilirubin, albumin, coagulation factors and related analytes help assess hepatic function and prognosis. Therefore, a comprehensive hepatic profile should be interpreted with history and clinical findings,supplemented when necessary, with diagnostic imaging or liver biopsy.

Table 2: Reference values of different hepatic biomarkers in equines.

Parameters	Reference range
Total Bilirubin (mg/dL)	1-2
Direct Bilirubin (mg/dL)	0-0.4
Indirect Bilirubin (mg/dL)	0-2.2
Bile acids (µmol/L)	<15
ALT (U/L)	3-40
AST (U/L)	226-366
SDH (U/L)	2-8
GLDH (U/L)	2-10
LDH (U/L)	162-412
GGT (U/L)	7-54
ALP (U/L)	143-395
Total protein (g/dL)	5.2-7.9
Albumin (g/dL)	2.6-3.7
Globulin (g/dL)	2.62-2.04
Prothrombin time (PT) (sec)	12-14
Fibrinogen(mg/dL)	200-400
Ammonia (µmol/L)	13-108
Blood urea nitrogen (BUN) (mg/dL)	10-29
Glucose (mg/dL)	71-122

References

Satue K, MiguelPastor L, Chicharro D, Gardon JC. 2022. Hepatic Enzyme Profile in Horses. Animals.

Satue K, Fazio E, Medica P, Miguel L, Gardon JC. 2023. Biochemical and Hematological Indexes of Liver Dysfunction in Horses. Journal of Equine Veterinary Science.

Pires, M J, Cotovio M, Queiroga F, Pires C A, Ferreira A C S. 2025. Reference Intervals for Biochemical Analytes in Clinically Healthy Adult Lusitano Horses. Veterinary sciences.

Role of Herd Health Management in Dairy Farming

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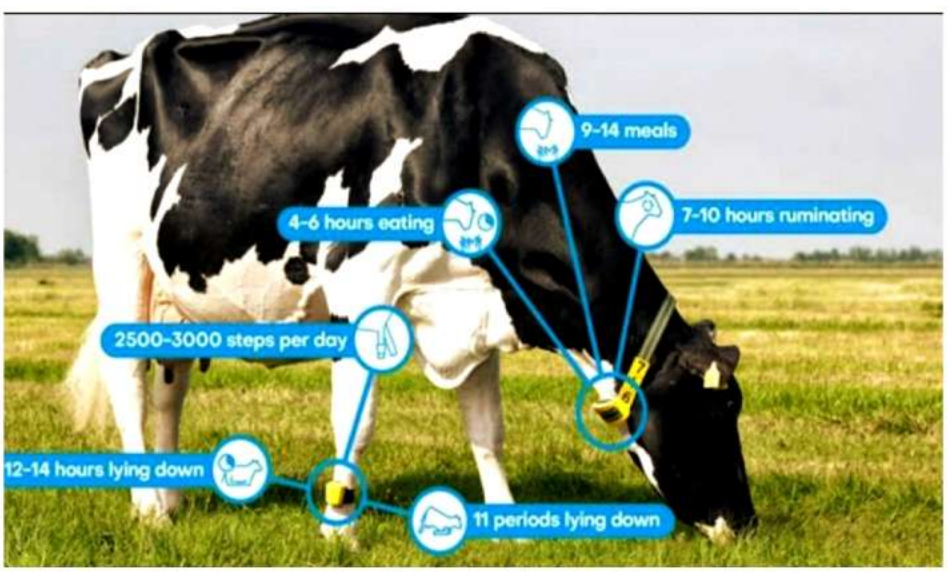
1. Introduction and Overview

Herd health management is one in all the foremost important components of total herd profitability and welfare. Maintenance of anappropriate environment, adequate nutrition, sanitation and vaccination are important for health management. Sound management, additionally to reducing the prospect of injury or exposure to potential pathogens, provides conditions that enhance the animal's ability to make or acquire immunity to prevalent diseases. It's important to remain vigilant for health problems within the herd. This may be achieved by general observation of animals, observing factors like changes in behaviour (e.g., separation from the group, excitation), voice, feeding (e.g., reduced feed intake, abnormality in rumination), defecation (constipation or diarrhea), urination, posture, gait and body condition. The dairy industry relies mainly on the farm's economic volatility. The well-being of the herd encompasses an enormous effect on the farm's economic profile. Both of them are inter-related. The word herd health might be a program for the intended management of animal health and production. It uses a combination of regularly scheduled veterinary activities and good programs for herd management. The goal of herd health management programs is to validate the optimal care and well-being of milk cow and to reduce losses in productivity caused by disease and management errors. Groups of diseases like clinical, subclinical, acute, chronic should be treated at the bottommost of the disease control program. Mastitis, lameness, milk fever, retained placenta, displaced abomasum are common incidences of clinical diseases that affect the health of herds. The subclinical diseases are difficult to discern. To look for the frequency of



subclinical infection, use of screening tests like culture or somatic cell count for mastitis or ELISA for Para Tuberculosis. Intolerance of diseases like rabies, brucellosis, tuberculosis requires regular herd screening and culling of the positive cases or herd occasionally. The effect of the health and productivity of the disease herd is increased culling, decreased milk or protein production, increased mortality of adult cows, decreased reproductive performance. The structure of health management programs is exclusive to each farm but is frequently keyed to the scheduled veterinary herd visits that combine routine reproductive examinations, review of selected herd performance records, and decisions and actions related to specific herd management issues. Dairy Herd Management is one of the utmost important aspect for Dairy farms that maintain long-term high production. They have to successfully manage several key factors: cow nutrition, reproduction, milking and well-being. This article outlines the principles of properly managing a dairy herd to sustain high milk production and happy cows.

2. Nutritional Management

The first step of scheduling nutrition is to acknowledge exactly what quantity to feed your cows. Remember, your cows always must be taking in additional nutrients than they're producing in milk. When planning feed consumption, the industry standard measures food built on its dry matter content or how considerably it weighs when all the water is extracted. Follow these guidelines for in what manner each category of cow needs:

- Non-pregnant adult cows: 1.2% of weight
- Pregnant, non-lactating cows: 2% of weight
- Milking cows: 1.2% of weight plus 5 kg per 10 liters of milk produced.

You see that properly managing feed means carefully monitoring milk production and weight. If you would like your cows to attain peak lactation, you'll must ensure they're getting sufficient high-quality feed.

2.1. The Principles of Food Nutrition

The first principle of cow nutrition is to make sure that cows get sufficient energy, which they'll get through starch and fats. Computation on what reasonably feed is available in your region that starch may derive in the form of wheat, maize, barley, sorghum, or other grains. The fermentation of grain is what produces lactose within the milk. Cows also need fat – up to 6% of their ration. Sources of fat include cottonseed, brewer's grain, and oils. In general, solid fats are better for cows' digestion than liquids. Cows also need a daily intake of vitamins. Most fresh forage naturally contains the vitamins and minerals that cows need at sufficient levels. Still, you may need to add supplemental vitamins during off-seasons once you are using the dried feed.

2.2. Feeding Management

It is essential that cows have constant access to high-quality feed and clean water. Milking cows each need 60-70 liters of water to every day, plus an additional 4-5 liters per liter of milk produced. To accomplish this, they need to have consistent access to water troughs. A cow drinks aenormous percentage of their daily water needed right after milking, so it's essential to entail plenty of trough space as cows leave the milking parlor. Likewise, fresh forage should be consistently available. There should always be quite enough space for each cow to access the forage, so dominant cows don't bully younger ones and

stop them from eating. In general, you must feed with forage first, and then supplement with nutritional concentrates. A universal rule is to feed 1 kilogram of concentrate for every 2 kilograms of milk a cow produces. This ensures that they're receiving enough nutrients.

3. Reproductive Management

3.1.Goals and Planning

Effective reproduction management requires effective planning regardless of how large or small, each dairy farm should have a detailed routine for monitoring cows. Regular farm records will also aid you to expect when cows are in heat. This ensures that you constantly know which cows are in heat, are pregnant, or show signs of disease. You oughtto even have plans in place for cows to undergo the transition period and to deal with any health issues that occur during pregnancy.

3.2. Heat Detection – Using the Latest Technology

Determining when cows are in heat is the cornerstone of maximizing reproduction. Some farms simply train staff to monitor cows visually. Standing to be mounted is an obvious sign of being in heat. Cows in heat may also have mucus discharge and become restless. This restlessness enables heat to be detected by activity monitors. Much like human pedometers, activity monitors track how much a cow walk. Peaks in activity can indicate a cow in heat. Using pedometers on cows eligible for heat can lead to a higher rate of heat detection and more efficient breeding.

4. Dry Cow Management

Itis also important because risk of postpartum diseases is present during the dry period. Diseases like milk fever, hypomagnesaemia, udder edema, ketosis, displaced abomasum, mastitis should be looked after at. Preventive measures such as vaccination, hoof care, nutrition should be used. Their feeding should start at 2-3 weeks before calving. This is called transition feeding. As non-lactating cows require low nutrients, they are fed with low forage but more nutrient rich feed. This feeding helps the rumen to adapt to a low forage and nutrient rich diet and to cope with pen and calving transition stresses. For their recommended dry time, the animals should be handled and watched out. Too long or too short dry period affect herd health. For avoiding these, reproductive record books should be routinely recorded and timely reviewed.

5. Principles of Cow Comfort

Cows need to be comfortable in order to have high production. A comfortable environment must provide the following:

- Clean, dry bedding
- Room to lie down
- Shade in the heat
- Non-slip flooring indoors

It should include optimal housing conditions. Highly produced animals have a high intake of dry matter, produce more internal heat, and are less tolerant of high ambient temperatures. With wide open sides and high ends and the use of fans and sprinklers, the housing structure should be designed to keep cows comfortable.

