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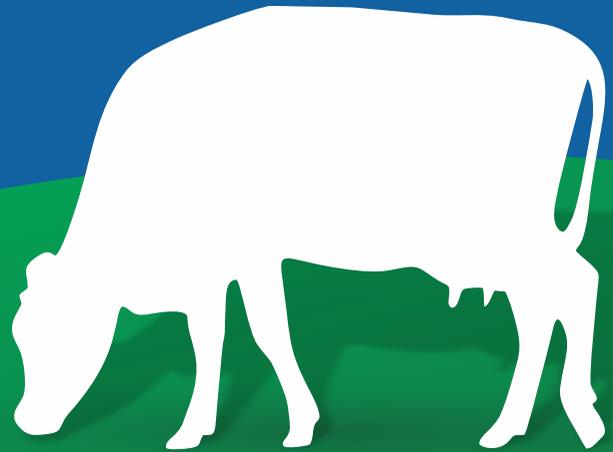
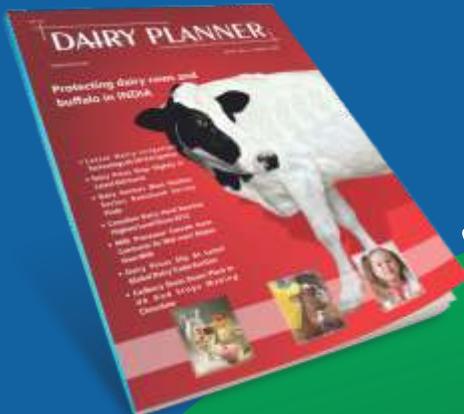
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# From the Pen of Chief Editor



## Hygienic Milk Production

As the food production chain becomes more complex, unsanitary working conditions and contamination risks continue to plague the industry. Milk, as a complete food, is nature's most wonderful gift to mankind. Milk's high nutritional content makes it an ideal growth medium for a wide range of microorganisms, including pathogenic ones. It has a poor shelf life and is most susceptible to adulteration and growth of microbes if proper hygiene practices are not maintained.

The most important factor in producing high-quality dairy products is avoiding contamination of raw milk and milk products. Failure to maintain adequate sanitation practices has resulted in milk contamination with undesirable or pathogenic microorganisms, as well as chemical or physical hazards. The milking environment, milking equipment, milk transportation, and water are the most frequent predisposing factors for milk contamination by microorganisms.

Milk can become contaminated at any point during the production process. It is the responsibility of the food business operator (milk producer) to identify these points and implement control measures to protect milk from contamination. One of the most essential hygienic practices needed to ensure clean milk production is cleaning the udder of cows before milking.

The importance of an integrated strategy for ensuring safety throughout the entire supply chain grows as the demand for safe milk and dairy products rises. It is necessary to understand the various causes and sources of milk contamination at the farm level in order to ensure the production of quality milk.

Since 1998, India has been the world's leading producer and consumer of dairy products, with milk and milk products becoming increasingly available. Dairy activities are an important part of the rural Indian economy, providing employment and income. In addition, India has the world's largest bovine population. All dairy products in India are consumed domestically, with the majority sold as fluid milk. As a result, the Indian dairy industry has enormous potential for value addition and overall development.

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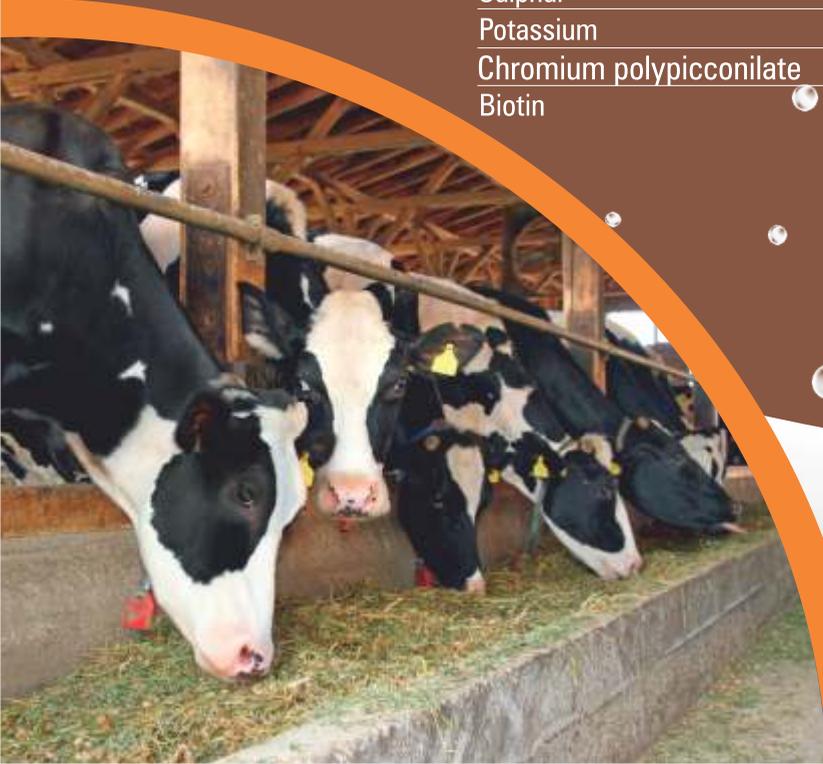
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# A2 Milk: The Need For The Future



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## Introduction

Milk is a popular dietary staple in many western countries. Sources of milk and milk products include cows, sheep, camels, goats, and others. Alternative sources that do not involve animals include soy, coconut, almond, flax, rice, and hemp.

Recently, a new type of cow's milk has appeared in the dairy aisles. This product, called A2 milk, has garnered attention from both consumers and scientists. Supporters of A2 milk claim that it is easier to digest and absorb than other types of milk. A2 milk was designed to help those who may have a sensitivity to the A1 protein in cow's milk.

This article provides an overview of A2 milk, its possible health benefits and current research (in India) surrounding the product.

## What is A2 milk?

Beta-casein, which makes up 30% of milk protein, exists in many forms. The two most common forms are A1 and A2. A1 milk is produced by cows present in the United States and northern European countries. A2 milk only contains the A2 variant of beta-casein protein which is similar to that found in breast milk, instead of the A1 form. Cows with the A2 gene only produce A2 milk and are found in herds of Asia, Africa, and parts of Southern Europe. Jersey, Guernsey, Normande, and Brown Swiss breeds have a higher percentage of A2 genes compared to Holstein. As of 2017, about 700 liters of milk a day were produced in Brazil through Gir cows, a breed originally procured from India, but which is now also being exported to India.

Some farmers have transitioned to being an A2 herd, but this can take many generations depending on the status of your herd, A1 and A2 beta-casein are genetic variants of the beta-casein milk

protein that differ by one amino acid. Agentic test, developed by the A2 Milk Company, determines whether a cow produces A2 or A1 type protein in its milk. An A2A2 animal, bred to another A2A2 animal will always have an A2 offspring. Cows that are A1A2 or A1A1 will not produce A2 milk.

## Health effects

The European Food Safety Authority (EFSA) reviewed the scientific literature and published their results in 2009.

As part of their evaluation, the EFSA looked at the laboratory studies that had been done on bovine  $\beta$ -casomorphin 7 (BCM-7) that found that BCM-7 can act as a weak opioid receptor agonist. The EFSA found no relationship between any disease and drinking milk with the A1 protein. In most of the animal studies, BCM-7 was not administered orally, as humans would be exposed to it, but rather was given to animals by injection into the peritoneal cavity or directly into the spinal cord or brain. Symptoms of stomach discomfort, such as gas, bloating, and diarrhea that occur after consuming dairy products, are typically attributed to lactose intolerance.

A pair of 2020 papers from Purdue University and the University of Auckland suggested that people with lactose intolerance experience significantly fewer symptoms from consuming A2 milk versus regular milk. A formula with only the A2 milk protein may be a helpful alternative for babies with milk-related tummy discomfort.

## Literary Work

Publication of a book, "Devil in the Milk" by Keith Woodford, about A1 beta-casein and its perceived dangers to health, boosted sales of milk with predominantly A2 protein.

This groundbreaking work is the first

Cow with LSD showing erupted, nodular, circumscribed lesions on the body



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internationally published book to examine the link between a protein in the milk we drink and a range of serious illnesses, including heart disease, Type 1 diabetes, autism, and schizophrenia.

These health problems are linked to a tiny protein fragment that is formed when we digest A1 beta-casein. All milk was once A2, until a genetic mutation occurred some thousands of years ago in some European cattle.

### Geographical Significance

The percentage of the A1 and A2 beta-casein protein varies between herds of cattle, and also between countries and provinces. While African and Asian cattle continue to produce only A2 beta-casein, the A1 version of the protein is common among cattle in the western world. The A1 beta-casein type is the most common type found in cow's milk in Europe (excluding France), the US, Australia and New Zealand.

On average, more than 70 percent of Guernsey cows produce milk with predominantly A2 protein, while among Holsteins and Ayrshires between 46 and 70 percent produce milk containing both the A1 and A2 proteins. It is sold mostly in Australia, New Zealand, China, and the United States. It was sold in the United Kingdom between 2012 and 2019.

### Harnessing Potential of A2 Milk in India

The screening for the status of A2/A1 allele of beta casein in different species or breeds in India revealed the frequency of favorable A2 allele across Indian native cattle breeds is 0.95 whereas for crossbred and taurine breeds it is nearly 0.70. Even the breeding bulls being used for artificial insemination, the frequency of A2 allele is 0.70. This indicates our native cattle breeds as well as crossbred population could be the best resource to meet the global demands for A2 milk.

Studies by the National Bureau of Animal Genetic Resources (NBAGR), Karnal, Haryana covering 22 desi breeds have established that the predominant genotype in India's native cattle is A2A2, confirming that our indigenous cows and buffaloes produce A2 milk.

Red Sindhi, Gir, Rathi, Shahiwal and Tharparkar do not have A1 allele or A1A1/A1A2 genotype. There is huge potential for enterprising dairy units to take advantage of indigenous cow / buffalo milk and cater to the growing demand of A2 milk and A2 milk based value-added products in the market.

Given its predominance in Indian cattle there is no need for consumers to switch to A2 milk. By all counts and proven results it is no doubt that A2 milk is one of the most rising concepts of veterinary science which has a high demand in the international market and can be proven beneficial for the farmers and local people of India.

## Union Agriculture Minister attends the Convocation Ceremony of Indian Veterinary Research Institute



The 10th Convocation of the Indian Veterinary Research Institute (IVRI), Izzatnagar (Bareilly) was held on 23 Aug 2022 with the Union Minister for Agriculture and Farmers Welfare, Shri Narendra Singh Tomar as the chief guest. Speaking on the occasion, Shri Tomar said that the Government of India, under the leadership of Prime Minister Shri Narendra Modi, is working with full dedication to transform and move the country forward.

Shri Tomar said that the agriculture sector can only be complete with other allied sectors including animal

husbandry, beekeeping and fisheries. Along with agriculture, for the growth of the country, one has to work responsibly in allied sectors including animal husbandry. To improve the breed of animals, keep them healthy, this is the need of the hour. People are also

affected when the disease occurs in milch animals. Keeping in view the importance of animal husbandry sector, Prime Minister Shri Narendra Modi has made a provision of a special package of Rs.15000 crore in the form of Animal Husbandry Infrastructure Fund under the AatmaNirbhar Bharat (Self-Reliant India) campaign. Shri Tomar informed that recently indigenous vaccine (Lumpi-Pro Vac-Ind / Lumpi-ProVaInd) has been launched to protect animals from lumpy skin disease.

On the occasion, Shri Tomar presented

the degrees and awards in the presence of Union Minister of State for Agriculture, Shri Kailash Choudhary, former Union Minister and Bareilly MP Shri Santosh Kumar Gangwar, ICAR Deputy Director General (Animal Science) Dr. Bhupendra Nath Tripathi, IVRI Director Dr. Triveni Dutt and other dignitaries.

During the ceremony, three technologies developed by the IVRI were released. Dr. Mahendra Pal Yadav, Dr. Kamal Mall Bujarbarua and Dr. Anil Kumar Srivastava have been awarded the degree of Vigyan-Varidhi (Honorary) of Indian Veterinary Research Institute (Deemed to be University).



Shri Tomar also inaugurated the Swami Vivekananda Auditorium at the IVRI complex.

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# Clean Milk Production, Milk Hygiene and Udder Health : A Need for Healthy Society



## Vishal Yadav

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The golden rule of clean milk production is, **“prevention is better than cure”**

A contaminated milk contains dust, dirt, foreign material, off flavor and high microbial count. Sources of contamination include macro and micro environment around milk like cows body, udder tissue, surrounding soil and air, utensils, fomites, milker and its belongings, dung, rocking tail etc. Contaminated milk may lead to severe health problems.

### Sources of Contamination

#### a) Udder

Unhygienic conditions of milking farms, and bedding material and belongings of animal may lead to microbial growth. As teat canal remains open for a period of time after milking, these microbes get an opportunity to enter, leading to udder infection such as mastitis which makes the milk unpalatable. Always discard the few strips of foremilk as it contain high bacterial count and dead epithelial cells. Always perform the complete milking as incomplete milking may lead to udder infection.

#### b) Animal's Body

Microbes present on the animal's body may contaminate milk at the time of milking. Maintaining clean skin, flank washing and cleaning udder with clean damp cloth before milking decreases the chances of contamination.

#### c) Milking Farms

Milking farms having good cross ventilation and clean flooring avoids contamination of milk.

#### d) External Parasites

External parasites like mosquitoes, flies, lice etc may contaminate the milk, so, care

must be taken to avoid these parasites by spraying antiparasitics. Eliminate breeding areas of these parasites like stagnant water, hot and humid atmosphere etc.

#### e) Milker

Milker comes in direct contact of milk and hence responsible for primarily contaminating the milk. Dirty hands, belongings and clothing of the milker may act as the source of contamination. Several microbial diseases may transmit from the milker to the milk. Persons having signs and symptoms of diseases like dysentery, tuberculosis, diphtheria, typhoid must be avoided to perform milking. Bad habits like drinking, smoking must be avoided.

#### f) Utensils

The containers or equipments in which the milk is handled, processed, stored or transported are called utensils. Clean, dirt and dust free, sanitized or disinfected, smooth copper free and dry utensils should be preferred in milking.

#### g) Methods of Milking

Milking with wet hands or using a bent thumb against teats (called knuckling) leads to contamination of milk. In rural areas, milkers moisten their fingers with milk, water or saliva, to perform milking. This must be avoided. Wet hand milking leads to harsh and dry chokes, cracks and sores on teats predisposing it to infection and finally leading to milk contamination. Knuckling causes damage to the teat tissue which leads to udder infection. So always practice dry hand milking with full hand milking method (grasping teat in palm by encircling between thumb and four



palm fingers).

### Steps in Clean Milk Production

- Always wash the animal before milking, as it minimizes microbial entry.
- Promote dry udder practices because moist udder lead to milk contamination by dirty drops falling into the milk. Hence, udder should be washed, clean and sanitized, and finally should be wiped out using dry cloth.
- Proper washing, cleaning and sanitization of milker's hand must be done followed by wiping with clean dry cloth to avoid wet hand milking.
- Proper and complete hygiene of milker is necessary like short hairs, trimmed nails and proper bath.
- Milker should be free from all diseases and must not have any disease which is a potential source of milk contamination like dysentery, tuberculosis, diphtheria, typhoid.
- Never feed dusty feeds to animal during milking and reduce animal movements during milking by providing concentrate feed.
- Proper restraining of animal is necessary during milking as it may lead to milk contamination, for example by using milker's knot on hind legs above hock joint and tying of tail.
- Milking farms should be properly washed, cleaned and well ventilated and also free from flies and other parasites.
- Use clean, sanitized, smooth and copper free utensils for milking.

- To avoid undesirable smell and taste in milk, feed flavour producing feeds after milking.
- Discard first few drops of milk and use small mouthed container covered with muslin cloth to collect milk.
- After milking cover the container properly to avoid environmental contamination.
- To increase shelf life and keeping quality of milk, properly store milk in cool and dry place and may refrigerate or freeze if long time storage is provided.

### Milk Hygiene

In case udder is healthy and normal, the milk is sterile. Most of the contamination occurs during and after milking. Use mastitis control routines at each milking to reduce the proportion of infected cows and clinical mastitis cases. With better management and care, milk contamination can be avoided. Perform dry udder and clean milking practices. As milk is a good media for microbes, proper storage and handling is very necessary.



### Udder Health

Udder should be maintained clean as it avoids source contamination before milking. The greatest economic loss to dairy industry is by mastitis.

Management of cows should be like that their udders and teats are clean and milking is to be done in such a way that minimizes microbial contamination. Keep udder covered with a cloth so that dust and dirt especially when animal lies down is restricted and always perform teat dipping after milking and not allow the animal free to lie down for few minutes after milking because pores of teat canal remains open after milking for sometime which leads to direct microbial



entry into the udder.

### Points to be Noted

1. Never drink or promote consumption of unpasteurized or unboiled milk as it may lead to life threatening situations.
2. Perform milk and udder examination time to time by consulting a veterinary doctor.

### Conclusion

As milk is an important diet source in Indian food habits and it is also a perishable product, and if consumed or stored or handled unhygienically it may lead to development of diseases which may be life threatening or zoonotic (diseases which transmit from animals to humans like brucellosis) in nature. So, focus should be given on clean milk production, milk hygiene and udder health so that economic loss and loss of healthy life can be avoided.

# Lumpy Skin Disease : A Threat to Dairy Animals



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*Figure showing generalised nodules on skin.*

## Introduction

Lumpy skin disease is a viral disease caused by Lumpy skin disease virus of genus capripoxviridae and family poxviridae. LSD is infectious and vector borne, non-zoonotic disease and have host range limited to cattle and buffalo (river). Arthropods vectors like biting flies, mosquitoes, and ticks are responsible for spread of Lumpy Skin Disease. Previously this disease was endemic to African countries but now days LSD affected the whole globe. Worldwide first case of LSD was reported in Zambia, a country of African continent in 1929. At that time LSD was limited to southern and western Africa. In year 2019, OIE confirmed outbreak of LSD in China and Bangladesh. In the same year, Mayurbhanj district of Odisha state reported India's first case of LSD. The cause of this disease transmission in India is unknown, it may have been cause through the movement of animals through international boundaries or either through movement of vector from neighbouring nations. After outbreak of LSD in India it spread among 15 states and affected thousands of bovines. India ranks first in milk production in world and embrace large population of cattle 193 million and buffalo 109.85 million (19th livestock census) which provide living to millions of small and marginal farmers and make a considerable contribution to

national agricultural economy. This disease become matter of concern because it causes vast economic loss, severe pain and death to animal, so it become essential to know efficient disease management and appropriate planning.

## Etiology

Lumpy skin disease is caused by Lumpy skin disease virus which belongs to family poxviridae and genus capripoxviridae. LSDV contains a double stranded DNA genome and is an enveloped virus. Another members of genus capripoxviridae are sheep pox virus and goat pox virus. The SPV, GPV and LSDV have similar genetic identity (approximately 95%) and have strong antigenic homology. The virus can survive for long time under ambient climatic conditions. Virus remains active in necrotic skin nodules for 33 days, dehydrated skin scabs for 35 days and 18 days in surface dried leather.

## Transmission of disease

The prime route of transmission for this disease is Mechanical transmission. In countries like Africa, Egypt and Ethiopia where LSD is endemic, Incidence of this disease increase with starting of seasonal rains. The decrease in incidence during dry conditions with few or no insects has proved insect vector's role in spread of this disease. The arthropod vectors involved in



transmission of this disease are Mosquitoes (Aedes, Culex), Ticks (Amblyomma spp., Rhipicephalus spp.), Biting flies (Stomoxys and Biomyia). These arthropods either bite or feed on blood. Apart from mechanical transmission this disease also spread through direct contact with infected animal, from infected mother to foetus and from mother to calf via milk secretion. Use of single needle in treatment of infected and healthy animal elevates risk of transmission.

#### Host Range

Since lumpy skin disease virus, goat poxvirus and sheeppox virus share 95% similarity in structure, the susceptible hosts are cattle and buffalo only. Sheep and goat are found unaffected even when remain in close contact with infected animals.

#### Clinical signs

As the virus enter in animal body, biphasic fever starts. After 3-4 days of fever formation of nodule initiates with Ocular and nasal discharge. Affected animal suffer from agalactia and emaciation. Pox lesions are found on mucus of alimentary canal and respiratory tract. Nodules are generalised on whole body are painful and persist upto 15 days. Nodules developed into papules, vesicles, pustules, and exudate before gradually forming scabs. Healing of these lesions is extremely slow and enlargement of regional lymph nodes is seen. Lumpy skin disease leads to pneumonia due to inhalation of exudate by animal. Mastitis, Pneumonia and maggot wound are common sequelae after this disease. Recovery of animal is slow because of secondary bacterial infections. Both male and female infected from lumpy skin disease remains infertile for some time and in pregnant female abortion may occur.

#### Economic Loss

Lumpy skin disease cause significant economic loss due severe emaciation of animals, poor hide quality, reduction in milk yield, abortion and degradation in reproductive efficiency of male and females. This disease affects quality and trade of animals and animal related by products. The financial losses are high in leather, meat and milk industry and other industries dealing with animal products. Industries are not only who suffers, Small and marginal farmers which rear livestock as source of livelihood suffer from

economic loss and supportive treatment of this disease adds extra burden to such farmers.

#### Management, Prevention and control

Proper awareness and efficient management can help to prevent the spread of disease, infected animal can take one month to recover but proper management helps to prevent infection in unaffected animals.

Limit the movement of animals- Animals which graze on pasture lands are at high risk as they can get infection from other animals. Quarantine measures should be applied for new animal introduced in herd. If animal show symptoms of lumpy skin disease, isolate the animal.

Limit the vectors- Vector control is the important aspect for this disease because vector play significant role in transmission. Proper hygiene in shed helps to control flies, mosquito and ticks.

Disinfection and hygiene- Use disinfectants like phenyl, potassium permanganate solution to clean the floor. Spray 2-3 % solution of sodium hypochlorite in sheds. Smoke of cow dung cake with neem leaves and camphor helps to control mosquito and flies.

Management of infected animal- As animal shows symptom, isolate the animal. Separate the arrangement of feeding and watering. Provide good quality fodder, plenty of water to sick animal. Provide symptomatic treatment as directed by veterinarian. In case of mortality dispose the carcass by burial method and disinfect the shed and utensils of infected animal.

Vaccination- Vaccination should be done in completely healthy animals, infected animals and animals in close contact with infected animals should not be vaccinated. In year 2022 ICAR launches first indigenous lumpy skin vaccine named Lumpi-ProVacInd which contain live attenuated virus. Earlier the sheeppox and goatpox vaccines were used as LSDV, SPV and GPV share 95% of structural similarity. Several vaccines were available in various countries like Bovivax by MCI Sante Animale, Morocco, Lumpyvax by MSD Animal Health-Intervet, South Africa and Neethling strain like Lumpy Skin Disease Vaccine for Cattle by Onderstepoort Biological Products, South Africa.

Treatment- There is no effective treatment of Lumpy skin disease. Symptomatic treatment includes administration of

antibiotics, non-steroidal anti-inflammatory drugs (NSAIDs), antihistamines and multivitamins. Ethnoveterinary/ Traditional treatment suggested by National dairy development board (NDDB) includes two methods

1. For oral Administration- It include 2 preparations
  - A. 10 gram of salt, 10 gram of black pepper and 10 number of betel leaves are blended to form a fine paste and mixed with jaggery. Feed one dose of this preparation in every three hours for first day and from second day provide three times a day i.e., morning, afternoon and evening upto two weeks. Prepare fresh dose every time.
  - B. 10 gram of coriander, ginger, cumin black pepper, bay leaves, turmeric powder and 30 grams of chiraita powder, one handful of tulsi, neem, sweet basil and bel patra leaves, two pearls of garlic, two shallots and five betel leaves are blended to mix a fine paste and freshly prepared doses are feed with jaggery at every three hours on first day and in two doses morning and evening from second day till condition resolves.
2. For external application- One handful of Acalypha indica, mehndi, neem and tulsi leaves, ten pearls of garlic and 20 grams of turmeric powder are blended thoroughly and boiled in coconut or sesame oil. Cool down the oil and apply on ruptured nodules after cleaning the wound. Camphorated oil or Anona leaves (custard apple) paste is used for first day if maggots are present in wound.

#### Conclusion

Lumpy skin disease affects cattle and buffalo which are main contributor to dairy sector. This disease causes wide range of economic loss not only locally but globally as it affected import and export of various livestock products. India has large population of cattle and buffalo and livestock rearing is major livelihood source for small and marginal farmers, control of this disease becomes necessary to protect livestock population. Effective vaccination strategy by government and awareness among farmers for vector control, isolation and quarantine policy and management of infected animal can prevent major loss from this disease.

# Feeding Of Dairy Cattle During Milk Production



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## Introduction

### A. Milk and milk products:

1 In the American diet? Annual per capita consumption of about 280 kg of dairy products, and they supply about 75% of dietary Ca. Also, an important source of other nutrients, i.e., energy, protein, vitamins, and other minerals.

2 Other countries? Consumption could be 50 to 100% higher than the US in some countries, and world consumption is more than 100 kg per capita even when including those countries with consumption of much fewer milk products.

B. In the US, about 9.5 million dairy cows, each producing an average of 7,500 kg milk/year. nutrients, i.e., energy, protein, vitamins, and other minerals.

C. Systems used in the US? The type of system used is partially dependent on the geographic area and availability of feedstuffs.

1 Pasture system - Traditional system is continuing in areas of the sparse human population.

2 Drylot systems with minimum roughage and higher quantities of less bulky feeds such as concentrates - Being used in areas surrounding.

D. Dairy cows need to consume a lot of feed/nutrients to achieve today's expected milk production and feed represents about 50% of the total production costs.

1 Thus, a feeding program, more than any other single factor, can determine the productivity of lactating dairy cows & profitability.

2 About 75% of the differences in milk production between cows is determined by environmental factors, with feed making up the largest portion.

3 At peak production, may require 3 to 10 times as much protein & energy vs. late gestation, but the cow's appetite usually lags behind her nutritional needs.

### The lactation and Gestation Cycle

A. The relationships among milk production, DM intake, and body wt changes.

B. Milk production - Increases rapidly and reaches peak 6-8 wk after calving.

C. Feed intake - Lags behind milk production, i.e., maximum DM intake does not reach until 12 to 15 wk after calving.

D. Body reserves - Make up the difference in the need & supply by mobilizing body stores. Often lose 90 to 135 kg of body wt!.