7. Milking Management at the Farm

7.1. Milking Tips

Milking is never as simple as connecting cows to the equipment. The following tips will help to make milking as efficient and low-stress as possible:

- Cows are susceptible to stress – farm staff should try to maintain a calm, quiet environment.

(A) (B) (C)

***Note: A = Estrotect heat detector, B = Levelled animals, C= Approaching behaviour of oestrus**

- When moving into the milking parlor, keep cows moving slowly to avoid slipping.
- Teats should be clean and dry before being connected to milking equipment
- Teats should be treated with an antiseptic after milking to prevent disease
- Milking equipment should be checked daily by looking for vent blocks and watching milk flow
- Milking equipment should be cleaned with water and sanitizer.

It includes managing various milking routines at the farm. Observation of routine milking parlour should be done. For the preservation of high quality milk and the identification of udder issues in herds, animals used for milking should be observed. It involves scoring through milk testing of various milk produced from animals. Milk quality assurance program should include hygiene milking of animals, cleaning of milking parlour; use of drugs for treatment of milking animals, mastitis control program, and hoof health should be maintained to avoid lameness.

8. Mastitis:

Mostly bacterial infections, different species of bacteria causing mastitis are – *Staphylococcus aureus*; *Streptococcus agalactiae*; and other Streptococci, Coliform bacteria, Pseudomonas, etc. Udder becomes hot, painful, swollen and hard. Milk secretion is reduced and watery at the beginning, and later, it becomes purulent. Fever is also common in acute cases.

8.1. Prevention and Control

Strict hygiene and sanitary conditions of the farm should be maintained. Dry full hand milking should be adopted. Milking machine if used should be germ free. Udder and teat should be rinsed before and after each milking with a mild antiseptic solution.

Mastitis Control Program is used for screening acute or chronic mastitis. To know which teat carries mastitis infection, CMT testing is

performed. For testing, milk should be used. The udder sample can show enormous leukocyte infiltration. It is important to begin care of these animals efficiently and immediately.

9. Investigation

Even on the best managed farms, unexpected health and production problems arise. Surveillance program should incorporate to detect problems early. Uses of epidemiological concept of disease outbreaks are helpful in detection ofthese before any serious financialproblem occurs.

10. Summary (Conclusions)

Proper execution and smartplanning is needed for effective herdhealth management. In the preventionof parasitic infections, supervision ofparasites by using drugs is beneficial.For efficient execution of herdhealth programs, trained labor isnecessary. Routine feeding should beeffective.In animals, medicationsshould be cautiously used.Farm shouldbe well equipped for an outbreak. Howwell managed a herd is depended onhow well they perform during anoutbreak.

Resistant Starch: A Novel Nutritional Source for Better Animal Health and Higher Productivity

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Abstract

Resistant starch (RS) is a unique type of starch that is not completely digested in the small intestine like conventional starch. Instead, it is fermented by beneficial microorganisms in the large intestine or, in ruminants, in the rumen and hindgut. This fermentation produces volatile fatty acids (VFAs) such as butyrate, acetate, and propionate, which play a vital role in maintaining gut health, improving digestive efficiency, and enhancing nutrient utilization. In recent years, resistant starch has gained considerable attention as an effective prebiotic and functional dietary ingredient in animal nutrition.

Keywords: Resistant starch, prebiotic, rumen, animal nutrition, gut health, milk production,functional feed.

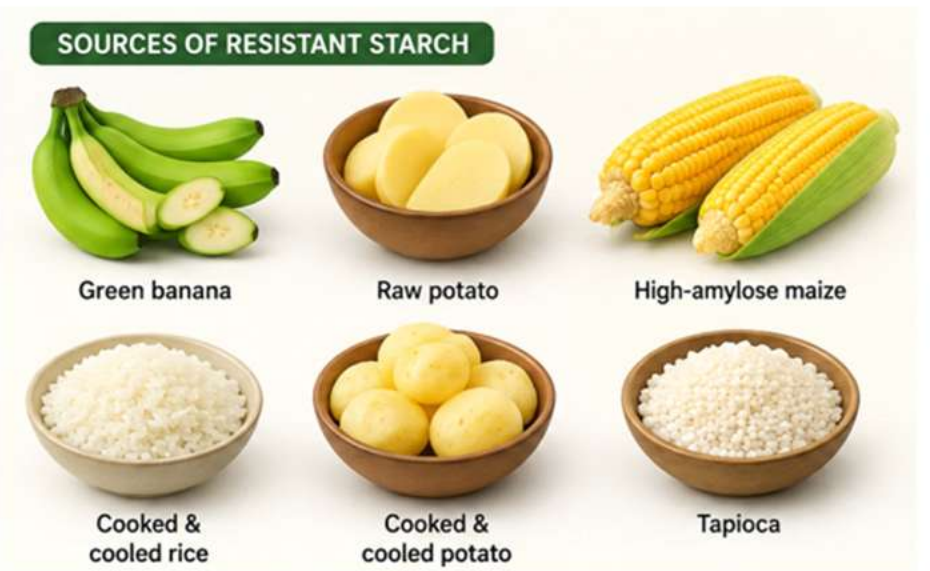
What is Resistant Starch?

Resistant starch is a form of starch that resists digestion by normal digestive enzymes in the small intestine. It passes largely unchanged into the lower digestive tract, where it is fermented by beneficial microorganisms. Because of this property, it is commonly referred to as "resistant" or "slowly digestible" starch.

Types of Resistant Starch

Scientists classify resistant starch into five major categories:

- **RS1:** Physically inaccessible starch found in whole grains and seeds, enclosed within intact cell walls.



- **RS2:** Naturally resistant starch present in raw potatoes, green bananas, and high-amylose maize.
- **RS3:** Retrograded starch formed when cooked rice, potatoes, or maize are cooled.
- **RS4:** Chemically modified resistant starch.
- **RS5:** Starch formed through amylose-lipid complexes.

How Does Resistant Starch Work in Animals?

After reaching the rumen or intestine, resistant starch is fermented by beneficial microorganisms. This process:

- Produces volatile fatty acids such as butyrate, acetate, and propionate.
- Increases the population of beneficial bacteria.
- Suppresses the growth of harmful microorganisms.
- Improves intestinal health.
- Enhances nutrient utilization efficiency.

Benefits in Ruminants

Several advantages of resistant starch have been observed in dairy and meat-producing animals:

- Improves the activity of rumen microorganisms.
- Provides a more balanced supply of energy.
- Supports fiber digestion.
- Reduces the risk of ruminal acidosis.
- Enhances microbial protein synthesis.
- Improves feed utilization efficiency.

Effect on Milk Production

When included at appropriate levels in the diet, resistant starch may:

- Improve milk yield.
- Help maintain milk fat percentage.
- Improve energy balance in lactating animals.
- Reduce negative energy balance during early lactation.

Role in Gut Health

The butyrate produced during resistant starch fermentation:

- Serves as a primary energy source for intestinal cells.
- Strengthens the intestinal lining.
- Helps reduce intestinal inflammation.
- May decrease the risk of gastrointestinal infections.

Importance as a Prebiotic

Resistant starch promotes the growth of beneficial bacteria such as **Bifidobacterium** and **Lactobacillus**. As a result:

- Digestive efficiency improves.
- Immune function is strengthened.
- The likelihood of digestive disorders, including diarrhea, may be reduced.

Precautions

- Excessive inclusion may lead to digestive disturbances.
- It should be incorporated only as part of a balanced ration.
- Avoid sudden introduction of high levels.
- The inclusion level should be determined according to the animal's age, production stage, and dietary composition.

Future Prospects

Modern animal nutrition aims not only to maximize production but also to develop sustainable and healthy production systems. Functional feed ingredients such as resistant starch have the potential to reduce antibiotic use, improve gut health, and support environmentally sustainable livestock production.

Conclusion

Resistant starch is an emerging functional feed ingredient for livestock. Beyond serving as an energy source, it contributes to improved gut health, microbial balance, digestive efficiency, and animal productivity. When included in balanced amounts, it can be a valuable nutritional strategy in dairy and meat production systems. Further research will strengthen its potential application in Indian livestock production.

Wallowing in Buffaloes: A Natural Cooling System for Better Production and Welfare

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Abstract

Buffaloes are highly prone to heat stress in tropical climates because their body structure limits natural heat loss through sweating. Under hot conditions, inadequate cooling may reduce feeding activity, milk yield, reproductive performance and overall comfort. Wallowing provides an effective natural cooling opportunity by allowing buffaloes to dissipate excess body heat through direct contact with water or wet mud. This behaviour supports normal physiological balance, improves comfort and contributes to better production and welfare. However, wallowing must be managed hygienically with clean water, safe flooring, proper drainage and udder care to avoid health problems such as mastitis, skin infections and lameness.

Introduction

Buffaloes are one of the most important dairy animals in India and other tropical countries. They are valued for their high-fat milk, strong body constitution, ability to utilize roughages and suitability for small and marginal farmers. However, one major limitation of buffaloes is their poor tolerance to heat stress. Compared with cattle, buffaloes have dark skin, sparse hair coat, thick epidermis and fewer functional sweat glands. Due to these features, they absorb more solar radiation and lose less body heat through sweating. As a result, they depend strongly on external cooling methods such as shade, bathing, sprinkling and especially wallowing.

Wallowing is the natural behaviour in which buffaloes stand, sit, lie or roll in water, mud, ponds, canals, tanks or wet soil. For buffaloes, it is not merely a traditional habit; it is a biological need. It helps them regulate body temperature, reduce heat stress, maintain feed intake, support milk production, improve reproduction, express natural behaviour and enhance overall welfare. In the present era of rising temperature and frequent heat waves, wallowing or an equally effective cooling system has become an essential part of scientific buffalo management.