### Forages

A. The cow cannot consume enough forage to meet its nutrient needs during lactation, even though they have a considerable capacity!

1) Daily intake for forages is estimated based on body wt and forage quality.

3) Estimated silage intake (as-fed



basis) - 3 lb for each 1 lb of expected hay intake.

- 4) Pasture intake - Usually, higher than silage at the same dry matter percentages.
- B. Increase forage intake by feeding several times/days and providing a variety of forages?

Forage quality	Daily intake (% body wt)
Excellent	3.0
Good	2.5
Average	2.0
Fair	1.5
Poor	1.0

### Concentrates

- A. A concentrate mixture contains grains, mill feeds, protein supplements, and minerals
- 1) The kind of mixture to feed will vary with the kind of forage fed (e.g., a high-protein mix will be needed with a low-protein forage), availability, and cost.
  - 2) The amount of concentrate mix fed will depend on:
    - a) The amount of forage consumed.
    - b) The amount of milk produced.
    - c) The composition (fat %) of the milk produced.
  - 3) Limit % of concentrates to a maximum of about 60% regardless of the comparative cost of and rough ages.
  - 4) Rations with more than 60% of concentrates may result in changes in the proportion of ruminal VFA, which in turn can result in the reduction of milk fat.
- B. Intake of a concentrate mixture is affected by palatability and the time available to consume concentrates in the barn or milking parlor.
- C. Depends, but tend to overfeed the low producer and under feed the high producer?!

### Phase Feeding Program/Feeding Guidelines

#### A. Feeding periods/phases can be divided into four or five - The Lactation and Gestation Cycle."

- 1) **Phase 1** - First 10 wk of lactation. Peak milk production & body stores are being used to make up deficits in nutrient intake.
  - 2) **Phase 2** - 10 to 20 wk or so of lactation. Maximum DM intake and the intake is in balance with the needs?!
  - 3) **Phase 3** - The intake exceeds the needs. The main period is to restore body reserves for the next lactation.
  - 4) **Phases 4 & 5** - Dry period, and can be considered as only one phase, but:
    - a) **Phase 4** - Most of the dry period, and replete body reserves & regenerate secretory tissues for the next lactation.
    - b) **Phase 5** - The last 1 to 3 wk of pre-partum. Start increasing grain intake as a means to prepare the rumen for the increased nutritional deficiencies.
- B. Dry period & bred heifers (Phases 4 & 5)**
- 1) Cows need a short dry period as rest to prepare for the next lactation. The optimum dry period would be 6 to 8 wk
    - a) Shorter than 40 d? - Not enough time for udder regeneration, thus may reduce the production rate.
    - b) Longer than 60 d? - Do not increase the production, and may result in excess body condition & calving difficulties.
  - 2) Bred heifers
    - a) Nutrient needs are slightly higher vs. dry cows of similar size - Still growing.
    - b) Need some grains along with

forages during the last 3 to 4 months of gestation to support growth & provide nutrients for fetus.

- 3) Quality of forage may not be as critical during the dry period, but cows need sufficient feed to support both the unborn calf and to meet body reserves not replaced in the previous period.
- 3) "Fat cow syndrome" - Feeding high levels of corn silage or grains may cause excess fat deposits in the liver area:
  - a) Characterized by high blood lipids & fatty livers.
  - b) May result in calving difficulties, displaced abomasum, ketosis, and others.
- 1) Cows need a short dry period as rest to prepare for the next lactation. The optimum dry period would be 6 to 8 wk.
  - a) Shorter than 40 - Not enough time for udder regeneration thus may reduce the production rate.
  - b) Longer than 60 d - Do not increase the production, and may result in excess body condition & calving difficulties.
- 4) About 2 wk before calving, increase grain feeding, so cows are consuming 12 to 16 lb grain/day at calving (1% of body weight).
  - a) Helps cows get accustomed to high grain intake needed after calving, and can reduce the occurrence of ketosis during lactation.
  - b) Best to increase the amount of grains gradually, which may minimize the chance for milk fever. Most grain mixes have a more desirable Ca to P ratio?
  - c) Feed a low-Ca ration (< 0.20%, reduce Ca intake to 14 to 18 g/d) 2 wk before parturition to those with milk fever problems may be beneficial?!

- d) Also, feed a diet with a negative dietary electrolyte balance (-10 to -15mEq/100 g DM) may alleviate milk fever problems.

### C. Peak milk production (Phase 1)

- 1) Cows should be brought into peak milk production as soon as possible after calving. Can be done by feeding slightly more grain than recommended until there is no increase in production & then adjusting the amount of grain accordingly.
- 2) Milk production increases rapidly, peaking at 6 to 8 wk after calving.
- 3) The most critical period for a dairy cow is "from parturition until peak milk production:"
  - a) Objective for this phase - To increase feed intake as rapidly as possible.
  - b) Increase grain intake by 1 to 2 lb per day after calving to meet the energy needs.
  - c) May want to avoid excessive grain (> 65% total DM) and maintain 17 to 19% acid detergent fiber in diet to reduce rumen disorders.
  - e) More ruminally un degradable protein source (i.e., bypass protein) might be recommended for high-producing cows in early lactation. The protein need of cows producing up to 5 kg/100 kg body wt can be met by rumen microbial protein, plus normal amount of bypass protein, but cows producing more would benefit from additional bypass protein.
  - f) Limit urea to 0.2 to 0.4 lb/day.
  - g) Buffers, such as Na bicarbonate alone or in combination with Mg oxide, may be beneficial during the early lactation –This May aid in maintaining ruminal pH, which minimizes acidosis, reduces digestive upsets, and results in increased DM intake.

### D. Peak dry matter intake (Phase 2)

- 1) To maintain peak milk production, should achieve maximum DM intake as early in lactation as possible. Usually, reached at 12 to 14 wk
- 2) With maximum DM intake:
  - a) Can minimize the negative nutrient balance experienced during the early lactation.
  - b) A conception rate is greater for ones in positive energy balance, which is an important consideration because cows are usually being bred during this phase.
  - c) Maximum DM intake will likely to reach 3.5 to 4% of body wt for most cows, but some variations. (Some may consume as much as 5% of body wt)
  - d) Grain intake may reach 2½% of cow's body wt, and forage intake (DM) should be at least 1-1¼% of cow's body wt to maintain rumen function and milk-fattest.
  - e) Should feed forages and grain several times daily.

### E. Mid to late lactation (Phase 3)

- 1) Should keep in mind that young cows are still growing, i.e., the nutrient requirements for growth are 20% of the maintenance requirements for 2-yr-olds and 10% maintenance for 3-yr-olds.
- 2) The NPN may be well utilized, thus can use urea (0.4 to 0.5 lb/cow/day) if needed to, again, reduce feed costs.
- 3) Some Considerations in Feeding for Milk Production
  - A. Optimizing feed intake during lactation
    - 1) Water content of feed:
      - a) Important consideration when using ensiled or fresh forages, or other high moisture feed stuffs such as high-moisture corn, wet

brewers grains, liquid whey.

- b) The effect on DM intake is less when water is present in the form of fresh forages than it is in the form of silage or other fermented feeds - e.g., DM intake can be reduced when the moisture content exceeds 50% from ensiled feeds, perhaps, partially caused by chemicals in the feed rather than by moisture per se?
  - 2) Frequency of feeding:
    - a) A minimum of four daily feedings - Alternating between forages and concentrates might be the best to increase intake.
    - b) Total mixed ration - Feeding frequency may not increase DM intake, but may help to stabilize rumen fermentation though!
  - 3) High-producing cows Obviously, necessary to maximize feed intake:
    - a) Should have access to feeds for at least 18 to 20 hr/d? May consume their daily intake in 12 to 22 meals & increase the intake!
    - b) Consuming more than 4.5 kg of concentrate mix/meal at once can cause acidosis.
    - c) Many electronic grain feeders are programmed to limit the amount of concentrate consumed by a cow within a short period of time, which would be helpful in alleviating acidosis problems.
    - d) Most lactation rations will contain 13 to 17% CP and 60 to 70% TDN (0.6 to 0.8 Mcal/lb NEI).
    - e) Finely ground or pelleted forages or grains should not be fed alone to lactating cattle because it can lower milk fat test.
    - f) Cows in full production will consume 3 to 5 lb of water (including water in feed) for each 1 lb of milk produced. Have water available at all times and warm water during winter.

# Milking Methods in Dairy Cow

India is ranked 1st in milk production contributing 23 percent of global milk production. Milking the animal is an art that require the skill and experience. Milking is an important operation in the dairy farm which directly affect the income. An ideal milking method is one which ensure the proper labour utilization and helps in reducing the cost of milk without any detriment to udder and health. Cows are generally milked from left side. Milking should be completed with in 5 to 7 minutes.

## Milking Preparation

- Tie the cow to stanchion.
- Washed the milking barn after each milking.
- Brush and wash the hind quarter thigh and udder.
- Udder region of cow should be dried with clean towel.
- Tie the legs along with tail with tight slip knot.
- Wipe the udder and teats with the towel soaked in antiseptic solution.
- Milker should wear the clean dress and cover their head with suitable caps.
- Milker nails should be trimmed and hands should be cleaned

and disinfected.

- Milker should be free from infectious diseases.
- Massage the udder for let-down of milk.
- Draw off few streams of fore milk from each teat in the strip cup and observe abnormality, if any.
- Hold the diagonal teats and milk in a full hand method of milking.
- First few streams of the milk should not be mixed with rest of the milk as the former contains highest number of bacteria.
- Milk the cow quickly, silently and completely with dry hand.

## Methods of Milking

**Full Hand** - This is the best method of milking. In this the teat is closed at the base between the thumb and index finger in this manner, and the milk that has become trapped in the teat sinus is pushed out by pressing with the other finger on the teat. This method is superior to the stripping as it stimulates the natural suckling process by calf.

**Stripping**- Cows having small teats are milked using the "stripping" method, which involves



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**Full Hand**



**Stripping**



**Knuckling**





strongly pushing down on the teat's base with the thumb and index finger while extending them along the whole length of the teat to force milk out in a stream. It causes more injury and irritation to teats.

**Knuckling-** This is the bad method of milking. In this method thumb is bent against the teat. It should always be avoided to prevent injuries of the teat tissues.

**Machine Milking-** It works on principle of vacuum to extract milk from the teat. Machine milking is commonly used in herds having high-yielding and large number of cows. On a dairy farm, the milking process is one of the labour-intensive tasks. More and more dairy farms are converting to machine milking as a result of the rising demand for milk. Maintaining udder health and milk quality as well as achieving milking performance depend on the milking machine's proper

operation. The Machine milking unit consist of pulsator system, vacuum supply system, and milk flow system. The suspension cup, teat-cup assembly, and connecting air and milk tubes are all part of the milking apparatus that is connected to the udder. The teat cup is made comprised of a steel outer shell and an inflation-style liner that fits over the teats. As the pulsator functions, the inflation squeezes and relaxes on the teat, causing the milk to flow into the system. The duration of the milking and resting phases of the pulsation cycle is known as the pulsation ratio. The number of pulsations per minute is referred to as the pulsation ratio. Typically, the pulsation ratio ranges from 1:1 to 2.5:1. After cleansing the udder, apply the milking machine gently between 30 to 60 seconds. As soon as the milk flow ceases, remove the milking machine immediately by first releasing the vacuum. Dip the teat ends in an antiseptic solution

to clean them. Teat cups and milk utensils are quickly rinsed with warm water. Traditionally, the majority of dairy farmers relied on labourers or electric milking machines to collect milk from the cows or buffaloes on their dairy farms. Now by utilizing the Green technology by using the renewable energy milking equipment powered by solar energy, which lowers their power expenditures and labour costs can also be used.

### Conclusion

Milking operation is the major activity of every dairy farm affecting the quantity, quality and the cost of the milk produced. India is still hand milked, as majority of farmers cannot afford the costly electrical milking machine. Machine milking saves the time, labour cost, increase the milk yield and ensures clean milk production and welfare of animal.

# Robotic Milking: Future of Dairy Technology

## Introduction

Automatic milking/ robotic milking is the milking of dairy animals, especially of dairy cattle, without human labour. Automatic milking systems (AMS), also called voluntary milking systems (VMS), were developed in the late 20th century. They can also be used to monitor the health status of cows. The milking process is the collection of tasks specifically devoted to extracting milk from an animal. This process may be broken down into several sub-tasks: collecting animals before milking, routing animals into the parlour, inspection and cleaning of teats, attachment of milking equipment to teats, and often massaging the back of the udder to relieve any held back milk, extraction of milk, removal of milking equipment, routing of animals out of the parlour.

## Technical Aspects

Voluntary milking allows the cow to decide her own milking time and interval, rather than being milked as part of a group at set milking times. AMS requires complete automation of the milking process as the cow may elect to be milked at any time during a 24-hour period. Typical capacity for an AMS is 50–70 cows per milking unit. AMS usually achieve milking frequencies between 2 and 3 times per day, so a single milking unit handling 60 cows and milking each cow 3 times per day has a capacity of 7.5 cows per hour.

### An AM system has six main modules:

1. Milking stall

2. Teat-cleaning system
3. Teat detection system
4. Robotic arm device for attaching the teat cups
5. Control system including sensors and software
6. Milking machine

### 1. The Milking Stall

AM systems can be divided into one and multi stall systems. The one-stall systems have a milking stall with an integrated milking machine and a robot device for attaching the teat cups. The multi stall systems have up to five stalls and a mobile robot device, which moves from one stall to another to attach the teat cups. All AM systems are equipped with electronic ID reading systems to identify the cow's ID tag in order to decide if the cow has to be milked or not. AM systems have a concentrate dispenser to make the cow's visit to the system more attractive.

### 2. Teat Cleaning System

The purpose of cleaning the teats is primarily to remove dirt and other particles that can contaminate the milk. Automatic cleaning is also necessary to meet international legislation and hygiene rules from the dairy industry. Automatic cleaning devices also stimulate the milk letdown process.

### 3. Teat Detection System

The udder shape and teat position will differ substantially from cow to cow and besides breed and genetic merit are dependent on milk production, milking interval, deformation of the udder shape due to cows lying in the cubicle, and stage of lactation. Moreover, cows,

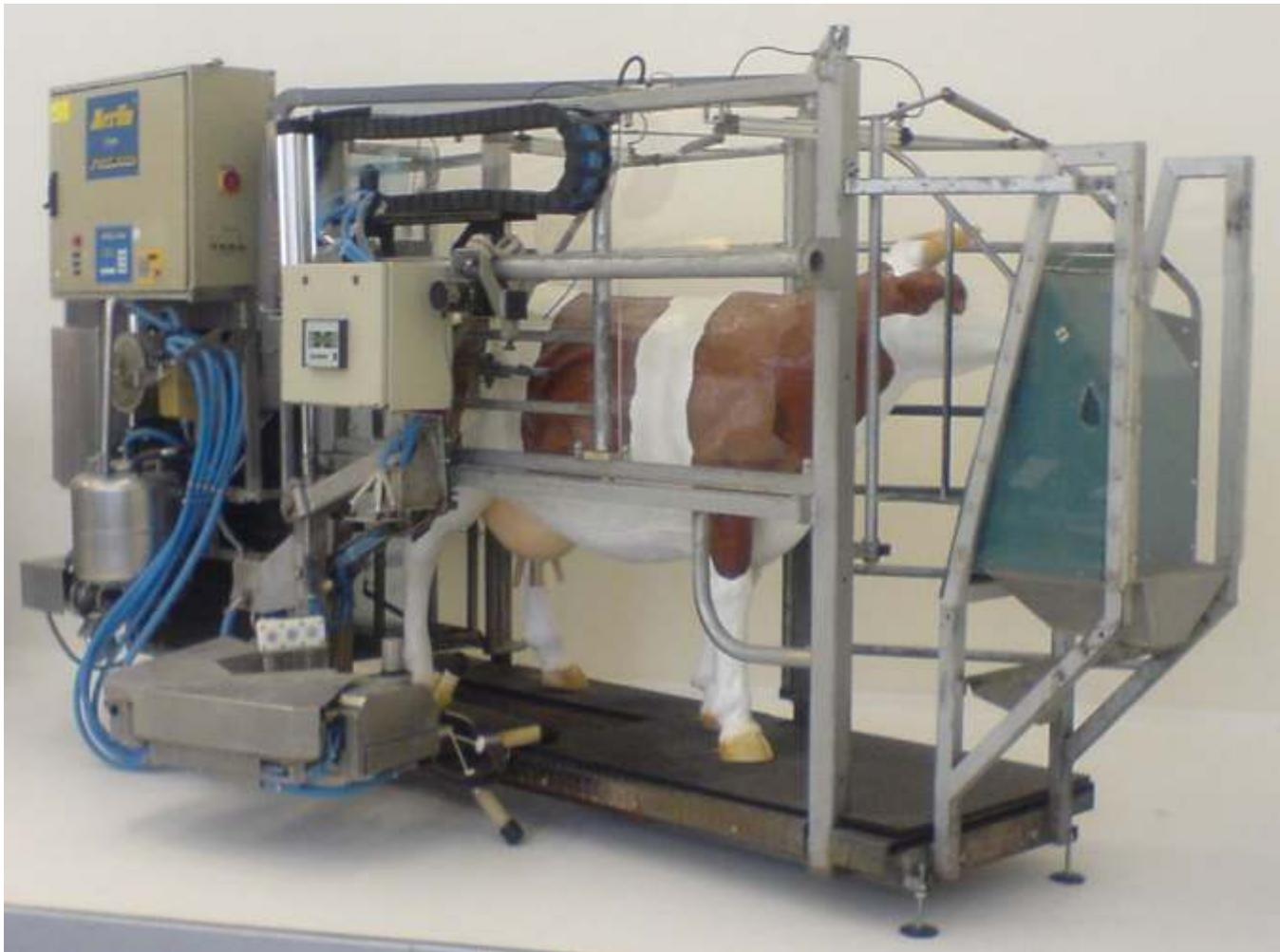


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although they are locked up, can move in the milking stall and so the position of the teats will change. AM systems have active teat detection systems to localize the four teats.

#### 4. Robotic Arm

Different types of robot arms are used. Some robot arms imitate conventional milking by using an arm with a gripper, which picks up the teat cup from a storage rack at the side of the stall. The four teat cups are attached in succession.

#### 5. Control System and Sensors

AM systems need sensors to observe and to control the milking process as the milker is doing. These sensors are the 'eyes' of the AM system and their task is to monitor the technical functioning of the AM system, like cow identification, teat cup attachment, vacuum level, and start of the milk letdown process. The control unit in fact acts as the 'brains'

of the AM system.

#### 6. The Milking Machine

The milking machine is more or less similar to the milking systems in conventional milking parlors, except for the cluster. AM systems lack a milking cluster and are based on individual quarter milking.

#### Advantages of Robotic Milking

- a. Elimination of labour.
- b. The milking process is consistent for every cow and every visit, and is not influenced by different persons milking the cows.
- c. Milking frequency may increase to three times per day, however typically 2.5 times per day is achieved.
- d. There is a perception that elective milking schedules reduce cow stress.

- e. The use of computer control allows greater scope for data collection and record keeping.
- f. Better herd management.

#### Disadvantages of Robotic Milking

- a. Higher initial cost
- b. Increased electricity cost.
- c. Touchscreen display of a milking robot and increased complexity.
- d. Possible increase in stress for some cows due to unknown reasons.

#### Conclusion

Robotic milking is an advanced automatic systems which eliminates several human errors and works more efficiently with accuracy and precision. Hence to improve herd health and milking practices in modern dairy farms it may prove to be a better option in the future dairy technology.

# Ticks and Their Economic Significance, with Special Reference to Lumpy Skin Disease

## Introduction

Livestock farming is an integral part of the agricultural production system in India and plays a crucial role in the economic growth and food and nutritional security of the nation. It also contributes significantly to the socioeconomic growth of small and medium-sized farms. More over a quarter of the agricultural sector's total output in India is generated by cattle alone. In 2010-2011, animal husbandry contributed 3.37 percent to the nation's gross domestic product, indicating that it is the largest industry in the Indian economy. The profitability of the livestock business hinges on the continued productivity of healthy livestock. Plans for animal breeding used foreign germplasm to boost the animal's productivity; disease resistance and animal health were of least concern. Disease susceptibility destroyed the livestock industry's optimism, and these problems are multifaceted. India has the largest cattle population in the world, despite its milk and meat production being 20–60% lower than the global average. In addition to the low productivity of Indian animals, livestock illnesses, decreasing resistance to infections, and a lack of an efficient disease control strategy contributed to the production loss. Four of the top 10 diseases affecting livestock are caused by parasites. Parasitic diseases are a global problem not just in terms of health difficulties, but also in terms of economic status. Ticks and tick-borne diseases (TTBDs) rank fourth among the most prevalent livestock infections, and tick-borne diseases are considered the most significant arthropod-borne diseases of cattle, people, and companion animals. The transmission of Lumpy skin disease (LSD) by ticks increases the importance of tick control. The disease can quickly spread hundreds of kilometres from the initial outbreak sites. These intrusions have reignited interest in LSD. New research on the disease's epidemiology, transmission, and risk factors has begun. LSDV appears to travel long distances via infected animals,

while seasonal patterns indicate that arthropod-borne transmission is responsible for short-distance spread. Understanding how LSDV spreads will enable more effective containment and eradication strategies. The disease is most likely transmitted mechanically by vectors, but there is insufficient data to support or refute this. The most likely LSDV carriers are stable flies, mosquitoes, and hard ticks (*Rhipicephalus* and *Amblyomma* species).

## Economic Impact

Ticks and Tick Borne diseases (TTBD) affects 80% of the world's cattle population, and its prevalence is widespread, particularly in tropical and subtropical countries, resulting in production losses. Vector-borne diseases have a direct or indirect impact on the growth of the livestock industry, which is critical to rural India. They provide income to farmers and ensure food supply and income during the agricultural hiatus. Ticks cause a variety of losses and directly attach to the host, causing toxins to be injected, blood loss, general stress, hide damage and irritation, and a decrease in productivity in terms of milk, meat, and so on. It indirectly suppresses immune function and spreads several pathogens. The annual global costs of TTBDs in cattle ranged from \$13.9 billion to \$18.7 billion. Losses from cattle ticks [*Boophilus* (*Rhipicephalus*) *microplus* (*B. microplus*) (*R. microplus*)] were estimated to be US\$ 62 million in Australia alone, and around US\$ 2 billion in Brazil. Tick-borne diseases are regarded as the most serious problems in animal production in Africa. The annual economic losses in India due to TTBDs in animals were calculated to be US\$ 498.7 million. Accurately estimating losses due to TTBDs is difficult, but they have a significant impact on farm income. TTBDs have a negative impact on dairy cows and reduce milk yield. When crossbred Holstein-Zebu cows were infested with an average of 105 ticks, milk yield was reduced by 23% per day. Loss of about 14 percent of income from milk has a significant impact on



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livestock-dependent systems. Furthermore, the direct impact of tick infestation on the meat and hide industry is much greater. According to one estimate, animals with an average of 40 ticks a day could lose up to 20 kg annually and have a 20%–30% decrease in the value of their hides. Bovine tropical theileriosis (*T. annulata*) is caused by the protozoan parasite *Theileria annulata* (*T. annulata*) and is transmitted worldwide by tick species of the genus *Hyalomma*, putting approximately 250 million cattle at risk of this important protozoan disease. Worldwide and in India, the estimated loss due to *T. annulata* and tick fear was US\$ 384.3 million and US\$ 57.2 million, respectively. Despite routine vaccination, an outbreak of Kyasanur forest disease (KFD), a *Haemaphysalis* tick-borne infection, occurred in Karnataka, India, in 2012, indicating the need for strategic tick vector control.

### Lumpy skin disease (LSD)

The ability of a virus to resist histolysis in tick tissues and the sensitivity of tick cells to virus infection are both necessary for a virus' survival in tick vectors. When a single tick feeds multiple times and switches hosts in between feedings, mechanical transmission of the virus by ticks is possible, just like with insect vectors. The biology of the tick is intricate and differs across the various types of ticks. Nymphs, larvae, and adult three-host female ticks typically only feed on a host once before detaching and dropping off. The subsequent feeding takes place on a different host and in the subsequent life-cycle stage. While searching for females suitable for mating, mature males of numerous common hard (ixodid) tick species eat multiple tiny blood meals. They either do so on a single host or, if cattle come in close touch with each other, they can quickly and readily switch hosts. Females may also feed on many hosts under the right conditions, such as when the host dies or when intense host grooming pauses the feeding early on. Experimental evidence of mechanical transmission of the LSDV from infected to uninfected hosts has been found in the male tick species *Rhipicephalus appendiculatus* and *Amblyomma hebraeum*. After feeding on infected cattle, tick saliva has been shown to contain LSDV and transstadial transmission of the virus has also been documented. It appears that tick moulting lowers viral titers. Immunohistochemical techniques have shown the presence of the LSD virus antigen in tick salivary glands, hemocytes, synganglia, ovaries, testes, fat bodies, and

midgut. *Rhipicephalus decoloratus* is a one-host tick, with all three stages of its lifecycle occurring on a single host. Females feeding on infected cattle were able to transmit LSDV via their eggs to the next generation of larvae, which were able to infect naïve cattle. LSDV is extremely stable, and this may constitute mechanical transmission; however, the precise transmission mechanism requires further investigation. Likewise, *Hyalomma truncatum* ticks transmit the Crimean-Congo hemorrhagic fever virus sexually. During periods of interrupted feeding on the skin of an infected animal, the mouthparts of the male become contaminated with the virus. Since the male places its semen sack into the female's genital openings with its mouthparts during copulation, it also contaminates the female. In addition, communal grazing practises that allow cattle to share pastures with other herds and/or wild ruminants are likely to facilitate the tick-borne transmission of LSDV.

Despite evidence for vector-borne transmission, outbreaks can occur in the apparent absence of vectors, demonstrating that vector-borne transmission is not the only mode of LSDV transmission. Occasional reports of the direct transmission of LSDV indicate that no season should be regarded as absolutely safe in regards to LSD.

It may be overly optimistic to assume that identifying the principal vector species would eliminate the need for vaccines, but it would aid in reducing disease prevalence. Veterinary authorities would be able to develop more effective, science-based containment and prevention strategies against LSDV if they had a better understanding of the feeding habits and preferences of local blood-feeding and biting vectors, the survival of the infectious virus in those vectors, and the capacity of local arthropod species to act as mechanical vectors.