Why Buffaloes Need Wallowing

Buffaloes are semi-aquatic animals and naturally prefer areas where water is available. Their black skin absorbs solar radiation rapidly, while their limited sweating ability reduces natural heat loss. During hot weather, this creates a high

thermal burden on the body. When body heat increases, buffaloes become restless, reduce feed intake, drink more water, stand for longer periods and may show panting or increased respiration.

Wallowing helps overcome these problems because water removes heat from the body more efficiently than air. When buffaloes immerse themselves in water or mud, heat from the body surface is transferred to the cooler medium. After coming out, the moisture left on the skin evaporates and gives further cooling. Mud also forms a protective layer over the body, reducing direct solar impact and irritation from insects. In this way, wallowing acts like a natural cooling system for buffaloes.

Effect on Body Temperature

The primary benefit of wallowing is thermoregulation, which means control of body temperature. During hot weather, buffaloes may show increased rectal temperature, high respiration rate, rapid pulse rate, panting, restlessness, excessive standing, reduced feeding, reduced rumination and increased water intake. If heat stress continues for a longer time, it can disturb metabolism, immunity, milk production and reproduction.

Wallowing directly cools the skin and helps reduce internal heat load. It lowers skin temperature, supports reduction of rectal temperature and decreases the need for excessive panting. As heat load reduces, respiration rate and pulse rate also become more normal. Buffaloes become calmer, more comfortable and more willing to eat, lie down and ruminate. Therefore, wallowing is not just an external cooling practice; it helps maintain the normal physiological balance of the animal.

The importance of wallowing is greatest during summer, hot-humid weather and heat waves. In humid conditions, evaporative cooling becomes less effective because air already contains more moisture. In such situations, direct cooling through water becomes very useful. During winter, however, wallowing is generally not required and should not be forced, especially in calves, weak animals, sick animals and late pregnant buffaloes.

Effect on Feed Intake, Rumination and Digestion

Heat stress has a direct negative effect on feed intake. When buffaloes are exposed to high temperature, they reduce dry matter intake because digestion produces metabolic heat. Although this is a natural protective response, it reduces nutrient supply to the body. This leads to lower milk production, poor body condition, weak immunity and poor fertility.

Wallowing improves thermal comfort and helps buffaloes maintain better appetite. A cooled animal spends more time eating and ruminating. Proper rumination increases saliva production, supports rumen buffering, improves fibre digestion and enhances nutrient utilization. Better digestion supports milk production, body maintenance, reproduction and immunity.

During summer, wallowing should be combined with good feeding management. Animals should preferably be fed during cooler hours such as early morning, late evening and night. The ration should be balanced, palatable and nutrient-dense because total intake may still be lower than in cool months. Green fodder, good-quality roughage, mineral mixture, salt and clean drinking water should be provided regularly.

Effect on Milk Production and Milk Composition

Milk production is one of the most economically important traits affected by heat stress. A heat-stressed buffalo eats less, spends more energy on cooling the body and undergoes metabolic and hormonal disturbances. As a result, milk yield decreases, especially during peak summer. Early lactation and high-yielding buffaloes are more vulnerable because their nutrient demand and metabolic heat production are already high.

Wallowing helps maintain milk production by reducing heat stress, improving feed intake, supporting rumen function and conserving energy. It may not increase milk yield beyond the genetic capacity of the animal, but it helps prevent the sharp summer decline in milk production. It also supports lactation persistency, meaning the ability of the animal to maintain milk yield for a longer period.

Buffalo milk is highly valued because of its high fat, protein and total solids. Heat stress can disturb rumen fermentation and nutrient utilization, which may affect milk fat, protein, lactose and total solids. By improving comfort, feed intake and rumination, wallowing helps maintain milk quality. This is important for farmers because buffalo milk price is often linked with fat and solids-not-fat content. Thus, wallowing has both

biological and economic importance.

Effect on Reproductive Performance

Reproduction is very sensitive to heat stress. Buffaloes already face problems like seasonal breeding tendency, silent heat and weak estrus signs. High temperature further worsens these problems by affecting hormonal balance, ovarian activity, follicular growth, ovulation, uterine environment and early embryo survival.

Heat-stressed buffaloes may show silent estrus, weak heat symptoms, delayed ovulation, poor conception rate, longer service period and increased calving interval. Pregnant buffaloes may suffer from reduced comfort and stress, which can affect fetal development and future lactation. Wallowing reduces body heat and supports normal reproductive physiology. Comfortable buffaloes may show clearer estrus signs, better ovarian function and improved chances of conception.

Breeding bulls also require cooling because sperm production is highly temperature-sensitive. Heat stress can reduce libido, semen volume, sperm motility, sperm concentration and overall semen quality. Safe and hygienic wallowing or alternative cooling methods help maintain breeding efficiency in buffalo bulls.

However, special care is necessary for advanced pregnant buffaloes, weak animals and sick animals. They should not be forced into deep, slippery or dirty ponds because of the risk of slipping, injury and infection. For such animals, shallow water, sprinkling, showering, shade and proper ventilation are safer options.

Effect on Behaviour and Animal Welfare

Wallowing is a normal and natural behaviour of buffaloes. When buffaloes are allowed to wallow, they express their natural instinct and appear more relaxed. They spend less time panting, standing restlessly or crowding near water points. They show better feeding, lying, resting and rumination behaviour.

If buffaloes are denied cooling during hot weather, they may become restless, irritable and uncomfortable. They may stand for long periods, reduce lying time, reduce feed intake and continuously search for shade or water. These are signs of poor welfare.

Animal welfare means good health, comfort, freedom from unnecessary stress and freedom to express natural behaviour. From this point of view, wallowing is not only a production-related practice but also a welfare requirement for buffaloes in hot climates. A comfortable buffalo is more productive, more fertile and healthier.

Effect on Skin, Udder, Hoof and General Health

Clean wallowing can benefit the skin by cooling it, reducing dryness, protecting it from direct sunlight and reducing insect irritation to some extent. Mud coating may act as a natural protective layer. However, dirty wallowing water can become harmful. If the pond contains dung, urine, sewage, decaying organic matter or stagnant water, it may increase the risk of skin infections, wound contamination, parasitic exposure and foul smell.

Udder health is an important concern in wallowing management. If buffaloes lie in dirty water or contaminated mud, bacteria may come in contact with the udder and teats. If milking is done without proper washing and drying, the risk of mastitis may increase. Therefore, udder and teats should be washed properly before milking, dried with a clean towel and the milking area should be kept hygienic. Wallowing itself is not harmful; poor hygiene is harmful.

Hoof and leg health also need attention. Slippery pond floors, deep mud, poor drainage and sharp stones can cause slipping, wounds, lameness, hoof softening and foot rot. A safe wallowing area should have a gentle slope, non-slippery floor, proper drainage and a dry resting place nearby. Animals should not be kept continuously in wet and dirty areas.

Heat stress weakens immunity and disturbs metabolism. It may increase oxidative stress, reduce disease resistance and affect hormonal balance. By reducing heat stress, wallowing indirectly supports immune function, metabolic stability, hydration and general health. However, clean water and good management are essential to avoid disease transmission.

Wallowing for Different Classes of Buffaloes

The need and method of cooling may vary according to the class of animals. Lactating and high-yielding buffaloes need special attention because they produce more metabolic heat. Dry buffaloes should not be ignored because heat stress during the dry period can affect fetal growth, udder development and next lactation. Transition buffaloes, especially three weeks before and after calving, require careful cooling because this stage is highly sensitive to metabolic stress.

Young calves should not be allowed in deep ponds because of the risk of drowning and chilling. They should be protected through shade, ventilation, clean water, dry bedding and light sprinkling. Breeding bulls should be provided safe cooling to maintain libido and semen quality. Sick, injured, weak, lame or advanced pregnant animals should be given separate and safer cooling arrangements.

Ideal Time, Duration and Design of Wallowing Facility

The best time for wallowing is during the hotter part of the day,

usually late morning to afternoon. In practical farm conditions, buffaloes may be allowed to wallow between **10:00 AM and 3:00 PM**, depending on local weather. Duration may vary from 30 minutes to a few hours according to temperature, humidity, water availability and animal preference. Animals should not be forced unnecessarily; they should be allowed to use the facility naturally.

A good wallowing pond should be close to the shed but away from feeding and milking areas to prevent contamination. It should have sufficient space, suitable depth, gentle entry and exit slope, non-slippery floor, clean water supply, drainage facility, regular cleaning arrangement, shade nearby and a dry resting area. Overcrowding should be avoided because it increases stress, injury and contamination. Drinking water must always be separate from wallowing water.

Where wallowing is not possible due to lack of land, water scarcity or intensive housing, alternative cooling methods can be used. Sprinkling, showering, fans with sprinklers, foggers, shade, roof insulation and proper ventilation can help reduce heat stress. Foggers should be used carefully in humid areas because excess humidity can worsen discomfort. In water-scarce regions, intermittent sprinkling with fans may be more practical than full wallowing.

Possible Problems and Their Prevention

Poorly managed wallowing can create several problems such as mastitis, skin disease, hoof disorders, lameness, slipping injuries, parasite exposure, mosquito breeding, foul smell, environmental pollution and water wastage. These problems can be prevented by scientific management.

Farmers should provide wallowing during hot hours, keep water clean, clean the pond regularly, provide proper drainage, avoid overcrowding, maintain udder hygiene, provide dry resting area and monitor animals for injuries, mastitis and lameness. Animals should not be allowed to wallow in sewage-contaminated water. Animals with open wounds should not enter dirty ponds. Late pregnant buffaloes and young calves should not be forced into deep or slippery water.