Further research is required to investigate the role of vector saliva, the length of time mechanical vectors remain infectious, the survival time of LSDV in their mouthparts or salivary glands, and the number of insects required for infection transmission.

### Holistic approach of tick control

The benefits and drawbacks of particular technical approaches are the foundation of tick control programmes. If used properly, chemical acaricides are effective and economical, but inappropriate application can result in chemical resistance and chemical residues in food, both of which are

problems for public health. Cost, effectiveness, production, application, and stability are significant obstacles in biological control approaches. The ineffectiveness of the present anti-tick vaccines could stand alone as a question. Therefore, there isn't currently a single, perfect, and economical method for the control of ticks. In order to manage the population of tick integrated control is the methodical application of two or more technologies in a way that is both economical and environmentally friendly. TickGARD, a tick vaccination, was first introduced in Australia along with the short-term use of acaricides as part of an IPM package. The level of parasite control it provided was adequate. In Mexico and Cuba, more trials of a similar nature were conducted. It decreased the possibility of chemical resistance in addition to reducing the use of chemicals. Therefore, in order to reduce tick populations it is vital to investigate the potential pairing of tick control tactics with other existing options in a given area.

### Conclusion

Four of the top ten animal diseases are parasitic in nature. Parasitic diseases pose a threat to global health and the economy. Ticks and tick-borne diseases are the fourth most common livestock infection and the most serious arthropod-borne diseases affecting cattle, humans, and pets. Lumpy Skin Disease is transmitted by ticks. Disease can spread hundreds of kilometres from its source. Because of these intruders, LSD is once again en vogue. Epidemiology, transmission, and risk factors are being researched. Seasonal patterns suggest that LSDV is transmitted by arthropods. Knowing how LSDV spreads aids in its containment and eradication. Inadequate data confirm or refute vector-borne disease transmission. LSDV is carried by hard ticks, stable flies, and mosquitoes (*Rhipicephalus* and *Amblyomma* species). Outbreaks can occur in the absence of vectors, demonstrating that vector-borne transmission is not the only mode. Direct LSDV transmission demonstrates that no season is LSD-free. The identification of the main vector species may help to reduce disease prevalence. If veterinary authorities understood the feeding habits and preferences of local blood-feeding and biting vectors, the virus's survival in those vectors, and the ability of local arthropod species to act as mechanical vectors, they could develop more effective, science-based containment and prevention strategies against LSDV.

# Effect of Trace Mineral Injection in Dairy Animals

Minerals are important for all physiological processes in animals including production and reproduction. Trace minerals viz. Zinc (Zn), Cobalt (Co), Copper (Cu), Iodine (I), Iron (Fe), Manganese (Mn), Chromium (Cr) and Selenium (Se) are considered essential in dairy animals because of their vital role in reproduction, immunity and growth. Research has suggested that slight deficiencies of certain trace minerals may severely affect a cow's health and productivity. Subclinical deficiencies are more common than clinical deficiencies that results in decreased immune response, reduce growth and reproductive performance. Clinical deficiencies are less common and can be seen in animals depleted of trace minerals demonstrating pathological or visual signs of a deficiency.

## Trace minerals in Dairy Animals:

Adequate amount of bio available minerals need to be supplemented to support the haemostatic state of the animal during all phases of life. During periods of dietary mineral insufficiencies, essential minerals drained out from body tissues to support milk production, which ultimately affects the quality and quantity of milk as well as health of the animals. Reduction in pregnancy rates can occur as a subclinical effect of marginal trace mineral status. Deficiencies in Cu, Se, Mn, and Zn have been linked to abnormal estrous cycles, impaired ovulation and decreased conception rates.

In development of replacement heifers, trace minerals Cu, Se, Mn, Cr and Zn play roles in bodily functions that support reproduction. Supplementations of trace minerals improve conception rate & productivity in dairy cows in different situations. Few important functions of the trace minerals are given below:

**Zinc (Zn):** may be the most widely deficient trace mineral. Zn plays an important role in metabolism as a component of more than 300 enzymes and hormones. Zinc may impact immune function because of its essential role in cell replication and proliferation. Zinc is also required for the synthesis of metallothionein, a metal binding protein that may scavenge hydroxide radicals. In dairy cows, zinc deficiency is visible through bad hoof horn

quality, reduced fertility and poor udder health. Zinc-deficient calves may have swollen feet, scaly skin with open lesions, wounds that take longer to heal, loss of hair, excessive salivation, reduced appetite, reduced feed efficiency and growth rates, and impaired immune systems.

**Manganese (Mn):** It works as an enzyme activator and is crucial for energy, protein and fat metabolism. Importance of Mn in steroid hormone synthesis may be its most important role in reproduction. It is also hypothesized that Mn may play an important role in immune function because of its role in removing superoxide radicals produced by active immune cells. Deficiencies in manganese are reflected in reduced growth, skeletal deformities, poor fertility and birth defects in new born calves.

**Copper (Cu):** Cu plays important roles in the formation of haemoglobin, bone, melanin and keratin. Cu is also an essential component of enzymes that have activities in cellular respiration, cross-linking of connective tissue, central nervous system formation, reproduction and immunity. In the reproductive cycle, it plays an important role in the function of many enzymes. A clinical deficiency in copper can lead to decreased conception rates, infertility, anoestrus, and fetal resorption. Cu deficiency can occur in diets normally considered adequate because of high levels of antagonists such as sulfur, iron, and molybdenum which reduce bio availability.

**Chromium (Cr):** Cr has been shown to be effective in increasing glucose use and growth performance. Cr increases effectiveness of insulin action in lactating ruminants which has an overall increase in metabolic efficiency, leading to improved production. Cr supplementation also improves health and immune function in stressed calves & cows.

**Selenium (Se):** Both selenium and vitamin E act as metabolic anti-oxidants. Selenium is a major constituent of glutathione peroxidase, which aids in the reduction of hydrogen peroxide and other peroxide radicals. Se acts directly on granulosa cells of ovarian follicle to enhance their proliferation and increase estradiol



**Dr Dibyajyoti Kalita**  
Head-Technical & Regulatory,  
Zenex Animal Health



synthesis. Se deficiency resulted in reduced follicle cell proliferation, altered blood vessel and stromal tissue development of the fetal ovaries. Supplementation of Se during the third trimester may be needed to maintain maternal Se status and antioxidant activity.

#### **Factors affecting trace mineral status:**

The absorption of essential trace minerals from feed or feed supplements is often not sufficient when the demand for these minerals is high. A variety of factors negatively impact the absorption of orally consumed trace minerals. These can include poor or inadequate trace mineral supplementation strategies, large variations in oral mineral intake and the presence of antagonists in feed & forages. This reduced absorption or bio-availability makes it difficult to optimize trace mineral status and functions at critical production periods using only the oral intake route.

It is reported that dairy cows and calves under stress reduced their trace mineral retention ability. Moreover, either the act of parturition or the beginning of lactation has been found to be related with a decrease in plasma minerals levels. Hence, during the transition period cows may have increased trace minerals needs which is due to improper absorption of dietary mineral supplements owing to interactions with other nutrients at the ruminal level or due to modifications in the rumen. Besides, antagonists located in drinking water may also have a negative effect on the efficiency of trace minerals absorption from the digestive tract.

#### **Immunity and Trace Minerals**

The role of Zn, Fe, Cu, and Se are critical in disease resistance of dairy animals. It is reported that complex antioxidant systems keep free radical concentrations low through superoxide mutases (need Mn, Zn, and Cu), catalase (Fe containing enzyme), and glutathione peroxidase (Se containing enzyme). With Zn deficiency, thymus weight is reduced with a reduced number of lymphocytes. The thymus is important in T cell formation and immune capacity. Young animals may be more affected because they are not as immune-competent as mature animals. Zn supplemented animals demonstrated improved weight gain and reduced treatment days in stressed cattle. Fe deficiencies affect antibody formation associated with B cells. Cu affects the antibody forming cells of

the immune system and susceptibility to infection. Trace mineral effects on immunity have been established, but specific levels have not been documented.

#### **Injectable Trace minerals:**

The technology, targeted application, and scientific assessment of efficacy of injectable trace minerals has been a subject of attention in the recent years. Cu, Se, Mn, Fe and Zn are the trace minerals that can be supplemented through injection. It is basically designed for administration in conjunction with a pre-existing dietary mineral program so as to ensure a consistent rate of trace mineral supplementation on a per animal basis. Trace mineral injections can also be utilized to treat animals with a suspected mineral deficiency.

- Advantage of injectable trace minerals is the targeted delivery of a known amount of trace minerals to individual animals that removes the variability associated with voluntary intake.
- Another benefit of injectable trace minerals is their rapid availability and transport in the blood. The initial spike caused by a trace mineral injection in plasma and serum levels are only elevated for a short period of time (24 hours), and then decrease slowly over the following days (14 – 15 d) as they are stored in the body.
- Delivery of trace minerals via an injection ensures that all animals are receiving trace minerals at times when their requirements may be higher such as at breeding or pre-calving in cows. This could potentially improve the performance of deficient and marginally deficient animals.
- Calf response to trace mineral supplementation has been even more variable than in cows, possibly because of the transfer of trace minerals from their dam during gestation and transfer of trace mineral through the milk. Therefore, the use of trace mineral injection to the calf to ensure each calf is receiving trace minerals may be more beneficial to calves.
- Trace mineral injections can be used in addition to free choice supplementation as they are not stored in the body for extended periods of time as some may be used immediately or excreted from the body a few days after being injected.

- Strategic trace mineral injection in the pre-calving period helps to raise not only the trace minerals but also the essential enzyme levels in cows rapidly and effectively which could benefit cows during the transition period.
- Many studies have investigated the use of trace mineral injections in dairy cattle, and the transfer and storage of Cu, Mn, Fe, Cr and Zn from the injection throughout the body; have shown beneficial effects on growth and immunity of dairy cattle:
  - Positive impact on udder health, reduction in incidence of mastitis, stillbirth parturition and endometritis (Machado V. S. et. al., Cornell University, USA)
  - Favourable body condition scorecard between calving & breeding and greater conception rate to fixed time AI (L R Mundell et.al., Kansas University, USA)
  - More weight gain in new born calves as well as lower morbidity (J T Richeson et. al., Deptt. Animal Science,, University of Arkansas, USA)
  - Improved semen characteristics for bulls receiving injectable trace mineral (Dr. Shane Gadberry, University of Arkansas, USA)

#### **Conclusion:**

Trace mineral supplementation in the diet of dairy cow, replacement heifers & calves is essential to maintain the health and the economic competitiveness of the dairy farmers. Many dynamic factors influence both nutrient requirements and nutrient availability from feeds. While daily oral trace minerals are essential for maintenance but at critical periods like pre-calving, calving and early-lactation daily oral trace mineral intake can become variable or fall in response to stress. During these periods there is a marked increase in trace mineral demand. Clinical or subclinical deficiency can develop in cattle at these high demand periods, even a well formulated diet may not compensate. Strategic injectable trace mineral supplementation bypasses the harsh rumen environment and antagonists, rapidly raises circulating mineral levels in cattle within 8-10 hours. Injectable formulation of most essential trace minerals comprise of Zn, Mn, Cu, Se etc. may be ideal solution for cows during the period of high productivity & developmental stages of young ones.

# KCVAS Organises Dairy Training for UNA Farmers in Collaboration with CEDSI.

In collaboration with the Center of Excellence for Dairy Skills in India, Khalsa College of Veterinary and Animal Sciences (KCVAS) Amritsar organised a 'Dairy Training Course' for dairy farmers (CEDSI). Lectures were given on a variety of dairy farming topics, including dairy farm management, balanced feeding and ration preparation, common dairy animal diseases and their prevention, reproductive disorders, AI, and biosecurity on dairy farms.

To clear the trainees' doubts and questions, an open discussion and question-and-answer session was held. In addition to the training, a special visit is scheduled. KCVAS Livestock Farm hosted a practical session for trainees, during which the farmers learned about the excellent dairy germplasm for milk production.

The trainees were introduced to animals

of various milch breeds, as well as their rearing patterns and how to record basic body parameters (temperature, pulse, and so on) for early diagnosis of sick animals. Furthermore, CEDSI and KCVAS have a Memorandum of Understanding (MOU) for such skill-related training and activities for farmers.

This is the first training held following the signing of the MOU, according to Principal Dr. Harish Verma, who revealed that 20 trainees, including 6 lady farmers and 14 farmers from Himachal Pradesh's Una district, participated in the training. Interestingly, the trainees were given information about Lumpy Skin Disease management in dairy animals, as well as nursing care for early normalcy and milk production. CEDSI, Gurgaon, also held an online exam and an offline practical viva to assess their training skills in order to award them skill certificates.



The rising demand for milk and animal-based products, along with the increasing commercial livestock production, is driving the Indian animal feed market.



“ The Indian animal feed market reached a value of INR 873.7 Billion in 2021. Looking forward, IMARC Group expects the market to reach INR 1493.8 Billion by 2027, exhibiting at a CAGR of 9.6% during 2022-2027 ”

**Gyandhara**  
Budhiya Wala Paslu Aahar

Today, Gyandhara Industries Private Limited cater to more than one lakh fifty thousand dairy farmers of Gyan Dairy as well as in the open market where we have created a successful network of more than 100 Distributors who cater to the general dairy farmers. Gyandhara balanced cattle feed helps to increase the productivity of the cattle by providing them with necessary proteins, carbohydrates, fat, fiber, vitamins and minerals etc. as suggested by animal nutritionist and as per varying needs of cattles basis breed and milk yield.