Economic and Climate Importance

Wallowing has direct economic value. By reducing heat stress, it helps prevent summer decline in milk yield, maintains milk fat and total solids, supports fertility, reduces service period, improves body condition and may reduce veterinary expenses. Better milk production, improved reproduction and healthier animals ultimately improve farm profitability.

With climate change, heat waves and extreme temperatures are becoming more common. Buffaloes are likely to face more heat stress in the future. Therefore, cooling systems should be included in buffalo farm planning. Wallowing, sprinklers, fans, shade trees, proper housing, roof insulation and clean drinking water are important components of climate-resilient buffalo farming.

Conclusion

Wallowing is one of the most important natural behaviours of buffaloes. It helps overcome their poor sweating ability and low heat tolerance. Its benefits are not limited to cooling only; it supports body temperature regulation, feed intake, digestion, milk production, milk composition, reproduction, semen quality, immunity, metabolism, behaviour and welfare.

At the same time, wallowing must be managed scientifically. Dirty water, poor drainage, slippery surfaces and poor milking hygiene can create problems such as mastitis, skin infection, hoof disorders and injuries. Therefore, the best approach is to provide wallowing with clean water, safe pond design, proper drainage, udder hygiene and dry resting facilities.

In tropical dairy farming, wallowing should not be considered a luxury. It is a practical, natural and welfare-friendly method of heat stress management. A cool buffalo is a comfortable buffalo; a comfortable buffalo is healthier, more fertile, more productive and more profitable.

"A cool buffalo is a comfortable buffalo, and a comfortable buffalo is healthier, more fertile and more profitable"

References

Katwal, S., Choudhary, S., Sandhu, K., & Singh, Y. (2024). Wallowing in buffaloes: An overview of its impact on behaviour, performance, health and welfare. *Indian J Anim Prod Manag*, *40*, 58-67.

Aarif, O. and Aggarwal, A. (2016). Dry period cooling ameliorates physiological variables and blood acid base balance, improving milk production in murrah buffaloes. International Journal of Biometeorology, 60(1): 465-473.

Mota-Rojas, D., Napolitano, F., Braghieri, A., Guerrero-Legarreta, I., Bertoni, A., Martínez

Burnes, J. and Orihuela, A. (2020). Thermal biology in river buffalo in the humid tropics:

Neurophysiological and behavioral responses assessed by infrared thermography. Journal of

Animal Behaviour and Biometeorology, 9(1): 0–0.

Dash, S., Chakravarty, A. K., Singh, A., Upadhyay, A., Singh, M., & Yousuf, S. (2016). Effect of heat stress on reproductive performances of dairy cattle and buffaloes: A review. *Veterinary world*, *9*(3), 235.

Unconventional Feed Resources In Dairy Animals: An Overview

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Introduction

Feed is a critical factor influencing both productivity and profitability in dairy livestock, as it has a direct impact on milk yield, milk quality, reproductive performance, and overall animal health. In India, the cost of feed constitutes about 60–70% of the total expenses associated with livestock production, highlighting the significance of cost-effective feeding practices for sustainable dairy farming. However, many regions in the country face a shortage of quality green and dry fodder. A review by ICAR indicated a deficit of roughly 35.6% in green fodder and 10.95% in dry fodder, with this issue being particularly severe in arid and semi-arid areas.

The rising expenses associated with traditional ingredients such as maize, soybean meal, and premium fodder, along with the competition between food and feed, have sparked interest in alternative feed resources. India produces vast amounts of crop residues and agro-industrial by-products that are often underutilized or inadequately managed. These materials include cereal straws, oilseed cakes, waste from fruits and vegetables, by-products from breweries and distilleries, residues from the sugar industry, and various feeds derived from trees. When assessed and utilized effectively, these resources can offer essential nutrients to dairy animals while also lowering feed costs and mitigating environmental pollution. Consequently, unconventional feed resources (UFRs) are increasingly recognized as a vital element of sustainable and circular dairy production systems.

Unconventional feed resources and their nutritional potential

Unconventional feed resources can broadly be described as feed materials that are not traditionally used or are not commonly included in commercial livestock rations. Their nutritional value varies considerably according to their botanical origin, stage of maturity, processing method and storage conditions. Therefore, their suitability should be assessed on the basis of dry matter, crude protein, fibre fractions, energy, minerals, digestibility and the presence of anti-nutritional factors rather than merely on their availability or low price.

Crop residues such as wheat straw, rice straw, maize stover, sorghum stover and sugarcane tops constitute an important feed resource for Indian dairy animals. However, cereal residues are generally rich in structural carbohydrates and lignin and poor in protein and minerals, which limits their digestibility and productive value. Appropriate supplementation or processing can improve their utilization. Agro-industrial by-products such as rice bran, oilseed cakes, molasses, brewery spent grain and distillers grains are particularly promising because they may provide relatively concentrated sources of protein, energy and fermentable nutrients.

Recent studies on alternative feed resources reveal significant

differences in their nutritional value. An investigation into pomegranate peel, sugarcane bagasse, orange peel, mango seed kernel, banana leaves, carrot pulp waste, neem oil cake, and poultry manure indicated that crude protein levels varied from 1.98% to 20.88%, while NDF values ranged from 15.21% to 78.15%. Notably, carrot pulp waste exhibited the highest in-vitro gas production among the evaluated resources. This variation highlights the necessity of treating unconventional feeds as distinct nutritional entities, necessitating individual assessments prior to their inclusion in dairy diets.

Agroindustrial and Food Processing By products

Agroindustrial byproducts possess significant potential due to their large-scale production and year-round availability near processing facilities. One notable example is brewery spent grain, which is rich in protein and fiber and has been utilized as a feed component for dairy cattle. A recent meta-analysis encompassing 12 studies with 472 dairy cows indicated that the incorporation of brewery grains led to a slight reduction in dry matter intake, while also showing a tendency to enhance milk yield and a significant improvement in feed efficiency.It was found that adding up to about 20% of the diet could potentially boost milk production and feed efficiency in the evaluated circumstances..

Nevertheless, responses to unconventional feeds are not always uniform. A recent systematic review and meta-analysis conducted in 2026, which included 103 studies and 674 comparisons, assessed various types of corn distillers grains in lactating dairy cows. On the whole, energy-corrected milk production rose by 2.13%, yet the response varied significantly based on the type of distillers grain used. Wet distillers grains with solubles led to a 5.71% increase in milk yield, while dried distillers grains with solubles were linked to a 3.05% decrease in milk yield. This clearly illustrates that the nutritional value of a by-product is influenced not only by its origin but also by the processing method, nutrient composition, and inclusion level.

Fruit and vegetable waste constitutes a promising category of unconventional feed sources. These wastes are rich in easily fermentable carbohydrates, fiber, and minerals, although their composition can vary significantly. In a study involving lactating Holstein cows, fruit and vegetable waste was added to the concentrate at levels of 6%, 8%, 12%, and 18%. The results indicated no negative impact on milk production, while alterations in the fatty acid profile of the milk were noted, including an increase in cis-9, trans-11 CLA and α-linolenic acid. The findings imply that fruit and vegetable waste can be utilized at concentrations ranging from 6% to 18% of the concentrate, provided that the overall nutritional needs of the animals are sufficiently fulfilled.

Tree based and tanning containing feed resources

Foliage from trees, shrubs, and various drought-resistant plants can be especially beneficial in arid and semi-arid regions where traditional fodder cultivation is limited. Options like Indian mesquite, halophytic forages, and other plants that are well-suited to the local environment have been proposed as viable alternatives to enhance feed supply.

Tanninrich feeds warrant particular consideration due to the dual role of tannins as both anti-nutritional and advantageous substances. In elevated concentrations, tannins can diminish palatability, lower feed intake, and impair nutrient digestibility. Conversely, at moderate levels, they may decrease the ruminal breakdown of dietary protein, potentially enhancing the passage of undegraded protein to the small intestine. Consequently, the effects of tanninincontaining feeds are dependent on dosage, necessitating a thorough assessment of tannin concentration and inclusion rates.

Processing and safe utilization

The primary drawbacks linked to numerous unconventional feed resources include inadequate digestibility, elevated moisture levels, low palatability, and the existence of anti-nutritional or toxic substances. Consequently, processing can significantly enhance their nutritional value. Physical techniques like chopping, grinding, drying, and pelleting can facilitate handling and consumption, while chemical treatments such as urea or alkali treatment can enhance the digestibility of fibrous crop residues. Additionally, biological methods such as fermentation and ensiling may also augment

nutrient availability and improve storage properties.

Safety holds equal significance. Food and market waste can harbor mycotoxins, pesticide residues, heavy metals, pathogenic microorganisms, and foreign substances. Therefore, an unconventional feed should not be incorporated into a ration solely due to its low cost or easy accessibility. It is crucial to conduct chemical characterization, evaluate contaminants, assess digestibility, and perform suitable feeding trials prior to endorsing its application at the farm level.

Effect on Dairy Production and Economics

The practical significance of an unconventional feed must ultimately be evaluated based on its impact on dry matter intake, nutrient digestibility, milk production, milk quality, feed efficiency, animal health, and financial returns. Research suggests that various unconventional resources can serve as partial substitutes for traditional ingredients without negatively affecting performance when utilized at suitable levels. Nonetheless, economic assessments should focus on the cost per kilogram of dry matter and nutrients provided, rather than merely the price per kilogram of fresh material. Factors such as transportation, processing, preservation, and storage losses are particularly critical for high-moisture materials like fruit waste and brewery by-products.