Our extensively spread manufacturing unit and well trained manpower with channel partners makes us the market leaders in Uttar Pradesh and Nepal.

With the mission and objective of upliftment of farmers and improvement in cattle's health, we are constantly and consistently working towards making best in class cattle feed with high nutritional value and purity. We associate with our dairy farmers to educate them about the well-being of cattle, betterment of their products and in all, the growth of this sector. With optimum levels of technology and training, we aspire to achieve the goal of uplifting the overall quality of cattle feed production in our region.

We, at Gyandhara, follow stringent quality norms at each step starting from procurement of raw material to dispatch of finished products. Today with a workforce of over 100 skilled individuals and fully automated manufacturing facility, we have a manufacturing capacity of 500 MT per day in Sandila, District Hardoi, Uttar Pradesh.

**Gyandhara Industries Private Limited** highest priorities, deeply held beliefs, and core, fundamental driving forces are its core values;

- **FARMERS FIRST** - Kisan Khush toh Hum Khush
- **HAPPY PLACE** - Both Personal & Professional Growth Matters
- **QUALITY CONSCIOUS** - Awareness, Alignment, Attention

Gyandhara aims at providing best-in-class cattle feed products to our dairy farmers because we believe in quality over anything. Our products not only help in improving the milk production but improves the health of animals which leads to less investment on animal's diseases. Our 5 main products for improving or increasing milk yielding capacity of animals are-



- Gyandhara Supreme- Good for animals with milk upto 7-9ltrs
- Gyandhara Gold Pro and-(Good for animals with more than 15 litres of milk
- Gyandhara HI-Power- Good for animals with milk upto 15-20ltrs
- Gyandhara Bhains Special – Best in class, specially designed for high yielding buffalos

Mineral Mixtures & Milk Maxima are our two key products that are specially designed to fulfil the deficiency of essential minerals and vitamins that ultimately helps in preventing them from many diseases like milk fever, indigestion, calcium deficiency etc , supports growth of calf and cattle, reduces inter calving period. (refer [www.gyandhara.com](http://www.gyandhara.com))

We stand for quality and have measures to ensure the same, our plant is in itself a state of art property with advanced machineries that checks and makes BIS approved formulation products only that solves the major problems of cattle's like digestion, and increases their milk production naturally and not artificially.



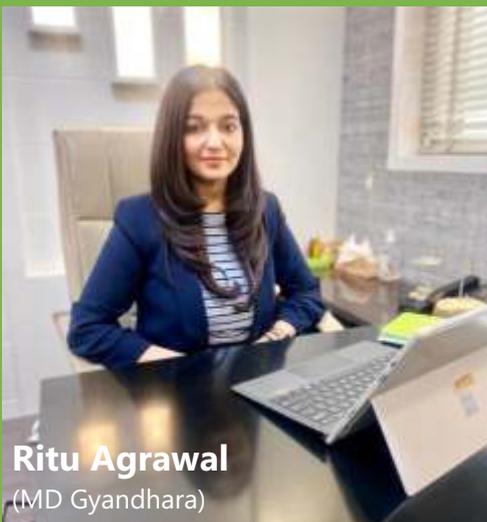
Our raw materials are tested at every stage of its production through the wet chemistry at our lab with standards set in GMP (Goods Manufacturing Practices) & GLP (Goods Laboratory Practices). We also use NIRS (Near Infrared Spectroscopy) for the sustainability of our products. This entire process is followed for Raw materials as well as Finished Goods.



The impacts of climate change are already being felt across our business. And we acknowledge that we have a responsibility to contribute solutions by both reducing our own emissions and building resilience by helping the business and communities to adapt to climate change. We have saved 5.30 Lac units of power through solar panel energy since Nov, 2020

Gyandhara Industries Private Limited is BIS approved and ISO certified company

As a part of the celebrations of Azadi ka Amrit Mahotsav, the Ministries of Fisheries, Animal Husbandry and Dairying organized a AHIDF conclave at Bhim Hall, Dr Ambedkar International Centre, Janpath, New Delhi on 14th July 2022. In this prestigious event Department Of Animal Husbandry and Dairying, Union Minister Shri Purushottam Rupala ji and Minister Of State Animal Husbandry and Dairying Dr. Sanjeev Balyan ji felicitated Gyandhara Industries Private Limited for being the successful feed company in the region and was received by Mr. J B Singh, VP, Gyandhara Industries.



**Ritu Agrawal**  
(MD Gyandhara)



## MD's Message

"Since the inception of Gyandhara, we have always given priority to the quality of our feed and the well-being of our farmers. With the help of our nutritional experts and using the latest technology, we provide the best-in-class feed to our farmers which results in healthy cattle and hence good quality milk production. We will always uphold our mission, "Upliftment of farmers by providing them with best-in-class feed at affordable prices". We work together to build a business that works upon its core values i.e., Farmer's First, Quality Consciousness and thus making it a Happy Place to work."



## Focusing on the Welfare of Farmer's Families- Visakha Dairy



Visakha Dairy's CSR initiatives cover a wide range of topics, including health, education, and socio economic development.

In 1989, Visakha Dairy Chairman Sri Adari Tulasi Rao established the Milk Producers and Employees Education, Health, and Medical Welfare Trust.

The Trust's primary goal is to provide farmers and their families with medical and educational services. The trust built its own hospital with cutting-edge technology and hired specialists and super specialists. It has also built a school and a hostel for the children of rural poor and farmers.

The trust runs a residential educational facility for Visakha dairy milk producers, employees, children, and members of the public. It offers free education to orphans recommended by village leaders as well as children living in poverty.

The main aim of the trust is identifying, training and providing employment to weaker sections that do not have any support from the society.





# India Art Contest



“  
**India 2050**  
 Now vs. the future:  
 Nurturing nature  
 for a better future  
 ”

**Alltech**

## Alltech launches 8th annual Art Contest, invites nationwide participation from school children

Alltech, a leading global animal health and nutrition company, announces its 8th annual Art Contest for school children. The Alltech India competition will accept entries from September 16 to October 14, 2022.

India is an emerging and developing country with one of the fastest-growing economies in the world. It has the fifth-largest GDP globally and the third largest in Asia. However, despite an expected average annual economic growth of 7.4% (22–23), India faces significant challenges, including immense utilization of natural resources, which has prompted it to make great efforts toward a green and decarbonized economy.

To let help young minds imagine the boundless possibilities for a sustainable environment and economy, the Alltech India Art

Contest 2022 asks children to create on the theme **India 2050 “Now vs. the Future”**: **Nurturing nature for a better future**

Launching the competition, Dr. Sayed Aman, Managing Director - India, Regional Director - South Asia, said, “Sustainability is a big concern for the entire planet and to address this there is a need for technological innovations and stringent policies. To achieve energy efficiency, carbon neutrality and sustainable economic growth, India must invest towards the sectors that highlight green initiatives.”

Requoting the lines of Paul Polman, speaker at the Alltech ONE conference 2022, Dr. Aman continued, “We cannot choose between growth and sustainability — we must have both.”

**Who can participate in the Alltech**



## India Art Contest 2022?

Students aged between 5–16 years.

### Timeline

The contest is open from September 16 to October 14.

### Submission:

Submission is online. Entrants will upload a scanned image of the artwork to the contest website by filling out all the relevant details requested on the page.

Check out the link below to participate and learn more about the Alltech India Art Contest 2022.

*Website link:*

<https://www.alltech.com/en-in/about/events/alltech-india-art-contest-2022>

### Online submission rules:

- The artwork must be on drawing paper of A4 size
- Acceptable media include crayons, watercolours, oil paints, acrylic paints, coloured posters, coloured pencils, and pastels.
- The theme, India 2050 "Now vs. the Future": Nurturing nature for a better future, should be the focus of the artwork.
- Entries should be submitted online. Entrants will upload a scanned image of their artwork to the website, filling in all the relevant details requested on the page. Please do not send your original artwork unless Alltech asks for it. The artist must leave

the artwork unsigned.

### Prize

Winners are selected by a panel of judges and a Facebook contest and will be rewarded with a cash prize. The winning paintings will also be featured in the Alltech India 2023 calendar.

For more details, please contact your local

**Alltech sales manager** or email [alltechartcontest@alltech.com](mailto:alltechartcontest@alltech.com).

### Contact:

**Dr. Manish Chaurasia**

Marketing Manager, South Asia  
[mchaurasia@alltech.com](mailto:mchaurasia@alltech.com);  
+91 8130890989

### About Alltech:

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

We are a global leader in the animal health industry, producing additives, premix supplements, feed and complete feed. Strengthened by more than 40 years of scientific research, we carry forward a legacy of innovation and a unique culture that views challenges through an entrepreneurial lens.

Our more than 5,000 talented team members worldwide share our vision for a Planet of Plenty™. We believe agriculture has the greatest potential to shape the future of our planet, but it will take all of us working together, led by science, technology, and a shared will to make a difference.

Alltech is a private, family-owned company, which allows us to adapt quickly to our customers' needs and maintain focus on advanced innovation. Headquartered just outside of Lexington, Kentucky, USA, Alltech has a strong presence in all regions of the world. For more information, visit [alltech.com](http://alltech.com), or join the conversation on Facebook, Twitter and LinkedIn.





## NDDB Signs an Agreement to Manage the Ladakh Milk Federation with the Ladakh Administration and LAHDC

National Dairy Development Board (NDDB) signed a tripartite MoU with Union Territory of Ladakh and Ladakh Autonomous Hill Development Council (LAHDC) by which it will manage the entire operations of Ladakh Milk Federation for a period of five years and implement a structured dairy development programme in the region.

The MoU was signed in the gracious presence of Shri Radha Krishna Mathur, Hon'ble Lt. Governor of UT Ladakh and Shri Jamyang Tsering Namgyal, Hon'ble MP of Ladakh by Shri Meenesh Shah, Chairman and Executive Director, NDDB, Shri Tashi Gyalson, Hon'ble Chief Executive Councilor, LAHDC, Leh and Shri Ravinder Kumar, Secretary, Animal Husbandry and Cooperative Department, UT Ladakh.

On this occasion, Chairman, NDDB reiterated the continued focus of NDDB on the regions where dairy sector is yet to be developed to significantly contribute in the livelihoods of the rural households. He further mentioned that NDDB would ensure that the operations of the Federation and the constituent units are professionally managed with emphasis on providing fair and transparent operations to the dairy farmers.

Shri Shah also assured that NDDB along with its subsidiary company/ies would continue to support the UT of Ladakh in its endeavor to bring about prosperity through Dairying. IDMC, the wholly owned subsidiary company has already completed the

refurbishment and upgradation of the milk processing plant, Leh which will be soon operationalized.

Hon'ble Lt. Governor of UT Ladakh said that NDDB's expertise would help in establishing a robust milk procurement and processing system in Ladakh and would also help in undertaking scientific productivity enhancement activities with focus on animal breeding, nutrition and health. This MoU will encourage entrepreneurs to set up dairy farms leading to Development of Dairy sector in the region, which will also provide an avenue for employment for the rural youth and more milk production in UT.

Hon'ble Chief Executive Councilor, LAHDC, Leh, Shri Gyalson mentioned that Ladakh has the potential for milk production and this joint efforts by NDDB and the Ladakh Administration would definitely help in ensuring a better remuneration to farmers for their milk.

Addressing the gathering, Hon'ble MP Shri Namgyal, said focussed intervention for dairying in the region was long-awaited and signing of this MoU would surely help in bringing socio-economic development in Ladakh.

During the tenure of this MoU, NDDB will provide its services without any management fees and also depute its professional manpower at key managerial positions for managing the operations of the Federations and its constituent units.





# IDF WORLD DAIRY SUMMIT 2022 INDIA



## PM Modi inaugurates the IDF World Dairy Summit 2022

Prime Minister Shri Narendra Modi inaugurated the International Dairy Federation World Dairy Summit (IDF WDS) 2022, which was held at the India Expo Centre & Mart in Greater Noida.

Addressing the gathering, the Prime Minister expressed happiness that all the dignitaries from the world of dairy have assembled in India. The Prime Minister said that the World Dairy Summit is going to be a great medium for the exchange of ideas. "The potential of the dairy sector not only gives impetus to the rural economy, but is also a major source of livelihood for crores of people across the world", he said.

The Prime Minister underlined the centrality of 'Pashu Dhan' and milk-related business in the cultural landscape of India. This has given the dairy sector of India many unique characteristics. The Prime Minister pointed out that unlike other developed countries of the world, the driving force of the dairy sector in India is small farmers. India's dairy sector is characterized by "production by masses" more than "mass production". India is the largest milk-producing country on the basis of the efforts of these small farmers with one, two or three cattle. This sector provides employment to more than 8 crore families in the country, he informed.

Explaining the second unique characteristic of the Indian dairy system, the Prime Minister reiterated that there is such a huge network of

Dairy Cooperative in India, and one cannot find such an example in the whole world elsewhere. Shri Modi said that these dairy cooperatives collect milk twice a day from about two crore farmers in more than two lakh villages in the country and deliver it to the customers. The Prime Minister drew everyone's attention to the fact that there is no middleman in the entire process, and more than 70 per cent of the money that is received from the customers goes directly into the pockets of the farmers. "No other country has this ratio in the whole world", the Prime Minister added. He also underlined the efficiency of the digital system of payment in the dairy sector and said that it has many lessons for other countries.

Another unique feature, according to the Prime Minister, is the indigenous breeds that can withstand many adverse circumstances. He gave the example of the sturdy buffalo breed of Banni Buffalo of the Kutch region of Gujarat. He also talked about other buffalo breeds such as Murrah, Mehsana, Jafrajadi, Nili Ravi, and Pandharpuri; among the cow breeds, he mentioned Gir, Sahiwal, Rathi, Kankrej, Tharparker and Haryana.

As another unique characteristic, the Prime Minister highlighted the power of women in the dairy sector, the Prime Minister pointed out that women have a 70% representation in the workforce in India's dairy sector. "Women are the real leaders of India's dairy sector", he



added, "Not only this, more than a third of the members of dairy cooperatives in India are women." He said at more than eight and a half lakh crore rupees, the dairy sector is more than the combined value of wheat and rice. This is all driven by the women power of India.

The Prime Minister underlined that the government has worked relentlessly to enhance the potential of India's dairy sector since 2014. This has led to an increase in milk production thereby leading to an increase in the income of farmers. "India produced 146 million tonnes of milk in 2014. It has now increased to 210 million tonnes. That is, an increase of about 44 per cent", the Prime Minister pointed out. He also mentioned that as compared to the 2 per cent production growth at the global level, India is clocking the milk production growth rate at more than 6 per cent.

The Prime Minister said that the government is working on developing a blanched dairy ecosystem where challenges of the sectors are being addressed along with a focus on increasing production. Extra income for the

farmers, empowerment of the poor, swachhta, chemical-free farming, clean energy and care of the cattle is interlinked in this ecosystem. He stressed that animal husbandry and dairy are being promoted as a powerful medium of green and sustainable growth in the villages. Schemes like Rashtriya Gokul Mission, Gobarhan Yojna, Digitization of dairy sector and universal vaccination of cattle along with steps like banning single-use plastic, are steps in that direction.

Stressing the use of modern technology, the Prime Minister said that India is building the largest database of dairy animals and every animal associated with the dairy sector is being tagged. "We are doing biometric identification of animals. We have named it - Pashu Adhar", he said.

The Prime Minister addressed another major problem that is affecting the income of farmers which is the diseases of animals. "When the animal is sick it affects the life of the farmer, affecting his income. It also affects the efficiency of the animal, the quality of its milk and other related products", he added. The Prime Minister emphasised that in this direction, India is working toward universal vaccination of animals. "We have resolved that by 2025, we will vaccinate 100% of the animals against Foot and Mouth Disease and Brucellosis. We are aiming to be completely free from these diseases by the end of this decade", the Prime Minister remarked.

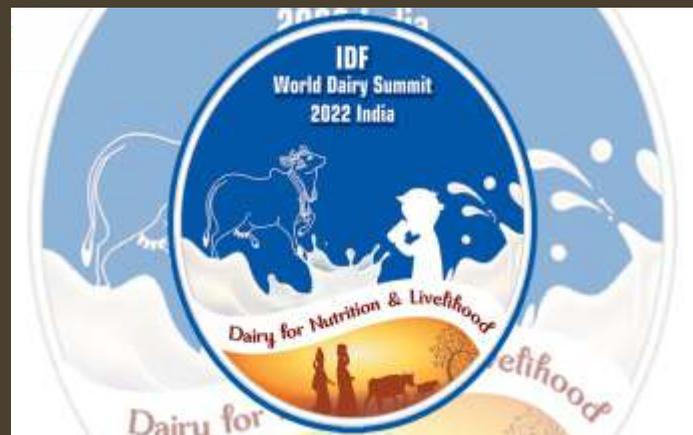
The Prime Minister observed that there has been a loss of livestock in many states of India

due to the disease named Lumpy in the recent past and assured everyone that the central government, along with various state governments, is trying their level best to keep a check on it. "Our scientists have also prepared indigenous vaccine for Lumpy Skin Disease", the Prime Minister added. The Prime Minister also pointed out that efforts are being made to track the movement of animals to keep the outbreak under control. Be it vaccination of animals or any other modern technology, the Prime Minister said that India is always eager to contribute to the field of dairy while striving to learn from its partner nations. "India has acted swiftly on its food safety standards", Shri Modi added.

In concluding the address, the Prime Minister reiterated that India is working on a digital system which will capture the end-to-end activities of the livestock sector. This will provide accurate information needed to improve this sector. This summit will put forward the work that is being done around the world regarding many such technologies. The Prime Minister also urged everyone present to suggest ways to share the expertise related to this field.

"I invite the global leaders of the dairy industry to join the drive to empower the dairy sector in India. I also appreciate the International Dairy Federation for their excellent work and contribution", the Prime Minister concluded.

Chief Minister of Uttar Pradesh, Shri Yogi Adityanath, Union Minister of Fisheries, Animal Husbandry and Dairying, Shri Parshottam Rupala, Union Minister of State for Fisheries, Animal Husbandry and Dairying, Dr L Murugan, Union Minister of State for Agriculture and Food Processing, Shri Sanjeev Kumar Balyan, Members of Parliament, Shri Surendra Singh Nagar and Dr Mahesh Sharma, President of International Dairy Federation, Shri P Brazzale, and Director General of International Dairy Federation, Ms Caroline Emond were among those present on the occasion. 75 lakh farmers got connected with the event through technology.



## Pantnagar University Appoints Dr. Manmohan Singh Chouhan As 28th Vice Chancellor

Govind Ballabh Pant University of Agriculture and Technology has appointed Dr. Manmohan Singh Chouhan, Director of the National Dairy Research Institute in Karnal, Haryana, as vice chancellor.

The appointment letter for Manmohan Chauhan was issued from the Dehradun Raj Bhavan per the directive of Lieutenant General Gurmeet Singh, the Governor of Uttarakhand.

Dr. Chouhan holds membership in the Indian National Academy of Sciences, the National Academy of Agricultural Sciences, the National Academy of Dairy Sciences, and the Society of Extension Education.

Dr. Chauhan, who visited the United States in 1999 and Germany in 2009, received the Rafi Ahmed Kidwai Award from ICAR in 2015, the Dr. P. Bhattacharya Memorial Award in 2020, the Rao Bahadur B Vishwanath Award in 2019, the Real Industrial Award in Agricultural Sciences, the 2015 ICAR-Team Award in Animal Science, the Dr. Benefsetvar Award, the DBT Biotechnology Overseas Fellowship Award, the Exemplary Research Award.

At the same time, he served on the NAAS Academy's Executive Council He has organised two national and two international conferences, including the 12th NAAS Congress at NDRI Karnal.

Dr. Chauhan has created significant and simple techniques for creating test tube babies (invitro embryos) in cows, buffalos, goats, and yaks. He is also credited with creating "Garima 2," the first buffalo calf ever to be cloned.

## October 2022

### 1. World Dairy Expo

**Dates:** October 2 – 7, 2022  
**Venue:** Alliant Energy Center  
**City:** Madison, Wisconsin  
**Country:** United States  
**Website:** [www.worlddairyexpo.com](http://www.worlddairyexpo.com)

### 2. Sommet-elevage, France

**Dates:** October 4 - 7, 2022  
**Venue:** Grande Halle Showgrounds  
**City:** Ferrand  
**Country:** France  
**Website:** [www.sommet-elevage.fr](http://www.sommet-elevage.fr)

### 3. VIETSTOCK 2022

**Dates:** October 12 - 14, 2022  
**Venue:** Saigon Exhibition & Convention Center (SECC)  
**City:** Ho Chi Minh City  
**Country:** Vietnam  
**Website:** [www.vietstock.org](http://www.vietstock.org)

### 4. The Dairy Expo

#### @ The Livestock & Agri Expo

**Dates:** October 28-30, 2022  
**Venue:** India Expo Center & Mart  
**City:** Greater Noida - Delhi  
**Country:** India  
**Email:** [info@thedairyexpo.in](mailto:info@thedairyexpo.in)  
**Website:** [www.thedairyexpo.in](http://www.thedairyexpo.in)

## November 2022

### 1. EuroTier

**Dates:** November 15 - 18, 2022  
**Venue:** Deutsche Messe AG  
**City:** Hannover  
**Country:** Germany  
**Website:** [www.eurotier.com](http://www.eurotier.com)

## December 2022

### 1. Agri Livestock 2022

**Dates:** December 2 - 4, 2022  
**Venue:** Myanmar Expo Hall  
**City:** Yangon  
**Country:** Myanmar  
**Website:** [www.agrilivestock.net](http://www.agrilivestock.net)

## Aavin releases 10 new dairy products and projects an increase in revenue of Rs. 24 crore annually.



SM Nasar, Minister of Milk and Dairy Development, launched ten new milk products on Friday, including Aavin jackfruit ice cream, white chocolate, cold coffee, butter chipleets, basundi, health mix, processed cheese, baked yoghurt, milk biscuit, and butter murukku. Aavin expects to generate Rs 24 crore in annual revenue from these ten products alone. Aavin now has 225 milk products thanks to the additions.

According to the minister, Aavin products have been sold in other states as well as in foreign countries. Milk producers' livelihood resources would be improved by increasing the sale of milk products. These milk products contain no chemical additives and are thus safe to consume.

He also stated that sales of Aavin milk have increased by 50,000 litres per day as a result of price increases for Amul milk and certain private milk producers.

When asked about the proposal to allow advertisements in Aavin milk sachets, the minister stated, "Approximately 65 lakh packets reach homes across Tamil Nadu every day." As a result, the advertisements on the sachets would be seen by approximately two crore people on average. Advertisements for cinemas, serials, jewellery stores, and other businesses are being discussed.

An announcement in this regard would be made soon after regulating the cost of advertisements." The minister stated that Chief Minister MK Stalin would decide on raising the procurement price for milk very soon.

## Loopworm, an insect farming startup in India, receives \$3.4 million in seed funding



Indian agrifood VC Omnivore and WaterBridge Ventures jointly led the \$3.4 million seed funding round for the Indian insect biotech startup Loopworm. The first technology startup in India, Loopworm, is raising insects for use as animal feed.

Titan Capital and leading angel investors, including Godrej Agrovet chairman, Nadir Godrej, former R&D and sustainability group head at Indian conglomerate ITC, Sanjiv Rangrass, and Akshay Singhal, founder, and CEO of Log9 Materials, also participated in the round.

From waste to protein and micronutrient-rich animal feed Loopworm grows insects on food waste and processes them into value-added products for the animal feed industry. The company sources this food waste — which it likes to call "organic byproduct"— from food processors, retail food chains, and fruit markets. Through biochemistry and fermentation, it's processed to make it suitable for insects to breed. Currently, the black soldier fly. The insects are then processed into final feed for shrimp and poultry.

When co-founders Ankit Alok Bagaria and Abhi Gawri met at Enactus, a non-profit organisation that promotes social

entrepreneurship among university students, the concept for Loopworm was born. They both wanted to start a social enterprise and solve India's food waste problem, which, according to Bagaria, was critical given the country's growing population.

## Fonterra is making its first foray into non-dairy products



Fonterra has made its first foray into non-dairy products by investing in a start-up company that uses precision fermentation to develop non-dairy proteins.

Precision fermentation, which is similar to beer brewing, uses microbial cells to grow proteins, fats, enzymes, or vitamins.

The process required only energy, water, microbes, a feedstock such as sugar, and a controlled environment to produce nature-identical food ingredients.

Precision fermentation technology had been around for decades. The process is used to produce insulin, vanilla extract, and rennet (a product used in cheesemaking).

Fonterra stated that it has been working with DSM, a global nutrition and bioscience company, since 2019 to accelerate the production of proteins with dairy-like properties through precision fermentation.

Benny stated that the million dollar question was what would happen to milk prices and farmers if whole milk powder could be replaced by precision fermentation products.

"People are still investing in farms and farm-related businesses that will not pay off in the next seven to ten years." All of the signals we're getting from industry players and the government indicate that milk is selling well and that dairy farmers are helping the economy. If the

milk powder fails, the economy will suffer, according to Benny.

## ADM and New Culture collaborate on alternative dairy products

ADM and New Culture, an animal-free dairy company, have formed a strategic partnership to commercialise alternative dairy products.

The two companies will share ingredients and development methodology under the terms of the agreement, with ADM providing New Culture with product development resources and capabilities, as well as a suite of sustainable ingredients, to help bring new alternative dairy products to market quickly. The commercialization of New Culture's animal-free casein is also on the table.

New Culture's animal-free mozzarella will be the initial focus for accelerating commercialisation, with pizzerias in the United States set to open in 2023. ADM's production capacity for both fermentation and dairy operations will be made available as the commercial footprint expands to meet demand for its stretchy cheese.

"After tasting New Culture's delicious animal-free mozzarella, we recognised that the company had the potential to play a central role in bringing great-tasting, breakthrough products to the dairy aisle, and we're excited to bring our global precision fermentation and manufacturing expertise, as well as our extensive consumer product application capabilities to this effort," said Ian Pinner, ADM's senior vice president, Strategy and Innovation. We are excited to collaborate with New Culture to meet the rapidly growing consumer interest in alternative dairy and cheese."