Utilizing these resources can also aid in promoting environmental sustainability. Transforming crop residues and food-processing byproducts into animal feed minimizes the volume of organic material that needs to be disposed of, while simultaneously recovering nutrients in the form of milk and other animal products. The manure generated can then be reintroduced into crop production, establishing a circular cycle of crop production → food processing → feed → milk → manure → crop production. Therefore, the use of UFR can play a significant role in fostering a circular bioeconomy within dairy farming.

Constraints and Way Forward

Although unconventional feeds hold significant potential, various factors hinder their widespread adoption. These factors encompass variability in nutrient composition, seasonal availability, poor storage stability, transportation expenses, anti-nutritional elements, contamination risks, and insufficient information on safe inclusion levels. Field studies indicate that unconventional feeds, including wastes from breweries and starch industries, are currently utilized in certain peri-urban dairy systems; however, nutrient imbalances may arise when these materials are incorporated without appropriate ration formulation.

The future strategy must transition from merely "using waste as feed" to a more refined approach of "scientific characterization and precise utilization of alternative feed resources." It is essential to create region-specific databases that include details on nutrient composition, digestibility, anti-nutritional factors, and safe inclusion levels. There should be a stronger focus on long-term feeding trials that assess milk production, milk quality, reproduction, animal health, and methane emissions. Additionally, low-cost processing and preservation technologies that are accessible to farmers and dairy cooperatives need to be developed. Furthermore, economic and life-cycle assessments are necessary to evaluate whether an unconventional resource truly offers a significant economic and environmental benefit when factoring in collection, processing, and transportation.

Conclusion

Unconventional feed resources offer a significant opportunity to tackle feed shortages, escalating feed prices, and the management of agricultural waste in dairy farming. When appropriately characterized, processed, and integrated into balanced rations, crop residues, agro-industrial by-products, fruit and vegetable wastes, brewery and distillery residues, oilseed by-products, and tree-based feeds can supply valuable nutrients. Research indicates that certain unconventional resources can sustain or even enhance milk production and feed efficiency; however, their effectiveness is greatly influenced by the type of resource, the processing method employed, and the level of inclusion.

For Indian dairy production, particularly in smallholder and peri-urban systems, the efficient use of locally available unconventional feed resources can diminish the reliance on expensive conventional ingredients and simultaneously improve resource-use efficiency. The future of dairy production is rooted in the integration of feed characterization, precision nutrition, processing technology, food safety assurance, and circular economy principles, which will facilitate the conversion of underutilized biomass into safe and valuable feed resources for sustainable dairy practices.

Karnataka Bans Analogue Paneer for One Year

Karnataka has imposed a **one-year ban on the manufacture, processing, packaging, storage, transportation, distribution and sale of analogue or non-dairy paneer marketed as "paneer"** across the state. The order, issued by the **Karnataka Food Safety and Drug Administration (FDA)** under the **Food Safety and Standards Act, 2006**, is aimed at protecting public health and preventing non-dairy products from being represented as traditional dairy paneer. The prohibition will remain in force until **August 17, 2027**.

Analogue paneer is an imitation product made using ingredients such as **vegetable oils, including palm oil, industrial starch and other additives**, instead of natural dairy ingredients. Under the **Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011**, paneer is recognised as a standardised milk-based product, and milk fat cannot be replaced with vegetable oil, vegetable fat or other non-dairy ingredients when the product is sold as paneer.

Interestingly, the Karnataka FDA stated that it had **tested several paneer samples and did not detect adulteration with vegetable oil, vegetable fat or other non-dairy ingredients**. Nevertheless, the ban has been imposed in the interest of public health and to ensure that analogue products are not stored, transported, supplied or sold as paneer.

The restriction does **not** extend to separately regulated products such as **frozen desserts, processed cheese and milk-fat spreads**, which are governed under separate FSSAI regulations. The FDA has also directed food business operators not to use, store, supply or sell analogue or non-dairy paneer while preparing or manufacturing food products and has announced enforcement drives across Karnataka to ensure compliance.

The move follows a similar **one-year ban imposed by Maharashtra earlier in August 2026**, indicating growing regulatory scrutiny of dairy analogues and the way they are represented to consumers.
Source: Dairynews7x7

Bhopal Milk Procurement Rises 38% on Better Returns

Milk procurement by the **Bhopal Milk Union has increased by around 38% over the past year**, reaching **3.81 lakh kg per day**, according to *The Times of India*. The increase has been attributed to **better financial returns for farmers, assured procurement and expansion of village-level milk collection infrastructure**.

The rise highlights how stronger farmer economics can translate directly into higher milk availability for organised dairy networks. Along with improved returns, the expansion of collection facilities at the village level has helped strengthen the procurement system and encourage greater participation from milk producers.

For the dairy sector, the development offers an important lesson: **competitive farmer returns and reliable procurement mechanisms can be powerful drivers of milk production and collection**. Strengthening last-mile collection infrastructure can further help cooperatives build a more dependable supply base while supporting rural livelihoods.

Himachal Pradesh Bans Analogue Paneer

Himachal Pradesh has prohibited the **manufacture, storage, distribution and sale of non-dairy "analogue paneer" being passed off as genuine dairy paneer** across the state. The order was issued by **Commissioner of Food Safety Ashish Singhmar** under **Section 30(2)(a) of the Food Safety and Standards Act, 2006**, has come into immediate effect and will remain operational for **one year**.

The action follows **market surveillance and laboratory testing** by the state Food Safety Department, which detected instances of adulteration, misbranding and violations of food-safety and traceability requirements. Authorities found

cases where suppliers were substituting **milk fat with vegetable oils and other non-dairy fats** in paneer-like products while selling them under the name "paneer"; some products also lacked proper labels, purchase invoices and traceability records.

Under the new directions, food business operators are prohibited from manufacturing, transporting, storing or selling products containing **non-milk fats under the name "Paneer."** The restrictions also cover **restaurants, hotels, cloud kitchens, hostels, dhabas and caterers**, which cannot use synthetic or analogue paneer in dishes advertised or listed as paneer; any non-dairy alternative must be clearly declared to consumers.

The order also requires businesses to maintain **purchase invoices, batch details and product labelling** in accordance with the **Food Safety and Standards (Labelling and Display) Regulations, 2020**, strengthening traceability and the ability to establish product sources. Food Safety Officers have been empowered to inspect premises, collect samples and take action including **seizure, recall and destruction** of non-compliant products, while violators may face prosecution under applicable food-safety laws.

Importantly, the government has clarified that **separately regulated non-dairy products meeting applicable standards are not prohibited**; however, they must be accurately labelled and cannot be represented to consumers as genuine dairy paneer. Himachal Pradesh's move makes it the **fifth state** to take such action against analogue paneer being marketed as genuine dairy paneer. *(The Times of India)*

GDT 410: Powders rise, fats weaken again

The latest Global Dairy Trade (GDT) auction, **Event 410 held on 18 August 2026**, has strengthened the recovery in dairy commodity prices, with the **GDT Price Index rising 2.3%** from the previous auction. More importantly, the recovery is becoming increasingly product-specific: **SMP, WMP and Mozzarella are strengthening, while AMF, Butter and Butter Milk Powder remain under pressure**, signalling that global buyers are still highly selective rather than returning to broad-based stocking.

The weighted average prices in Event 410 show this divergence very clearly. **Skim Milk Powder (SMP) rose 7.6% to USD 3,502/MT**, the strongest movement among the major powder commodities, while **Whole Milk Powder (WMP) increased 3.0% to USD 3,591/MT**. This is significant because WMP remains the largest product traded through GDT and its recovery suggests that buyers are increasingly willing to replenish inventories at current price levels.

The other notable positive movement came from **Mozzarella, which increased 6.1% to USD 4,234/MT**, while **Lactose rose 3.2% to USD 1,807/MT**. The strength in these two products points towards relatively resilient demand from foodservice, industrial food processing, nutrition and specialised ingredient applications, reinforcing the emerging trend that demand for value-added dairy ingredients is becoming less dependent on traditional commodity buying.

The powder recovery, however, should not yet be interpreted as the beginning of another major global dairy price rally. Buyers appear to be using the lower price levels created during the June-July correction to rebuild inventories selectively, while continuing to avoid excessive forward commitments. This is consistent with the broader GDT pattern, where the market has moved from aggressive buying earlier in the year to a period of correction and is now beginning to establish a more credible price floor. The GDT itself notes that its percentage movements are based on product price indices rather than simply comparing weighted average prices, because changes in available volumes can otherwise distort the apparent movement.

The **fat complex tells a very different story**. Anhydrous Milk Fat (AMF) declined another **6.0% to USD 5,993/MT**, while Butter fell **2.0% to USD 5,090/MT**. Butter Milk Powder (BMP), which had been one of the strongest performers earlier in the year, also corrected **3.5% to USD 4,552/MT**. The continuing weakness in AMF and Butter suggests that the earlier premium attached to milk fat is being eroded as global milk availability improves and buyers become more comfortable delaying purchases or buying only against immediate requirements.

Cheddar, in contrast, was almost unchanged, increasing **0.6% to**

USD 3,744/MT. This is a relatively neutral signal and indicates that the cheese market is not participating in the powder-led recovery with the same strength as Mozzarella. The difference between Cheddar and Mozzarella is particularly interesting because it suggests that end-use demand, especially foodservice and processed-food applications, is increasingly influencing individual dairy commodity prices rather than the entire cheese complex moving together.

Taken together, the Event 410 price movement is therefore: **AMF USD 5,993, down 6.0%; Butter USD 5,090, down 2.0%; BMP USD 4,552, down 3.5%; Cheddar USD 3,744, up 0.6%; Lactose USD 1,807, up 3.2%; Mozzarella USD 4,234, up 6.1%; SMP USD 3,502, up 7.6%; and WMP USD 3,591, up 3.0%**. The overall GDT Price Index rose **2.3%**, confirming that the powder-led improvement was strong enough to outweigh weakness in the fat segment.

From the demand side, the most important change is not simply that prices have risen, but **where the buying strength is appearing**. China remains an important global dairy buyer, but its procurement behaviour has become more disciplined, with purchases increasingly linked to actual consumption and attractive price windows rather than large speculative inventory rebuilding. At the same time, Southeast Asia, the Middle East, North Africa and parts of Africa are becoming increasingly important demand pockets for milk powders, recombined dairy products, bakery, confectionery and food ingredients. This broader geographical spread is helping to create a more resilient demand base even though no single market is currently generating the kind of buying surge that can trigger a major price spike.

The supply side is equally important. Global milk availability has improved from the tighter conditions seen earlier in the year, particularly across the major exporting regions, reducing the urgency for buyers to secure supplies at any price. Recent market assessments indicate that global dairy markets are nevertheless moving towards firmer footing as production uncertainty and changing regional demand begin to offset some of the earlier oversupply pressure.

The GDT index has had a **highly volatile 2026 so far**. The market moved through a strong rally during February and March, followed by a significant correction during April, a brief stabilisation in May and then a much sharper decline through June and early July. The **4.9% fall in Event 407 was particularly significant**, followed by a 1.5% recovery in Event 408, a marginal 0.1% improvement in Event 409 and now a stronger 2.3% increase in Event 410. The sequence suggests that the market may have moved beyond the most severe part of the correction, although it is still too early to call this a sustained bull cycle.

My assessment for the **next two to three months is cautiously positive for powders but neutral to bearish for fats**. WMP could broadly remain in the **USD 3,500–3,700/MT** zone, while SMP could move towards **USD 3,400–3,600/MT** if Asian and Middle Eastern procurement continues to strengthen. Butter and AMF are likely to remain more volatile, with supply availability and the economics of milk-fat utilisation determining whether the current weakness continues or a seasonal recovery emerges. The key upside trigger would be stronger Chinese buying combined with tighter New Zealand and European milk supplies; conversely, comfortable export availability and cautious Chinese procurement could keep the market range-bound.

For **India, Event 410 sends a mixed but important signal**. The sharp recovery in SMP to **USD 3,502/MT** and WMP to **USD 3,591/MT** improves the international value proposition for Indian dairy powders and provides some support to domestic SMP realisations, particularly as India's own milk availability moves towards the leaner part of the production cycle. At the same time, the **6.0% fall in AMF and 2.0% fall in Butter** provides some relief on the international fat-cost side and could limit imported-equivalent pressure on butter and ghee values. However, India's domestic milk procurement economics remain far more important for processors than GDT alone; tighter buffalo milk availability and the approaching lean season for cow milk can keep domestic milk costs firm even when international commodity prices are soft.

For Indian dairies, therefore, the message from GDT 410 is not simply **"global prices are rising."** The more important message is that the global

market is beginning to differentiate between commodities: **powders are finding buyers, value-added ingredients are gaining traction, while milk fats are still looking for a floor**. For Indian processors, this means that product mix, inventory positioning and milk utilisation economics will become increasingly important over the next quarter rather than relying on a single global dairy price signal.

The next few GDT auctions will therefore be critical. If **SMP and WMP continue to rise while AMF and Butter stabilise**, it would confirm that the market has entered a genuine consolidation phase with a developing price floor. If fats continue to fall despite stronger powders, however, it would indicate that global milk supply remains sufficiently comfortable to prevent a broad-based dairy commodity recovery.

Dairy Consumption in Iran Falls Amid 134% Food Inflation

Iran's dairy market is facing a severe affordability crisis as **food inflation reached 134% nationwide and 140% in rural areas in July 2026**, pushing households to cut back on dairy, meat and other essential foods.

Annual dairy consumption has reportedly fallen from around **130 kg per person in 2010 to just 40 kg today**, while dairy products were approximately **147% more expensive in July than a year earlier**.

The broader inflation picture is equally severe. Iran's Statistical Center reported **66% annual household inflation** for the year ending July, while point-to-point inflation stood at **87.9%**, meaning the average household was paying roughly 88% more for the same basket of goods than a year earlier.

The pressure is extending across animal protein: **beef, lamb and chicken prices were around 149% higher** in July year-on-year. FAO data also showed Iran's red-meat supply at approximately **623,000 tonnes in 2025**, about **20% below 2024 and nearly 39% below 2010**. (mint)

For the dairy industry, the numbers highlight a critical reality: **when inflation outpaces household income, even essential nutrition can become discretionary spending.** The Iranian experience shows how prolonged economic disruption can reshape dairy consumption, protein choices and long-term nutritional patterns.

Global Dairy Prices Keep Sliding in July — But EU Spot Data Hint the Bottom Is Near

The global dairy market may be closer to a turning point than the latest FAO headline suggests.

The FAO Dairy Price Index averaged **116.2 points in July 2026**, declining 0.7% from June and falling a steep **24.8% compared with July 2025**. It was the fourth consecutive monthly decline since April and marks a remarkable unwinding of the global dairy price rally that had taken the index to a multi-year high of 155.5 points in June 2025.

On the surface, the message is clear: global dairy prices are still under pressure. But a closer look at the individual commodities, the latest Global Dairy Trade (GDT) auctions and European spot markets tells a more nuanced story. **The market may be shifting from a broad-based decline towards stabilisation, with some products already showing early signs of recovery.**

The July numbers illustrate this divergence. Butter declined 2.4%, SMP fell 3.3% and WMP dropped 3.1%, while cheese moved in the opposite direction, increasing 1.7%. The cheese increase is particularly significant because it is the **first monthly rise in a year**.

Butter continues to be the biggest casualty of the correction. Its FAO index has fallen from 226.1 points in June 2025 to 131.5 in July 2026 — a decline of more than 40%. Improved milk-fat availability and greater export supplies, particularly from Europe, have gradually released some of the tightness that had characterised the butter market during the earlier part of the cycle.

SMP and WMP tell a slightly different story. Both commodities experienced substantial declines during the second half of 2025, but neither followed a straight downward trajectory. SMP, for example, recovered from its December 2025 low through April 2026 before turning lower again. WMP followed a broadly similar pattern. This suggests that the apparent continuous decline in the headline FAO index masks a much more volatile underlying

market, with prices responding differently to changes in supply, demand and regional trade flows.

The most interesting development, however, is coming from the **latest** GDT auctions.

The GDT auction of 21 July produced a 1.5% increase in the overall GDT Price Index. SMP rose 2.8%, WMP 1.6% and AMF 1.1%, although cheese fell sharply by 6.5% and butter declined marginally. At the subsequent **GDT Event 409 on 4 August**, the overall index increased again. Cheddar jumped 3.8%, mozzarella increased 1.0%, while SMP and WMP also firmed.

Two consecutive increases do not constitute a new bull market. But they are significant because they suggest that the sharp downward momentum seen during much of the past year may be losing steam.

There is an important distinction here. **The FAO index is essentially a rear-view mirror, whereas GDT provides one of the more immediate signals of where international dairy commodity prices are heading.** The July FAO numbers incorporate quotations from earlier weeks when market sentiment was weaker. The latest GDT auctions, by contrast, are beginning to reflect current buying interest.

European markets provide another reason to be cautious about extrapolating the FAO decline indefinitely. EU butter prices were around EUR 386/100 kg on 25 June and EUR 388/100 kg on 16 July, showing remarkable stability and remaining roughly 14% above year-ago levels. SMP prices remained broadly around EUR 270–273/100 kg, while WMP stayed close to EUR 324–325/100 kg.

This does not look like a market in free fall.

Instead, it looks increasingly like a market **searching for a floor**.

There are, however, powerful forces that could prevent any sharp recovery. China remains the biggest question mark, particularly for WMP. Chinese import demand continues to be subdued, keeping pressure on Oceania-origin WMP prices. Some of this weakness is being offset by stronger buying from Southeast Asia and the Near East, but China remains too important to ignore.

On the supply side, Europe is moving towards its seasonally tighter milk availability period. This is already beginning to show up in cheese prices. If European milk supplies tighten further during the coming months, cheese could receive additional support, while butter may also benefit from some seasonal tightening after the earlier improvement in milk-fat availability.

But there is an important counterweight: **Oceania is approaching its spring production build-up**. New Zealand's milk production typically strengthens through September-November, and this seasonal increase in supply could put a ceiling on any sharp rally in WMP and butter. The same applies to SMP, where export supplies from both Europe and Oceania remain relatively comfortable.

Cheese could therefore emerge as the most interesting commodity to watch. European supply tightening is providing support, but strong US competition and abundant Oceania export availability could make the global cheese market highly volatile rather than consistently bullish. The sharp swing between the two latest GDT auctions is itself a reminder that the market is not yet moving in a clean direction.

So where does this leave the global dairy market over the next two to three months?

The most likely scenario is **stabilisation rather than a major price recovery**.

SMP appears to have the potential for mild upside, particularly if the recent GDT gains continue, although ample export availability should prevent a runaway rally. WMP could gradually firm if Southeast Asian and Middle Eastern demand continues to improve, but China's subdued buying and New Zealand's spring flush remain significant constraints.

Butter is likely to remain range-bound. The improvement in milk-fat availability and global supplies makes a rapid return to the extraordinary price levels of 2025 unlikely. Cheese, on the other hand, could remain firm but volatile as European seasonal tightening competes with US and Oceania supply.