## Avivagen Announces New Dairy Customer in Mexico

Avivagen Inc., a life sciences corporation focused on developing and commercialising products for livestock,

# Avivagen

companion animal, and human applications that safely improve feed intake and immune function, thereby supporting overall health and performance, is pleased to announce a promising new customer in the Mexican dairy industry.

"This new agreement represents the continued expansion of OxC-beta™ use within the dairy industry, a key growth market for Avivagen due to its size and positive economics," said Kym Anthony, Chief Executive Officer, Avivagen Inc. We are excited about the potential for this country's first dairy order to lead to others in this vital industry."

OxC-beta™ Livestock is a proprietary product that has been shown to be an effective and cost-effective alternative to antibiotics commonly used in livestock feed. Currently, the product is available for purchase in the United States, Philippines, Mexico, Taiwan, New Zealand, Thailand, Brazil, Australia, Vietnam, and Malaysia.

Avivagen's OxC-beta™ Livestock product is safe and effective, and it has the potential to meet the global mandate to eliminate all in-feed antibiotics used as growth promoters. Numerous international livestock trials with poultry and swine using OxC-beta™ Livestock have demonstrated that the product performs as well as, and sometimes better than, in-feed antibiotics in some aspects.

## Nestlé enters the animal-free dairy market with milk-like products

Nestlé has announced that it is exploring emerging technologies for the development of dairy protein-based products that are not derived from animals. This move adds to the company's previous investments in plant-based meat and dairy alternative offerings to meet the growing consumer demand for nutritious, more environmentally friendly diets that also taste great.



Nestlé will pilot a novel product through the company's newly established U.S. R+D Accelerator, bringing it to the U.S. market later this year as a test-and-learn. The product is made with animal-free protein from Perfect Day. According to Perfect Day, the protein, made through precision fermentation, is identical to the whey protein found in cow's milk, offers good nutritional and functionality benefits that is suitable for vegans and is lactose-free.

The product was developed by Nestlé R&D teams in Switzerland. With expertise in both great-tasting nutritious dairy and plant-based dairy alternatives, Nestlé is well-equipped to deliver a relevant consumer solution in this emerging space in collaboration with start-ups and other external partners.

Heike Steiling, Head of Nestlé's Development Center for dairy products: "As the world's largest food and beverage company, delivering foods and beverages that are good for people and the planet is a priority. We are exploring emerging technologies that can lead to animal-friendly alternatives that are nutritious and sustainable, without compromising on taste, flavor, and texture. Bringing together our unmatched R&D expertise, innovation capabilities and scale, we are working to develop and test novel animal-free dairy protein-based products to complement our wide-ranging portfolio of plant-based alternatives."

## Nutropy secures €2M to make animal-free premium cheese sustainably

Nutropy, a startup based in Paris that aims to make dairy products sustainably, has raised €2M in a pre-seed round that

was co-founded by Trellis Road, Big Idea Ventures, and Beast. It is one of the greentech startups that are solving environmental problems with their sustainable solutions.

Other investors included the French government, VegCapital, FoodHack, Techmind, and a few foreign business angels with backgrounds in technology, food technology, and agriculture.

Within the next 24 months, the French company will use the cash to begin its first commercial manufacturing of premium cheese without the usage of animals.

Nutropy, a company co-founded by Dr. Maya Bendifallah and Nathalie Rolland, has created a brand-new technique that imparts the texture and creaminess that consumers love in cheese to goods made without using any animal products.

"As cheese lovers, we know the importance of cheese in our gastronomic culture and want to offer consumers a wide range of cheeses free of lactose and dietary cholesterol that are produced in an environmentally friendly and sustainable manner", says Nathalie Rolland, CEO of Nutropy.

## Akshayakalpa, an organic dairy company, raises \$15 million to expand across India

Akshayakalpa Organic, India's first certified organic dairy enterprise, has raised \$15 million in Series B funding from both existing and new investors.

British International Investment (BII), the UK's development finance institution, Rainmatter Foundation, and its existing investor Venture Dairy have joined the Series B financing. The funding would support Akshayakalpa's efforts to promote and grow sustainable and regenerative farming while also providing premium organic milk to its customers.

Akshayakalpa intends to invest in the markets of Bengaluru, Chennai, and Hyderabad, as well as expand into new geographies of Pune, Mumbai, and



Kochi. It intends to distribute organic dairy products across the country.

Akshayakalpa stated that it will be able to give its farmer entrepreneurship initiatives a boost. Akshayakalpa Organic, founded by Dr. GNS Reddy and Shashi Kumar, is one of the country's largest organic milk producers. It has grown significantly in the last five years, with a compound annual growth rate (CAGR) of 60%.

"In recent years, consumers have become more conscious about living healthier lifestyles," said Shashi Kumar, co-founder and CEO of Akshayakalpa Organic. "We will continue to serve more customers while deepening our efforts to create sustainable farming systems."

Over 750 farmer families are served by the firm. It delivers organic milk and milk products to more than 60,000 customers per day in Bengaluru, Hyderabad, and Chennai via its direct delivery platform. Its products are available in over 2,000 retail locations and on all major e-commerce and quick commerce platforms.

## Govt. reform initiatives seek to maximise the

## potential of the dairy sector

Srinagar: The J&K Government is putting reformative measures into place to usher in a new era of the White Revolution throughout Jammu and Kashmir, in addition to improving opportunities for farmers and those working in the dairy industry.

By implementing various developmental programmes, initiatives, policies, and other measures with the aim of doubling farmers' income from dairying, the administration is diligently working to ensure that dairy development in the union territory is given the highest priority.

The integrated dairy development scheme (IDDS) is a significant programme that supports dairy producers by giving them a milking machine, a bulk milk cooling unit with a 50% subsidy, as well as other advantages.

The programme also offers aspiring business owners who want to launch start-ups in the dairy industry equipment for making paneer, khoya, dahi, cream separators, ice cream makers, butter and ghee, milk vans, milk ATMs, and DG sets.

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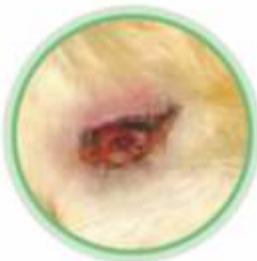
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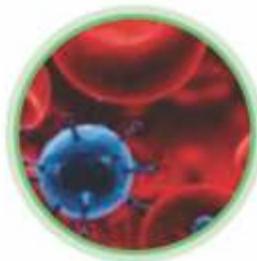
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# Editorial Calendar 2022

Publishing Month: <b>January</b> Article Deadline : <b>30<sup>th</sup>, Dec. 2021</b> Advertising Deadline : <b>3<sup>rd</sup>, Jan. 2022</b> Focus : <b>Disease Prevention</b>	Publishing Month: <b>February</b> Article Deadline : <b>30<sup>th</sup>, Jan. 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, Feb. 2022</b> Focus : <b>Herd Management</b>	Publishing Month: <b>March</b> Article Deadline : <b>28<sup>th</sup>, Feb. 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, March 2022</b> Focus : <b>Heat Stress</b>	Publishing Month: <b>April</b> Article Deadline : <b>30<sup>th</sup>, March 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, April 2022</b> Focus : <b>Cold Chain Mgmt.</b>
Publishing Month: <b>May</b> Article Deadline : <b>30<sup>th</sup>, April 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, May 2022</b> Focus : <b>Nutrition</b>	Publishing Month: <b>June</b> Article Deadline : <b>30<sup>th</sup>, May 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, June 2022</b> Focus : <b>Environmental Control</b>	Publishing Month: <b>July</b> Article Deadline : <b>30<sup>th</sup>, June 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, July 2022</b> Focus : <b>Calf &amp; Heifer Mgmt.</b>	Publishing Month: <b>August</b> Article Deadline : <b>30<sup>th</sup>, July 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, August 2022</b> Focus : <b>Processing</b>
Publishing Month: <b>September</b> Article Deadline : <b>30<sup>th</sup>, August 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, September 2022</b> Focus : <b>Milking Practices</b>	Publishing Month: <b>October</b> Article Deadline : <b>30<sup>th</sup>, September 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, October 2022</b> Focus : <b>Feed &amp; Fodder</b>	Publishing Month: <b>November</b> Article Deadline : <b>30<sup>th</sup>, October 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, November 2022</b> Focus : <b>Winter Management</b>	Publishing Month: <b>December</b> Article Deadline : <b>30<sup>th</sup>, November 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, December 2022</b> Focus : <b>Methane Emission</b>

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## Quarantine centres to be set up in 24 districts to treat cattle affected by Lumpy Skin Disease



The Maharashtra government is proposing to establish quarantine centres in the affected districts to treat the affected cattle, along the lines of COVID-19 quarantine centres, which were started to treat the virus-affected people, in response to the outbreak of Lumpy Skin Disease (LSD) in cattle in 682 villages of 24 districts. Chief Minister Eknath Shinde made the declaration on Saturday after raising the flag in celebration of Marathwada Muktisangram Din in Aurangabad. Vinod Patil, president of the RR Patil Foundation, made the demand to the Chief Minister during their meeting.

Following the pandemic's spread, "COVID-19 treatment centres were established for the general public. Quarantine facilities will consequently be established to care for the LSD-affected animals. To stop the LSD from spreading further, the government has made a number of decisions, according to Shinde.

The government, according to CM, is putting various measures in place to stop the spread of LSD, and a vaccination campaign has been started to stop the disease's rising incidence. Lumpy's infection is currently seen to be moving from one state to another. The department of animal husbandry and dairy development has been urged to increase efforts and take the necessary actions to combat the LSD, he continued.

In order to start the quarantine centres at the Zilla Parishad group level in the 24 districts affected by LSD, the department of animal husbandry and dairy development will coordinate with the district collectors, according to an officer from that department. Such centres will eventually be operational, he continued.

The department has asked all farmers to

notify local government veterinary clinics or livestock development officers about any LSD symptoms in order to receive free treatment for their afflicted cattle at their doorstep.

## At the World Dairy Summit, women-led dairy companies launch value-added products



Women-centric milk producer companies (MPCs) launched their products in the presence of global majors at the International Dairy Federation (IDF World)'s Dairy Summit 2022 on Wednesday.

The launch was in response to Prime Minister Narendra Modi's appeal to provide a global platform for women involved in cooperative dairies.

Over the next five years, MPCs owned by farmers are expected to triple their milk procurement to more than 18,000 crore from the current 5,575 crore.

Six MPCs, including Tirupati-based (Andhra Pradesh) Shreeja, Gujarat-based Maahi, Rajasthan's Paayas, Sakhi, and Asha, and Balinee from Bundelkhand in Madhya Pradesh, used the IDF platform to launch a half-dozen products in the presence of a galaxy of dairy majors.

In his inaugural address, the Prime Minister stated that women in leadership made up 70% of the workforce in the dairy industry and about one-third in cooperatives.

He referred to them as the driving force behind the 8.5-lakh crore Indian dairy trade and urged dairy leaders around the world to

"recognise women's contribution in dairying and give them access to global platforms."

Approximately 7.5 lakh dairy farmers have formed 20 producer companies. The recent introduction of value-added products by a few of them is viewed as an attempt to enter the organised dairy house, which is dominated by established State-level and national manufacturers.

The four MPCs - Shreeja, Asha, Sakhi, and Balinee - which are entirely run by women, launched four distinct brands of ghee, as well as curd and paneer.

Gujarat's Maahi introduced the Gir Amrut ghee model. The MPC currently operates in ten districts of Gujarat, with over one lakh

milk pourers as members. It processes approximately 7 lakh litres of milk per day.

Shreeja introduced cow ghee and mango yoghurt. Ghee was also introduced by the MPCs Sakhi and Balinee, and Asha added paneer and curd to its already extensive product portfolio.

The National Dairy Development Board (NDDB), through its wholly-owned subsidiary NDDB Dairy Services (NDS), has facilitated the establishment of 20 MPCs over the last ten years. 18 of these are operational, with a daily milk supply of 40 lakh litres. Meenesh Shah, Chairman of the National Dairy Development Board (NDDB), predicted that milk procurement by such MPCs would triple to more than 18,000 crores from the current 5,575 crores. Every day volumes would exceed 100 lakh litres.

He stated that NDDB, through its subsidiary NDDB Dairy Services, will assist additional such organisations.

Since the inception of the primary farmer's group, farmer members have been paid Rs. 27,500 crore until the end of the fiscal year (2021-2022) for the milk they have poured into their respective group.



# LUMPY SKIN DISEASE (LSD)

A CRITICAL PROBLEM IN DAIRY ANIMALS



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- Provides relief in stress



**RUCHAMAX**  
APPETITE STIMULANT AND DIGESTIVE TONIC

- Increases Appetite
- Maintains Rumen microflora
- Improves Milk Production after treatment





**THE DIGESTIVE SYSTEM IS DIRECTLY LINKED**



**TO THE HEALTH OF YOUR OPERATION**

Helping a calf meet its growth potential begins before birth. Novus researchers found that cows fed unique bis-chelated organic trace minerals containing methionine hydroxy analogue HMTBa during pregnancy produced calves with more muscle and stronger muscle fibers. This practice of maternal feeding—providing the right nutrients at the right time—can result in better performance from birth and beyond.

**MINTREX**<sup>®</sup>  
BIS-CHELATED TRACE MINERALS

Learn more about the solutions Novus is developing for your farm at [novusint.com](https://novusint.com)

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