Taken together, these factors suggest that the **FAO Dairy Price Index could broadly stabilise around the current 113–120 range during August–October**, with a modest upward bias possible towards October if the recent GDT strength persists.

For India, this transition could

be particularly important.

Indian dairy companies operate in a predominantly domestic market, but global SMP, butter, milkfat and cheese prices increasingly influence the economics of processing, exports, imports and inventory decisions. A continued fall in global commodity prices can put pressure on Indian commodity realisations, while a stabilising international market changes the risk equation for processors holding inventories.

For Indian dairy companies, therefore, the important question is not simply whether international dairy prices are low. It is **whether they have stopped falling**.

If the GDT gains continue through August and September and European spot prices remain stable, the opportunity for aggressive commodity buying at progressively lower prices could begin to disappear. Conversely, a stronger-than-expected New Zealand milk flush or another deterioration in Chinese demand could reopen the downside.

This makes the next few months particularly important.

The global dairy market has travelled a long way from the extraordinary highs of mid-2025. The FAO Dairy Price Index has fallen almost 25% in a year, with butter leading the correction and powders experiencing significant volatility.

But the latest signals are beginning to change.

GDT has risen twice. European spot prices are broadly stable. Cheese has finally turned upward. And the steep monthly declines seen earlier in the cycle are no longer evident.

The market may therefore be entering a new phase — **not yet a bull market, but perhaps no longer a straightforward bear market either.**

The real question for the dairy industry is now changing.

It is no longer simply **"How much further can global dairy prices fall?"**

It is : "Have we already seen the bottom?"

The answer will probably become clearer over the next two or three GDT auctions and as the September–October milk production picture emerges from Europe and Oceania.

For dairy procurement teams, commodity traders and processors, **this may be the period when watching the market becomes more important than simply reacting to it.**

Milky Mist IPO: A Landmark Investment Story for India's Dairy Industry

India's dairy industry has entered a new phase of growth, with consumers increasingly shifting from traditional liquid milk toward value-added products such as paneer, cheese, curd, yoghurt, Greek yoghurt, butter, ice cream and other processed dairy foods. Against this backdrop, the successful public-market debut of **Milky Mist Dairy Food Limited** has emerged as an important development for the Indian dairy sector.

Milky Mist, a Tamil Nadu-based dairy and packaged-food company, made its stock-market debut on **18 August 2026**, following a ₹1,553-crore initial public offering. The IPO attracted exceptionally strong investor interest and became one of the most closely watched dairy-sector offerings in India. The issue was subscribed **56.12 times**, with particularly strong demand from qualified institutional buyers.

The successful IPO demonstrates that investors are increasingly looking beyond conventional milk businesses and are paying attention to companies focused on value-added dairy products, brand development, distribution expansion and food-processing capabilities.

A Landmark IPO for the Dairy Sector

Milky Mist's IPO was open for subscription from **11 to 13 August 2026**, with a price band of ₹133–₹140 per share. The final issue price was ₹140, while the minimum retail lot consisted of 107 shares, requiring an investment of ₹14,980 at the upper price band.

The total issue size was approximately ₹1,553 crore. It included a fresh issue of around ₹1,428 crore and an offer for sale of approximately ₹125 crore. The fresh capital is intended to support the company's expansion, reduce debt and strengthen its manufacturing and distribution infrastructure.

The response from investors was particularly notable. The IPO was subscribed more than 56 times overall, while the qualified institutional buyer category was subscribed more than 155 times. Retail and non-institutional investors also participated strongly.

This level of demand is significant for the dairy sector because it demonstrates investor appetite for branded, value-added dairy businesses.

Strong Market Debut

Milky Mist shares were listed on the NSE and BSE on 18 August. The stock opened at ₹165 on the NSE, representing a **17.86% premium** over the ₹140 issue price. On the BSE, the shares also opened at ₹165.

The stock subsequently gained further momentum during the trading session, closing at ₹181.50 according to market reports. Reuters reported that the company reached a valuation of approximately **$1.46 billion** during its debut, reflecting strong investor interest in the company's value-added dairy portfolio and expansion plans.

The strong debut is particularly noteworthy because it came at a time when investors are increasingly evaluating Indian consumer and food companies based on their ability to build brands, expand distribution and capture premium categories.

For the dairy industry, the listing represents more than just a successful IPO. It provides an important indication of how capital markets view the future of organised dairy and value-added dairy products.

From Regional Dairy Brand to National Player

Milky Mist has its roots in Tamil Nadu and has built its business around value-added dairy and packaged food products. Its portfolio includes paneer, cheese, curd, yoghurt, Greek yoghurt, butter, ghee, ice cream, UHT products and other packaged foods.

The company has expanded beyond its traditional southern market and has developed a wider national distribution network. Reuters reported that Milky Mist products were available through more than **375,000 retail outlets nationwide**, highlighting the scale of its distribution expansion.

This transition from a regional dairy business to a nationally

recognised branded food company illustrates a broader transformation taking place in India's dairy sector.

Historically, much of India's dairy economy has been centred on milk procurement and liquid milk distribution. Today, companies are increasingly focusing on processing milk into products with higher value, longer shelf life and stronger brand differentiation.

Focus on Value-Added Dairy Products

One of the most important aspects of Milky Mist's business model is its emphasis on value-added dairy products.

Products such as paneer, cheese, yoghurt and Greek yoghurt can offer greater value per unit of milk compared with conventional liquid milk. They also allow companies to develop branded consumer products and target different consumption occasions.

Consumer preferences are changing rapidly, particularly among younger urban consumers. Convenience, nutrition, protein content, taste and product variety are becoming increasingly important purchasing factors.

Milky Mist has responded to these trends through products such as Greek yoghurt and protein-oriented dairy offerings. Reuters reported that the company is focusing on premium health-oriented products, including Greek yoghurt and protein-enriched cottage cheese.

This strategy places the company within a fast-growing segment of India's food industry where dairy products overlap with health, nutrition, convenience and premiumisation.

Strong Financial Growth

The growth of categories such as cheese, paneer, yoghurt and ice cream is therefore becoming strategically important Milky Mist's recent financial performance has also contributed to investor interest.

According to Reuters, the company recorded approximately **34% growth in revenue to ₹3,138 crore** for the financial year ended March 31, 2026. Its profit increased by approximately **176% to ₹127 crore** during the same period.

The company's growth demonstrates the potential of the value-added dairy segment when combined with strong branding and distribution.

While dairy remains a relatively low-margin business in several traditional categories, value-added products can provide opportunities for improved realisation and product differentiation.

for dairy companies looking to improve profitability and reduce dependence on liquid milk.

Where the IPO Money Will Go

A major objective of the IPO is to strengthen the company's financial and manufacturing infrastructure.

According to the company's IPO information, proceeds from the fresh issue will be used partly for repayment or prepayment of outstanding borrowings. The company also plans to finance capital expenditure associated with expansion and modernisation of its **Perundurai manufacturing facility**.

The company has also planned investment in visi coolers, ice-cream freezers and chocolate coolers.

These investments are important because dairy products require reliable cold-chain infrastructure. Expanding the number of refrigerated retail points can help a company increase product availability and improve market penetration.

For a dairy company expanding nationally, manufacturing capacity alone is not sufficient. It needs an integrated ecosystem covering milk procurement, processing, packaging, cold storage, transportation, distribution and retail refrigeration.

Temasek and Institutional Confidence

Milky Mist's growth story has also attracted major institutional investors.

In the period leading up to the IPO, an investment arm of Singapore's Temasek made a significant investment in the company. Reuters reported that Temasek acquired a 5.16% stake through a combination of investment in shares and convertible preference shares and a purchase of shares from the founders.

Other major institutional investors, including the International Finance Corporation and HDFC Mutual Fund, also participated as anchor investors before the listing. Reuters reported that anchor investors contributed approximately ₹465 crore before the IPO.

The participation of large institutional investors adds

another dimension to the story. It suggests that global and domestic investors see India's organised dairy and food-processing sector as having long-term growth potential.

The Larger Indian Dairy Opportunity

Milky Mist's IPO needs to be viewed in the context of the larger Indian dairy market.

India is the world's largest milk producer, and the country's dairy sector supports millions of farmers. However, the industry is gradually moving from a largely milk-volume-driven model toward one increasingly focused on processing, branding and value addition.

Urbanisation is one of the major forces behind this transformation.

As more consumers live in cities and spend less time preparing traditional foods, demand for convenient dairy products is rising. Ready-to-eat meals, packaged paneer, cheese slices, yoghurt cups, flavoured dairy products and frozen products are becoming increasingly common.

At the same time, health-conscious consumers are creating demand for high-protein and functional dairy products.

This creates opportunities for organised dairy companies with strong brands and distribution networks.

Competition in the Organised Dairy Market

Milky Mist is entering the listed-company landscape alongside established Indian dairy businesses such as Hatsun Agro Product, Heritage Foods, Dodla Dairy and Parag Milk Foods.

Following its listing, investors will increasingly compare companies on revenue growth, profitability, product mix, geographical reach, distribution strength and valuation.

The competitive environment is likely to encourage further investment in product innovation and processing capacity.

Large dairy companies are increasingly competing not only on milk prices but also on consumer brands, packaging, product quality and convenience.

This shift could benefit farmers as well if increasing demand for processed dairy products results in stronger organised milk procurement networks.

Opportunities for Dairy Farmers

The growth of value-added dairy companies can create opportunities throughout the dairy supply chain.

When companies expand processing capacity, they require consistent supplies of quality milk. This can encourage investment in organised procurement, milk testing, chilling infrastructure and farmer support programmes.

Better quality standards can also encourage farmers to improve animal nutrition, herd management and milk hygiene.

For dairy farmers, the expansion of organised processing can potentially provide more reliable market access. However, the benefits will depend on procurement policies, milk prices, input costs and the strength of farmer-company relationships.

The long-term success of India's dairy transformation will therefore depend on connecting consumers, processors and farmers through efficient supply chains.

Technology and Modern Processing

Expansion will also require technological investment.

Modern dairy plants increasingly use automation, digital quality monitoring, advanced packaging and efficient cold-chain systems. Such technologies can improve product consistency, reduce wastage and increase production efficiency.

Milky Mist's planned modernisation of its Perundurai facility is therefore strategically important.

For India's dairy sector, investments in processing technology will become increasingly necessary as consumers demand longer shelf life, better packaging, consistent quality and greater convenience.

A Signal for Future Dairy Investments

Perhaps the most important message from the Milky Mist IPO is the signal it sends to the broader dairy industry.

The success of the issue indicates that investors are willing to allocate significant capital to companies capable of creating value from India's enormous dairy base.

It could encourage other privately held dairy companies to consider public-market fundraising, strategic investments or institutional partnerships.

It may also encourage existing

dairy companies to accelerate investments in value-added categories.

The success of Milky Mist could therefore have an effect beyond one company. It may contribute to a wider shift in how India's dairy sector approaches capital, expansion and brand building.

Looking Ahead

Milky Mist has indicated an ambitious growth outlook. Reuters reported that the company expects approximately **30% annual revenue growth**, supported by expansion beyond its southern Indian base and continued investment in value-added dairy products.

Achieving such growth will depend on several factors: successful expansion into new markets, efficient use of IPO capital, consumer acceptance, competition, milk availability, commodity prices and the company's ability to maintain product quality.

The company will also need to balance rapid expansion with profitability. As the business grows, maintaining an efficient cold chain and controlling distribution costs will become increasingly important.

Conclusion

The Milky Mist IPO marks an important milestone in the evolution of India's dairy industry. The ₹1,553-crore issue attracted more than **56 times subscription**, followed by a strong market debut at ₹165 against an issue price of ₹140.

More importantly, the company's success reflects the growing importance of value-added dairy products in India's food economy.

From paneer and cheese to Greek yoghurt, ice cream and protein-focused products, the future of dairy is increasingly being shaped by processing, innovation, branding and convenience.

For investors, Milky Mist represents an opportunity to participate in India's organised dairy growth story. For the dairy industry, its successful IPO demonstrates that companies with strong brands, scalable processing infrastructure and expanding distribution networks can attract substantial institutional and public-market interest.

For farmers and the wider supply chain, the expansion of organised dairy processing could create new opportunities for milk procurement and value creation.

As India moves toward a more modern, organised and value-added dairy economy, the Milky Mist story could become an important case study of how a regional dairy business can evolve into a national consumer brand—and ultimately into a publicly listed company.

Global Cheese Market: Growth, Trends and Future Outlook

The global cheese industry is experiencing sustained growth, driven by changing consumer preferences, rising disposable incomes, urbanisation and increasing demand for convenient and value-added dairy products. According to a market assessment updated in August 2026, the global cheese market is projected to grow from approximately **US$208.66 billion in 2026 to US$328.71 billion by 2034**, representing a CAGR of around **5.85%**.

Growing Global Demand

Cheese consumption is expanding beyond its traditional strongholds of Europe and North America. Growing exposure to Western cuisine, changing lifestyles and increasing incomes are supporting demand in Asia-Pacific, the Middle East and other emerging markets.

Europe remains the dominant regional market, accounting for approximately **48.43% of the global cheese market in 2025**. Its established dairy traditions and high consumption levels provide a strong foundation for the industry. North America also remains a major market, where cheese is widely used in pizza, burgers, sandwiches, pasta and ready meals.

Asia-Pacific offers significant future potential. Countries such as India, China, Japan, Indonesia and other Southeast Asian markets are witnessing rapid urbanisation and changing food habits. In India, cheese consumption is growing through pizza, burgers, sandwiches, bakery products and processed foods. Dairy companies are responding with locally produced products, smaller packs and more affordable formats.

Popular Cheese Varieties

Mozzarella is one of the most important cheese categories, accounting for approximately **37.19% of the cheese product segment in 2026**. Its popularity is closely linked to pizza, pasta, sandwiches, bakery products and other foodservice applications.

Cheddar and Parmesan also continue to enjoy strong international demand because of their versatility, distinctive flavours and relatively long shelf life. At the same time, specialty and artisanal cheeses are gaining popularity among consumers looking for premium ingredients, traditional production methods and unique regional flavours.

Premium, Natural and Convenient Products

Consumers are increasingly interested in natural and less-processed cheese products with simple and recognisable ingredients. This growing clean-label trend is encouraging manufacturers to improve nutritional profiles and develop premium products.

Premiumisation is also creating opportunities for both large dairy companies and smaller regional producers. Organic certification, specialty varieties, unique flavours, attractive packaging and geographical identity are becoming important ways to differentiate products.

Convenience remains another major growth driver. Consumers increasingly prefer ready-to-eat, ready-to-cook and easy-to-prepare foods. This supports the use of cheese in frozen meals, snacks, prepared foods and other convenient food products.

Foodservice and Retail Growth

The foodservice industry is a major engine of cheese consumption. Pizza chains, restaurants, cafés, bakeries and quick-service restaurants use large volumes of mozzarella, cheddar, processed cheese and other cheese-based ingredients.

The growth of food delivery services has further increased demand for cheese-intensive foods such as pizza, burgers, sandwiches and pasta.

Retail also plays an important role in global cheese sales. Supermarkets and hypermarkets represented the leading distribution channel, accounting for approximately **42.94% of the market in 2026**. Consumers can access sliced, shredded, block, spreadable, specialty and imported cheeses through modern retail channels.

E-commerce is creating additional opportunities, particularly for premium, organic and specialty cheese products. Improved cold-chain logistics and temperature-controlled delivery are helping online retailers expand their dairy offerings.

Plant-Based Alternatives and Sustainability

Plant-based cheese alternatives made from soy, almonds, cashews and other ingredients are becoming increasingly available. Growth in veganism, environmental awareness and interest in alternative diets has encouraged investment in plant-based cheese technologies.

However, conventional dairy cheese continues to benefit from strong consumer acceptance, established production infrastructure and a wide variety of flavours and applications. Plant-based products are therefore creating an additional market segment rather than completely replacing dairy cheese.

Sustainability is also becoming a strategic priority. Cheese manufacturers are focusing on energy efficiency, water usage, waste reduction, recyclable packaging, renewable energy and improved supply-chain management. Since cheese production requires significant quantities of milk, improvements in dairy-farm productivity and milk utilisation can also help reduce the environmental impact.

Challenges and Innovation

Despite its positive outlook, the industry faces several challenges. Volatility in milk, feed, energy, transportation and packaging costs can affect manufacturers' margins. Health concerns regarding high-fat and high-sodium foods are also influencing consumer choices, leading companies to develop reduced-fat, reduced-sodium and nutritionally enhanced products.

Supply-chain disruptions and climate-related risks may also affect milk production, transportation and overall costs.

Technology is helping producers improve efficiency and product quality. Automation, digital monitoring, sensors, data analytics and advanced quality-control systems are increasingly used to monitor temperature, moisture, fermentation and maturation. Packaging innovation is also helping improve shelf life, reduce food waste and increase convenience.

Competitive Landscape and Future Outlook

The global cheese market includes major international dairy companies as well as regional processors and specialist producers. Important companies identified in recent market research include **Kraft Heinz, Fonterra, Arla Foods, FrieslandCampina, Saputo, Lactalis, Savencia, Agropur, Dairy Farmers of America and Bel Group**.

Competition is increasingly based on product innovation, brand strength, distribution, pricing, sustainability and reliable access to milk supplies. Large companies benefit from economies of scale, while smaller producers can compete through specialty products, regional identity and artisanal production.

Overall, the future of the global cheese industry remains positive. Rising foodservice consumption, urbanisation, premiumisation, expanding retail and increasing demand in emerging markets will continue to support growth. At the same time, sustainability, health-conscious consumption and plant-based alternatives will influence future product development.

Conclusion

The global cheese industry is moving towards a more diversified and innovation-driven future. With the market projected to reach approximately **US$328.71 billion by 2034**, cheese continues to offer significant opportunities for dairy farmers, processors, food manufacturers and retailers.

Europe and North America will remain important markets, while Asia-Pacific and other emerging regions are expected to provide major opportunities for future expansion. Companies that successfully combine **quality, affordability, convenience, nutrition, innovation and sustainability** will be best positioned to benefit from the continued growth of the global cheese market.

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 : **Summer Stress Management**	Publishing Month: **April** Article Deadline : **18th, March 2026** Advertising Deadline : **20th, March 2026** Focus : **Cold Chain**
Publishing Month: **May** Article Deadline : **18th, April 2026** Advertising Deadline : **20th, April 2026** Focus : **Nutrition**	Publishing Month: **June** Article Deadline : **18th, May 2026** Advertising Deadline : **20th, May 2026** Focus : **Milk - Production & Preservation**	Publishing Month: **July** Article Deadline : **18th, June 2026** Advertising Deadline : **20th, June 2026** Focus : **Monsoon Management**	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 : **Processing & Packaging**	Publishing Month: **October** Article Deadline : **18th, September 2026** Advertising Deadline : **20th, September 2026** Focus : **Disease Prevention**	Publishing Month: **November** Article Deadline : **18th, October 2026** Advertising Deadline : **20th, October 2026** Focus : **Biosecurity**	Publishing Month: **December** Article Deadline : **18th, November 2026** Advertising Deadline : **20th, November 2026** Focus : **Winter Stress**

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